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Tier 1 countries: First litmus test for the potential of N2Africa

Under most circumstances, 'Tier 1' refers to the most important or the highest priority. In the N2Africa project, Tier 1 countries are those countries in which we started the project in 2009. During the second phase of the project these countries are no longer priority countries, as the project focuses on five 'Core Countries'. Nevertheless, the 'Tier 1' countries are still very important and critical to the project, since they provide the first litmus test for the potential of N2Africa technologies and approaches to continue living and delivering their livelihood impacts without direct donor support.

N2Africa was designed to ensure that the benefits of grain legumes are impacting positively on rural livelihoods and their production environment. After all, grain legumes have multiple potential benefits – so why not investing in delivering on their potential? The initial set of countries (Ghana, Nigeria, DR Congo, Rwanda, Kenya, Malawi, and Zimbabwe) covered a critical range of agro-ecologies with varying farming systems and priority legumes, providing an excellent framework for evaluating the diversity of legumes and their benefits. Research activities in relation to legume agronomy, cropping system design and rhizobiology were developed. This generated interest for the first generation of dissemination partners. Partnerships were not only talked about, but also facilitated – a new and diverse set of experiences for the project team – resulting in the target number of households reached as per the approved results framework. For the second phase, funding levels for Tier 1 countries were substantially reduced, while outcome goals remained ambitious. This required a change of strategy in terms of engaging development partners and reframing N2Africa as a primary contact for information and knowledge on legume intensification.

Even with the reduced funding, the project targets for the Tier 1 countries were reached, providing the necessary evidence that legume research and scaling processes generated and fostered by N2Africa can have a life 'on their own'. While the upcoming impact studies will provide the necessary proof, the Tier 1 countries have lived up to their expectations and will hopefully lead the way for the Core countries.

Bernard Vanlauwe, R4D Director, IITA

Highlights from N2Africa in Rwanda

Introduction

Rwanda was among the first countries where N2Africa activities started, early at the beginning of the project. Already in February 2010, the first hundred farmers were testing the soyabean technology called "need to inoculate". Each farmer was hosting four plots, with two plots inoculated and two plots not inoculated. The results confirmed the need to inoculate soyabean. From then, N2Africa dissemination packages of soyabean included inoculants.
At the end of Phase I, more than 20,000 households from five districts of Rwanda had been reached with direct dissemination packages of legumes technologies, precisely soyabean and common bean.

Picture 1. Participatory evaluation of technologies

Experience

The implementation of activities were based on partnerships with national and local partners at district level (considered as mandate area inside which action sites were selected). The strategy of disseminating technologies through individual packages of seeds, inoculants and mineral fertilizer given to each direct beneficiary under the supervision of a master farmer for ten to fifteen beneficiaries, gave good results in terms of reaching large numbers of farmers in a short period. At the same time, the demonstration plots, installed in parallel to dissemination packages, conveyed a message of awareness in the community.

Working through partners turned out to be challenging, because participating partners also had their own priorities. This sometimes created conflicting situations leading to delays in reporting. The need for a good strategy with accurate tools for M&E became inevitable. However, the good point working through partners is sustainability and continuity of interventions with less resources.

Technologies tested and disseminated

In Rwanda, technologies tested and disseminated included

new varieties of soyabean, varieties of bush and climbing bean for biological nitrogen fixation (BNF), staking climbing bean using strings and the introduction of Purdue improved crop storage (PICS) bags for grain conservation (bean, maize and sorghum). Staking beans with strings in comparison with ordinary woods was promoted, as it showed several benefits: strings being more environmental friendly with less depletion of natural resources (wood), less expensive and higher grain yield.

The PICS bag is a triple layer hermetic bag developed by Purdue University. The technology was originally developed for cowpea storage and tested in West and Central Africa. The bags are also effective for controlling pests of other grains. The advantage of PICS bags include:
1. No pesticide is needed to store the grain;
2. The grain can be stored for up to one year;
3. The bag can be reused for up to 4 years.

Under the N2Africa context of linking farmers to markets, a study was initiated to assess the efficacy of PICS bags in Rwanda. The pilot activities were conducted in three districts where pest infestations on grain in storage are usually high, due to favorable climatic conditions and hence reducing market opportunities for farmers, particularly for common bean and maize grain. A local manufacturer of the PICS bags was initiated using the sample bag brought by N2Africa. Today, the technology is spread in the country through local agro-dealers who also sell other agriculture inputs and tools. From this experience, Minagri started a program on post-harvest using the PICS bags. One Acre Fund also extended the promotion of PICS bags in other districts of the country.

Local capacity building and strengthening

- Formal education: one PhD student (Mr Edouard Rurangwa) , two MSc students completed (Mr Alfred Tabaro Rumongi and Mr Domitille Mukankubana);
- Short courses for technical staff of partnering institutions: two technicians from RAB trained in rhizobiology and local facilitators on BNF technologies;
- Training of Trainers (lead farmers) who trained other farmers.

Success stories from partner farmers who worked with N2Africa since 2010

1. Seed production in Kayonza with Kundumurimo of Rukara sector

At the end of Phase I, a group of farmers, now a cooperative called Kundumurimo, started specializing in seed production for soyabean and bush bean. Nowadays, the cooperative sells seed at community level. The cooperative was trained by N2Africa to become a certified seed grower, registered by RAB. The seeds are produced on a piece of land of 40 ha in a swamp. This swamp provides irrigation possibilities and offers an opportunity to grow seed even off season. The cooperative produces certified soyabean seed and sells them to the Clinton Development Initiative.

