

N2Africa Podcaster no. 27

July, August and September 2014

Introduction

Welcome to a rather thick issue of the Podcaster. We have a lot of news! The first item highlights a workshop held in Wageningen in late August to develop the detailed plans for Monitoring and Evaluation within N2Africa as well as the Master Plans for project activities. Considerable effort is being put into standardization of