Picture 2. Seed production Kundumurimo District

2. Soyabean processing business with Claudine in Bugesera

After a Training of Trainers organized in November 2011 for women from all action sites, Mukakayonde Claudine, from Mareba action site of Bugesera district, decided to start a business around soyabean processing. She started processing 250 grams of grain per day. Today she processes 2 kg daily, producing 12 liter of milk and the cake used for soya balls. Her daily net profit from the sales of milk and soya balls is 10,000 FRW (approximately $13).

3. High yielding climbing bean varieties changed the life of farmers in Musanze, Burera and Gakenke Districts

Picture 3. Staking climbing bean in Burera District

Mr Mbonigaba Focas, Burera District, sector Nemba, village Kagesera

Mr Mbonigaba Focas started working with N2Africa in 2010. He joined the training on legume cultivation using a demonstration plot with different varieties of climbing bean. The importance of legumes and how to improve the agronomic techniques were studied. “Initially we used to grow beans as a local mixture. I was given a bean seed package (Gasilida) of 500 grams and DAP fertilizer. I planted the bean seeds and harvested 24 kg of beans, which I replanted on a larger plot. The harvested beans were sold and used for home consumption. The increased bean production helped to do other things. For example, I borrowed a field from a neighbor to increase the production and sales of beans. The following season, I was able to buy that plot of 0.7 ha. I continued to grow this improved bean variety and built a new house with 30 iron sheets. Furthermore, I bought a cow of 150,000 FRW. That season, I had harvested and sold 2 tons of beans and earned 600,000 FRW.”

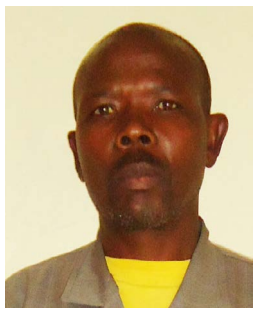
“In 2012, N2Africa gave me other bean varieties, which contain a high content of iron and zinc. Nowadays, I am capable to pay the medical insurance of my family and primary and secondary school fees for my five children. Recently, I also bought a plot of forest of 400,000 FRW from the sales of beans. I have become popular and referee for bean seeds in the district,” said Mr. Mbonigaba.

“When I evaluate the past five years in which I have been working with N2Africa, I can see a lot of progress. In this region, bean is not only a food crop, but also a cash crop by excellence, because it is consumed on daily basis and has market. Besides increasing my bean production, I was also a lead farmer to assist other farmers. I was trained in legumes management practices, such as appropriate seed rates and investment and benefits calculations. I participated in several study tours organized by the project. This has built my self-confidence and I have gained consideration in the community and the district at large. I feel more considered in my society and I was selected to be contact farmer by local authorities to assist other farmers in my sector. I was trained by the Ministry of Agriculture and got a certificate. In November 2012, I was part of group of farmers who went on study tour to Western Kenya. From that visit, I gained a lot of knowledge in terms of how to join cooperatives and work with others to bulk the production for marketing. This helped me a lot as a lead farmer to assist farmers I was in charge of. On the way back, we managed to form a group, which is a member of a cooperative at the sector level. The cooperative plays a big role in advocacy and marketing of our production.”

Picture 4. Mr Mbonigaba Focas (right) in his fiield

Mr Ndagijimana Daniel, Burera District, sector Kinoni, village Buharo

In 2011, I started working with N2Africa. I received 15 kg bean seed as a seed grower and harvested 550 kg of beans. I sold 400 kg sorted seed at 600 FRW kg^{-1} and kept 150 kg for home consumption and seed for my neighbours, relatives and myself. The second season, there was a crop failure, due to heavy rains. I only harvested 400 kg and sold 300 kg at 600 FRW kg^{-1}. The following season, I grew a different variety and harvested 600 kg, sold 500 kg at 600 FRW kg^{-1} as seed through Developpement Rural Durable (DRD) contract. Last season, I harvested 600 kg and now I will sell 500 kg and keep 100 kg for home consumption. Today, I also grow another variety from N2Africa, Gasilida. The variety is well liked at the local market and its grain are sold for 400 FRW kg^{-1}. Through growing beans, I managed to pay secondary school fees for my two kids. I have connected my house to electric power and piped water. Furthermore, I have set a small business rearing egg layers, I keep 100 chickens for eggs.”



Picture 5. Mr Ndagijimana Daniel

“Before working with N2Africa, I harvested 200 kg of beans in the same plot where I nowadays harvest 600 kg. The yield increased because of planting in row and applying organic manure with mineral fertilizer. The normal grain is sold at 300 FRW kg^{-1} and the improved variety is sold at 400 FRW kg^{-1} as grain. However, as a seed grower I sell it at 600 FRW kg^{-1}. I gained knowledge on how to use improved inputs, growing for markets, and how to increase yield on a small plot. I also learned on how to process the harvest and add value through sorting and packaging the production. Since the land size is small and cannot change, I would like to invest in off farm activities, such as layer hens.”

Mrs Nyiramanza Esperance, Musanze District, sector Rwaza, village Mutara

“I started working with N2africa in February 2010. We started as a group of eleven farmers. Nowadays the groups consists of seven women. We started with an agronomic trial of climbing bean varieties. We harvested 96 kg of Gasilida bean. The following season we harvested 370 kg of Gasilida and RWV1348. We sold the harvested beans, and with some savings the group had, we bought two cows. Today, all seven women own a cow, from the two bought initially in 2012. In 2012, we started multiplying seeds for the three bio fortified varieties. After harvesting, we sold the produced beans. Each member of the group produced also at her own farm and contributed 2 kg for saving in the group. Now, the group has 300,000 FRW on their account.”

“Through N2Africa, I learned and got knowledge on modern agriculture practices. I also learned how to manage my farm. I have developed myself, before I was an illiterate person, now I am more confident. The nutrition status of my family has improved, because I can buy other food stuffs such as oil, to prepare food. I pay school fees of my sons in private schools. In 2011, I planted 5 kg of Gasilida and harvested 180 kg, I sold 150 kg and gave 20 kg to the group, and kept 8 kg for seed for the following season. In 2012, I harvested 157 kg of Gasilida and 110 kg RWV1129, and sold the harvested beans and kept 8 kg.”

“Before working with N2Africa, I used to harvest maximum 80 kg on those plots, using a local bean mixture. The production increased, because I plant in rows with the accurate seed rate and use new varieties, manure and fertilizer. My children could not attend high school if I had not joined N2Africa. My house had been looted by rebels, who destroyed it. Now I managed to repair my house and buy household items.”

Mrs Nyirabanzi Immaculee, Musanze District, sector Muko, village Nyagahondo

"In September 2011 I started working with N2Africa. I started with seed multiplication of Gasilida with 6 kg and harvested 180 kg. I sold 150 kg at 600 FRW kg^{-1} and kept 30 kg for seed and home consumption. The following season in 2012B, I planted Gasilida again (12 kg), harvested 395 kg and sold most of it. From that time, I started to be able to pay secondary school fees for my three children."

Picture 6. Mrs Nyirabanzi Immaculee

"Before joining N2Africa, the bean production was low and it was difficult for me to pay the school fees. I used to struggle selling fermented sorghum to be able to survive with my children.

We grow beans twice a year. In September 2012, I multiplied 7 kg of RWV1129 and harvested 250 kg. I also harvested 200 kg of Gasilida, from 10 kg planted. The yield of RWV1129 was so good that farmers in the neighbourhood asked to get seed of that variety. I sold them at 700 FRW kg^{-1}. In total, I sold 240 kg and kept 10 kg for my own seed. Now, I harvest 700 kg to 800 kg in season B, from 28 kg of seed."

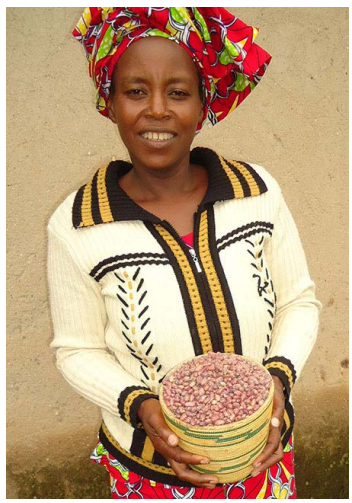
"Before joining N2Africa, I used to plant like 80 kg of beans and harvested 300 kg. Now, I can see the difference in seed rate and yield. Through practical training in planting in rows, I reduced the seed rate. Furthermore, I use staking. I learned that also even men can weed the crop. Through the use of organic and mineral fertilizer, the yield has increased. Applying organic manure in planting rows instead of just broadcasting has also increased the yield."

"When I look back, I have improved my livelihood. I have improved my house roofing, cement, iron doors and windows, all from the sales of bean. It is easy for me to pay school fees for my kids without struggle. I have bought a pig in 2012 from the sales of beans. Today, I have four pigs and regularly sell young ones. My vision is to buy a milking cow, for milk and organic manure. I was trained on seed production technology by N2Africa, now I want to register and become a certified seed grower."

"I am very respected in my community, everybody sees me as a technician in agriculture. When I started planting in row, my neighbours were laughing at me. Now, they come to seek technical advice from me. I am a respected woman in the community. Others who learnt from me, have improved the yield. My husband shows more respect, since I don't beg money from him, and contribute to the welfare of the family. The sector agronomist brings visitors to my farm to see a modern farmer. I really feel proud. Because of my modern way of growing beans in row, other projects also invited me to attend trainings and become a trainer for other farmers on other crops, such as Irish potato and tomato."

Mrs Nyirandama Marie, Kamonyi District, sector Musambira, village Rubanga

"I started working with N2Africa in February 2010 with a demonstration plot of beans and cassava. I started using mineral fertilizer and improved seeds. I became a lead farmer helping other farmers beneficiaries of N2Africa on new technologies. I planted 1.8 kg of bean and harvested 32 kg and sold 10 kg to COCOF to disseminate to other farmers. Five kg was sold to my neighbours. I planted 15 kg using modern techniques, and harvested 250 kg in 2011A. I sold 80 kg to COCOF to disseminate to other farmers, at the price of 500 FRW kg^{-1}. I became popular in the neighbourhood, because of the new variety of bean, RWR2245. Everybody was looking for this new variety and I continued to grow this bean. We grow it during three seasons per year, on average we harvested each season 200 kg, sometimes 300 kg per season. Per year, we have around 600 kg of bean harvested. We keep around 100 kg for home consumption. On average, we sell at 450 FRW kg^{-1}, now it is 500 FRW kg^{-1}. It is a superior variety in terms of cooking time, taste and colour. We have a good market for RWR2245, as seed and also as grain."



Picture 7. Mrs Nyirandama Marie

"I also received a package of soyabean, which I continued to grow and harvested on average 100 kg per year. This year, I harvested 80 kg. The package of bean was with cassava, and we harvested a lot. We sold fresh roots to a secondary school nearby. From the sales of cassava, bean and soyabean. Last year, we built a new house. From the sales of beans, we also grow vegetables, which also generate income to the household."

"As a lead farmer, I became popular in the area. I learnt to use mineral fertilizer, I cannot grow crops now without using mineral fertilizer. Every season average, I buy 100 kg of DAP and urea."

Mr Ntungiyehe Xavier, Kamonyi District, sector Musambira, village Gihembe

"I started working with N2Africa in 2011B season when I received a dissemination package of soyabean, maize and fertilizer. I planted and was given instruction on how to use the package of 300 grams of soyabean (SB24). I harvested 15 kg of soyabean. COCOF bought 10 kg to disseminate to other farmers. I kept 5 kg, which I planted again, during that season I was also trained as a lead farmer to help other farmers. I assisted 8 farmers. The following season, I assisted 20 new farmers beneficiaries of the project. From the 5 kg planted, I harvested 260 kg and sold the production at 450 FRW kg^{-1} to COCOF and other farmers as seed. Farmers liked the variety so much, they always asked for seed. Last year, I planted Squire, which is more productive than SB24. I harvested 380 kg, I sold and saved 150,000 FRW on my account at SACCO. This year, I bought a plot for farming 35m x 28m. This year, I harvested 150 kg, sold 100 kg at 600 FRW kg^{-1} and kept 50 kg for home consumption and seed. We consume soyabean at home roasted for sauce and porridge."

"Before joining N2Africa, I did not grow soyabean. However, I saw how much money I could earn from the soyabean production. So I reduced the area planted in bean to be replaced by soyabean. Soyabean has a better yield compared to bean. I argued with my wife to replace bean by soyabean and at the end I convinced her. And we moved from bean to soyabean, as a cash crop."

Mr Habyarimana Leonce, Kamonyi District, sector Musambira, village Bitsibo

"I started working with N2Africa at the beginning in 2011. We received a training of lead farmers. The training helped me to improve the soyabean production, planting in rows using inoculants and other inputs and harvesting plants without pulling. Before N2africa, I used to harvest 40 kg per season. After the training, I applied the knowledge acquired and I started to harvest 200 kg to 300 kg per season. I have 20 ares. The average yield of that plot is about 300 kg. I sell the production at 500 FRW kg^{-1} to RAB as a seed grower. After selling I save my money in SACCO, EJO HEZA. From SACCO, I got a loan and built a commercial house in center of Nkomane. I got a credit of Mobisol and started a business as hairdresser. The loan was 250,000 FRW. COCOF gave me a guarantee, because I worked with them. I got a credit of Mobisol of 1 million FRW. I also rent land to grow more crops. From the Mobisol loan, I pay 27,000 FRW $month^{-1}$, which I get from the sales of my agriculture production.

Beyond N2Africa

The following stories narrate t wo cases where farmers who worked with N2Africa got ideas on how to ensure continuity of interventions.

1. A legume platform was born from the former lead farmers in Kamonyi District. The group is called Karibanya with the mandate to promote legumes cultivation and marketing. This platform also provides technical knowledge on legume crops (soyabean and bean) to other farmers who seek advice from them. The platform has 40 members.

Picture 8. Legume platform members Kamonyi District

2. The second case of initiative born from N2africa, is Mr Gashirabake Celestin, from Musenyi action site of Bugesera. He was a lead farmer in Phase I, and he is now running an One Stop Shop, where he sells agriculture inputs and seeds. In addition, he provides technical advice to farmers who buy from his shop. To support farmers he has written technical messages to distribute. In the last 2 years, he was selling around 2 tonnes of soyabean seed and bean, and 1 ton of mineral fertilizer per agricultural cropping season. Now, he became an official agro-dealer, receiving large quantities of fertilizers to sell to all farmers in his village under the scheme of crop intensification program of the Government on priority crops, with subsidized prices. Beans and soyabean are part of the priority crops.

There are three more One Stop Shops run by other cooperatives in the former N2Africa action sites. In these shops, farmers can get technical messages and buy legume seeds, other inputs and fertilizers.

To conclude

N2Africa in Rwanda was very successful with BNF technologies increasing legume productivity and the level of technology adoption was strong. There are a number of local initiatives who took over from the formal technology dissemination process and contribute to ensure continuity of N2Africa interventions in Rwanda.

Kantengwa Speciose, Country Coordinator Rwanda

Plant legumes heal the soil in Malawi

Almost all crop types in Malawi suffered in what is seen as one of the worst crop performances of the last 13 years. Aftermaths of El Niño have left a good part of Malawian farmers more destitute, impoverished and worried. Despite the hard times in this planting season, those farmers who planted legume crops have some refuge and have stories to share.

Due to seasonal fluctuations in weather conditions, harvest in the 2015-2016 season slumped, thereby causing hunger to over 8,8 million people in Malawi. The state of affairs sends signs of dismay to tobacco farming. "After years and years of tobacco farming, the change to my life is not worthy pointing at. I have roofed my house with iron sheet, just after selling my soyabean in my three years of soyabean farming. Tobacco farming was too involving and required a lot of money to sustain it", explained Mr Harrison Kazembe, a farmer from Linthipe (EPA) in Dedza.

There has been a wide perception among farmers that soyabean requires no fertilizer. Of late, scientists have confirmed the introduction of inoculant to crops, particularly legumes, to boost and increase yield. Mr Kazembe is one of the farmers that is using inoculant in his soyabean field. He mentioned the use of soyabean inoculant as one of his secrets to the good soyabean harvest for his farm. Inoculant is cheap and affordable for smallholder farmers and it significantly increases the yield of legumes, such as soyabean.

Legumes have been identified as potential crops, that would best be an option to tobacco farmers. Particularly, since tobacco farmers currently face a lot of international market challenges. The newly introduced soyabean technologies can best be used to revamp the Malawi economy, which heavily relies on agriculture. The government has been asking farmers to embrace new farming technologies, such as proper site selection, recommended ridge and seed spacing, use of certified seed (early maturing, drought tolerant, amongst others), timely planting, use of inoculant and manure, proper seed rate, timely control of weeds, pests and diseases and post-harvest management.

Agricultural scientists argue that new and advanced farming technologies would propel and ensure sustained food security and household development for smallholder farmers. Since changing weather patterns are leaving a huge negative impact on the soil, they argue that advanced management practices, such as intercropping of maize and legumes, are needed. Intercropped maize would benefit from legumes, as the latter have the ability to return nitrogen to the soil, thereby increasing soil fertility.

The life of farmers like Mr Kazembe has positively changed, since accepting new legume technologies brought by different organizations that are helping farmers to understand these technologies. The increased number of people farming legume crops in the Linthipe area and around the country confirm the positive impact of legume cultivation. N2Africa started its work in Malawi in 2010 and has so far reached over 30,000 farmers in the districts of Kasungu, Mchinji, Dowa, Dedza, Salima, Lilongwe and Ntcheu. The project is supporting farmers with legume technologies and training them on how they can fix nitrogen and improve soil fertility.

Picture 1. A farmer harvesting soyabean improved variety in Kasungu District. ©IITA-Malawi

Mr Kazembe stated: “The coming in of N2Africa in our area has enabled me to double my soyabean production by planting double rows on single ridge. They made me realize that I could increase my production by applying inoculant to my soyabean. I was told that the inoculant also helped to return fertility to the soil. This was evidenced when I planted maize in the soyabean field the following year, where my harvested increased.” Furthermore, Mr. Kazembe said that N2Africa also introduced a number of improved early maturing soyabean varieties with good potential yield, such as Tikolore, Makwacha and Nasoko.

According to Lloyd Phiphira, Malawi country coordinator Malawi, the project is impressed with the response it is getting from farmers they are working with. He stated: “N2Africa would like to achieve high crop and livestock productivity, improve human nutrition, farm income, as well as soil fertility. Because of the erratic rains and persistent droughts, I am convinced that legumes, such as improved varieties of soyabean, groundnut, bean, cowpea, should be adopted both as nitrogen fixing, nutrition and cash crop in Malawi.”

Picture 2. Farmers like these have experienced high yield with the use of inoculants. ©IITA-Malawi

N2Africa is also building capacity of the local inoculant producing company Agro-Input Suppliers Limited (AISL) to ensure inoculant availability to farmers. Recently, it sent two technicians to Ibadan, Nigeria to learn more of how to produce high quality inoculants. Malawi imports inoculant from Kenya, Zimbabwe and other countries. However, AISL has started producing soyabean inoculants, Nitrofix, supported by the Department of Agriculture Research Services (DARS).

“N2Africa has run diagnostic and demonstration trials in different fields in Malawi to see the effectiveness of different types of inoculant on soyabean. The results are overwhelming. Depending on the type of variety planted, we have experienced higher yields up to 40% in soyabean where inoculant was applied,” explained Phiphira. There is however, a great concern on the availability of the inoculant

to farmers in Malawi. Mr Phiphira said: “AISL with technical and financial support from IITA, DARS, MOST and GIZ is trending towards sustainable production and supply of quality Nitrofix inoculant through agro-dealers. From this year start, Bio Fix from Kenya is another brand of inoculant that will be imported on commercial basis,” said Phiphira. Apart from helping farmers with how to plant and take care of their soyabean, N2Africa also taught farmers how to preserve soil fertility through nitrogen fixation. To prevent soil degradation by monoculture, we promote the practice of intercropping with legumes, such as soyabean, common bean, cowpea and groundnut.

Emmanuel Mwale, ICT Officer at IITA-Malawi

Testing biological nitrogen fixation of soyabean in partnership with NCBA-CLUSA in Mozambique

Background

Since the re-introduction of soyabean in Mozambique, the main soyabean inoculant used across the country is the short shelf inoculant MasterFix imported from Brazil. The National Cooperative Business Association (NCBA-CLUSA) is a not-for-profit cooperative development and trade association, and partners with N2Africa in the soyabean value chain. NCBA-CLUSA promotes the adoption of conservation agriculture practices in the Manica, Zambezia and Tete Provinces (through the PROMAC project). Working with 1,200 lead farmers and 30 extension agents, PROMAC supports over 36,000 smallholder farmers to increase crop yields. The project goals are to increase income, improve soil fertility, reduce land degradation, reduce agricultural losses and mitigate the negative impact of climate change, all building the economic and environmental resilience of smallholder farmers.

During the cropping season 2015-2016, N2Africa and PROMAC initiated the evaluation of soyabean response to long shelf inoculant LegumeFix, as an alternative to MasterFix. The study was conducted in Beira and Nacala development corridors in Mozambique. A total of 248 households (160 women and 88 men) hosted the on-farm demonstration trials using variety TGX-1740-2F. During several stages of crop development, a total of 19,402 farmers (10,700 women and 8,702 men, including farmers that hosted the demonstration trials), participated in the evaluation trials through field days (Picture 1).

Picture 1. Field day in Barue District

Apart from agronomic evaluation (yield), part of the harvested grain was used to train farmers on soyabean processing practices, including a hygiene component.

Preliminary research findings and way forward

The statistical analysis of soyabean yield data is still ongoing. Yet, the preliminary assessment suggests that there are no significant differences on soyabean yields between MasterFix and LegumeFix. Both inoculants performed differently in each province. The use of gypsum seems to have a positive impact on yield, suggesting acidity in the soils of the demonstrations trials. In general, soyabean yield under conservation agriculture was higher, as compared to yield under farmers´ practices. We should recall that, the cropping season 2015-2016 was characterized by dry spells and heavy rains, due to El Niño.

In order to draw conclusions, both organizations have agreed to continue with on-farm demonstrations trials for at least two more cropping seasons, as well as to include more farms. In the meantime, the agro-dealer Savon Trading showed interest in commercializing LegumeFix for smallholder farmers. N2Africa will play a role in linking Savon Trading to inoculant suppliers. We should mention that Mozambique has not embarked yet on the production of inoculants.

Table 1. Average soyabean yield (kg ha^{-1}) with MasterFix and LegumeFix inoculants per management practice, with and without gypsum

Province	Treatment	Type of inoculant and management practice			
		MasterFix	MasterFix	LegumeFix	LegumeFix
		Conservation agriculture (kg ha^{-1})	Farmers´ practices (kg ha^{-1})	Conservation agriculture (kg ha^{-1})	Farmers´ practices (kg ha^{-1})
Manica	Gypsum	2,180	915	2,370	1,465
	No gypsum	1,825	1,135	1,425	785
Tete	Gypsum	2,320	1,290	1,245	1,245
	No gypsum	1,550	945	1,550	1,010
Zambezia	Gypsum	2,885	1,605	Not applied	No applied
	No gypsum	2,070	1,105	2,345	1,445

Wilson Leonardo, Country Coordinator Mozambique and Sergio Ye, PROMAC Manager

Mid-year 2016 report: Marketing and processing legumes in west Kenya

Summary

Stimulating marketing and value-added processing of grain legumes is an important activity within the N2Africa Project in west Kenya. During the first six months of 2016 a total 96 tons of soyabean grain were sold through collective marketing by members belonging to the WeRATE R4D Platform in west Kenya, generating KES 5 million. This was a substantial improvement from the 36 tons sold over the same period in 2015 and does not include sales following the previous short rains or marketing by individual households belonging to WeRATE members. Furthermore, more WeRATE members subscribed to its factory processing services of branded soyabean products with more than 4,000 packets of roasted soyabean flour, 3,400 packets of dark roast soya beverage and 800 cups of soya yoghurt sold with net returns of nearly KES 220,000 in two months. Grassroots training continues among WeRATE members in legume marketing and processing, primarily focused upon youth and women interested in establishing income-generating enterprises. This training was conducted at existing One Stop Shops, which were previously established by N2Africa to provide last mile supply of BNF production technologies. Concerted networking and linkage efforts have earned the support of County Governments in west Kenya towards the development of the soyabean value chain by both WeRATE & other stakeholders in this region.

Picture 1. Grass root training on legume marketing and processing. Note how a 10 year-old girl keenly takes notes for her grandmother

Goals and objectives of Annapolis Wonder Enterprises (AWE) within WeRATE

1. Provide marketing support to the WeRATE R4D Platform and reinforce its marketing channels;
2. Assist in legume-based product design and packaging and support factory operations;
3. Support the WeRATE One Stop Shops in their technology dissemination and marketing activities;
4. Improve marketing and processing knowledge by conducting stakeholder workshops.

Activities and findings

Reinforce marketing channels. Enhanced links between soyabean producers of west Kenya and buyers, processors and brokers of the same led to the purchase of 96 metric tons of soyabean grain by seven buyers following production during the 2015-2016 short rains growing season (Table 1). During this period, soyabean production information on volumes and collation sites was gathered by AWE and N2Africa and shared with the soyabean buyers.

Table 1. Buyers of soyabean in the period January - June 2016

Buyers of soyabean	Quantities (tons)	Price (KES kg^{-1})	Payment mode
Soy Afrique	13	45	Farm gate cash on the spot
Kirinyaga Millers	33	55	Delivered to Nairobi cash after 2 weeks
Farmers choice	23	55	Delivered to Limuru cash after 2 weeks
Todays Agriculture	10	55	Delivered to store in Malakisi Cash after 1 month
Dominion Farms	3	65	Delivered to yala farm cash after 1 month
Getesha traders	6	48	Cash on the spot
Pamoja Poultry Farm	2.4	55	Cash over 12 months
Local/Grassroot processing	3	50	Collection point cash on the spot
7 buyers	96	$5\ 10^6$	

Likewise, contact details of buyers, their preferred soyabean varieties, volumes required, preferred purchase time/months, buying price, preferred delivery and payment mode was gathered and passed to WeRATE members. Soyabeans were marketed in branded 50 kg bags distributed. Monitoring was conducted to document these transactions by WeRATE members (Table 2) and in some cases AWE provided assistance in price and delivery negotiations.

Knowledge gaps and stakeholder training. To reinforce grassroots capacities on legume marketing and processing, AWE first identified critical knowledge gaps through a baseline survey tool, mostly through stakeholder interviews. This survey tool is available upon request. The information collected was analyzed and summarized. The strengths, weaknesses, opportunities and threats to effective legume marketing and processing were highlighted and a basic training module developed and used to conduct grassroots training of over 200 participants. This training was conducted in May and June at eleven venues in west Kenya with facilitators drawn from AWE, KIRDI, and IITA.

Table 2. Collection center and volumes soyabean (tons) sold in the period January - June 2016

Collection Center	Volume sold (tons)	Buyer
Migori County Agriculture Office	13	Soy Afrique
One World Development Foundation	66	Kirinyaga Millers, Farmers Choice, Todays Agriculture
MUDIFESOF	4	Getesha Traders
EBUSAKAMI FARMERS	2.4	Pamoja Poultry Farm
SCODP	3	Dominion Farms
BUSCO	2	Getesha Traders
KLEENHOMES & GARDENS	1.3	Local processing
UNGEINT	0.9	Local processing
BUSSFO	0.4	Local processing
MUDIFESOF	0.4	Local processing
10 Collection centers	95.6	7 buyers

Table 3. Volumes of soya products processed at the WeRATE soyabean processing factories for One Stop Shops in May and June 2016

Factory	Products	Quantities	Price (KES)	One Stop Shop
Kisumu Soyamilk Plant	Fresh flavored-sweetened soyamilk	500 x 200ml packets	25	Mudifesof/Ungent/KHG
Kisumu Soyamilk Plant	Soya yoghurt-Vanilla & strawberry flavors	800 x 250ml cups	35	Mudifesof/Ungent/KHG
Bungoma Soyabean Plant	Kinako	2,050 x 240g packets	60	Bussfo/Mudifesof/Ungent
Bungoma Soyabean Plant	Dark Roasted Soya Beverage	2,870 x 240g packets	100	UBussfo/Mudifesof/Ungent/KHG/EAK Vihiga County Chapter
Migori Soyabean Plant	Kinako	600 x 240g packets	60	Dacon Foods/Blossom Foods/Chamong Foods
Migori Soyabean Plant	Dark Roasted Soya Beverage	1,568 x 240g cups	100	Dacon Foods/Blossom Foods/Chamong Foods
TOTAL	**8 Operations**	-		
Gross return	**KES 215,880**			
Profit (25% of gross return	**KES 53,000**			

An immediate benefit from this grassroots training was wider recognition of the WeRATE One Stop Shops that hosted this activity. It stimulated participants' interest in soyabean production upon learning of the financial benefits of commercial production. This in turn increased the requirements for appropriate soyabean growing inputs sold through these One Stop Shops. Furthermore, there is increased farmer willingness to subscribe to the 2-TIER-FUNCTION, which is an additional opportunity for One Stop Shops to also act as aggregation points for legume harvest. The shops may then trade in these legumes either by selling grain or processed products.

Value added products. The processing of five value-added grain legume products at eight factories in west Kenya over two months is presented in Table 3. These products include fresh flavored-sweetened soyamilk, soya yoghurt in vanilla and strawberry flavors, Kinako soya flour and Dark Roasted Soya Beverage. These products result from several years' development during N2Africa and in many cases are fully registered with Kenyan authorities and bear certification logos and bar codes.

One of our goals in grassroots training is to promote similar processing at the more localized levels. Participants were educated on the significance of using properly processed legume products bearing the quality mark of assurance. This in turn has led to an increased demand for branded factory processed soya products among local consumers. As a result, the One Stop Shops have had to stock up on products such as Kinako, Soya Beverage and Soyamilk and its derivatives. The One Stop Shops have reported increased sale of these products in the months of May and June 2016.

Picture 2. Soya Beverage is packed in 12 x 20 g economy-sachets that are sold for KES 15 per sachet

Lessons Learned:

1. Farmers in west Kenya have adopted crop rotation and grow pure stands of soyabeans during both the long and short rains growing seasons.
2. Offered cash, soyabean farmers will sell their grain through established collection centers and as individual and local demand is rapidly growing.
3. Grassroots training on legume marketing channels and processing stimulates product awareness and adoption among rural communities. This training has created a "pull effect" for factory-made soyabean products by consumers and stimulates their localized replication. More rural folks, especially women and youth, have engaged in enterprises involving the soyabean products, such as producing and selling soya drinks and soya-based snacks. This pull-effect provides an opportunity for the One Stop Shops operated by WeRATE partners.
4. Increased awareness on the nutritional, health and financial benefits of soyabean has further catalyzed an interest in soyabean growing by the grass root rural communities of west Kenya.
5. Buyers are less willing to engage soyabean farmers in contractual farming, because of fluctuations in world market prices of the same and uncertainty of farmers' faithfulness to such contracts. Rather they prefer to purchase from reliable farmer groups on a post-harvest seasonal basis.

Way forward and recommendations

Reinforce collection centers. Because farmers readily deliver their soyabean grain to designated collection centers when assured of cash on delivery, it is prudent for these collection centers to be reinforced with the cash to pay the farmers for the deliveries made. In line with this, AWE will:

- Negotiate with the buyers to liaise with collection centers and provide the cash to pay farmers for the deliveries made;
- Advise collection centers to consider accessing commodity-financing- credit facilities from financial institutions.

Mobilize the grassroots consumer base. One Stop Shops operated by WeRATE partners should optimize the "pull effect" for its branded soyabean products created by grassroots training on legume marketing channels and processing conducted by AWE. These shops should stock

up on these products and wholesale them to the vendors and retail them to the end users. These activities must comply with Kenyan regulations where farm inputs (pesticides) and human food may not be marketed in the same shop without partition. In some cases, WeRATE members have acquired adjacent shops for this purpose.

Picture 3. Soyabeans are logged into collection points, their moisture content verified (left), the bags stitched (center) and stacked onto pallets prior to sales (right) at a WeRATE market collection point. Note use of the N2Africa branded soyabean bags

Step up grass root trainings and awareness campaigns. This training and accompanying information campaign have successfully increased the demand and utilization of branded soyabean products by consumers in west Kenya, including farming households. This helps meet N2Africa's objective of linking the protein needs of rural poor farmer households to the abundant atmospheric nitrogen, and increase their incomes through legume enterprises.

Josephine Ongoma, Annapolis Wonder Enterprises and Paul L. Woomer, Country Coordinator Kenya

BNF technology clearinghouse event in Kenya

WeRATE held a Clearinghouse planning meeting from 5 to 7 September attended by 30 participants drawn from 26 dues paying members, mostly farmer associations (see picture). During the meeting, BNF technologies were discussed and distributed to members, along with the field protocols to test them. These technologies include BioFix and NoduMax inoculants, rust-resistant soyabean (e.g. SC Squire), specialized fertilizer blends with and without starter N and use of Dual Gold pre-emergent fertilizer (Picture 1). During the upcoming 2016 short rains growing season, WeRATE will establish 30 on-farm BNF technology tests and host field days around them. As in the past, MEA Fertilizer Ltd. provided specially packaged inputs that conform to our standard 100 m^2 plot size. Furthermore the University of Nairobi MIRCEN is testing the quality of BioFix inoculants intended for sale this season. Data report forms from the recently concluded long rains growing season 2016 were collected and are currently being compiled into a database and inspected.

Picture 1. Participants at the Clearinghouse event (top) and this season's BNF technology package (bottom)

WeRATE members will continue to bulk soyabean and many (12) now operate One Stop Shops. The updated M&E forms were presented to the group so that they can be better completed during the next growing season. An updated presentation on marketing and legume processing was also provided. WeRATE members have sold 443 tons of soyabeans to seven buyers over the past several months, and not all of the long rains soyabean crop has been cleaned and bagged. Finally, 6,500 branded grain and seed sacks were distributed to members to assist in further marketing and seed production efforts. Since that meeting, the rains have started in a timely manner and the technology field packages are being installed.

Three recent reports and extension publications were released to members including the WeRATE "glossy" and the Annapolis Wonder Enterprises (AWE) marketing report. In addition, AWE will continue to offer training in household preparation of "legume breadbasket" products at the cottage industry scale. One concern is that WeRATE will soon be supported only by N2Africa as its other projects have ended or end this year (e.g. Humidtropics). Officers agreed to explore additional funding mechanisms and one proposal is in an advanced stage of preparation.

Paul L. Woomer, Welissa Mulei and Macdonald Wasonga

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

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

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

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 identifychampion 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!

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.

Picture 3. Making fritters in Makoni District

Picture 4. Measuring ingredients for nutritional porridge in Hwedza District

Picture 5. Farmer trainers in Murehwa District

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

N2Africa website renewed

Recently, the N2Africa website has been migrated to a new version of the content management system Drupal. This was done to improve security and performance. Furthermore, the intranet part of the N2Africa website has been separated from the public part. Therefore, the URL of the intranet part has been changed to: http://intranet.n2africa.org
To a great extent the functionality of the user interface has stayed the same. However please, let us know whenever you encounter problems.

Marcel Lubbers, Wageningen University, The Netherlands

Report uploaded on the N2Africa website

- MSc report Groundnut response to calcium and phosphorus fertilizer rates in Tanzania by Henry Tamba Nyuma (a summary of this report will be published in the next Podcaster);
- N2Africa as case study for PROIntensAfrica - What role for legumes in sutainable intensification (a summary of this report will be published in the next Podcaster);
- Guiding varietal choice for soybean in Africa: A comparison of bottom-up and top-down modelling approaches to assess water limited potential yields. MSc thesis by Ugo Verlingue. Research conducted at Supagro, Montpellier..

N2Africa in the news

A publication in The Conversation, lifting the gloom of African farmers through legume production by Frederick Baijukya and Fred Kanampiu: http://theconversation.com/why-boosting-legume-production-will-lift-the-gloom-for-african-farmers-63007

Related news

International Year of Pulses (IYP)
The International Year of Pulses creates a unique moment to showcase research investments that would allow pulse crops to deliver on their full potential as a critical player in the global food system. The 10-Year Research Strategy report will be used to set the future research agenda.

Related newsletters

We received a number of newsletters:
- SUN Movement Newsletter September 2016 (Scaling Up Nutrition);
- The IITA Bulletin 31 October – 4 November 2016 (No. 2352);
- Soybean Innovation Lab Newsletter October 2016;
- CIAT blog on Business of quick cook beans;
- CIAT blog on Uganda's rural women find beans to beat climate;
- Technical reports on pulse use and nutrition from around the world (IYP);
- Nutritional benefits of pulses (FAO);
- Pulses: The Heroes of Nutrition & Agricultural Sustainability (FAO).
- Legume Alliance blog – Championing radio…

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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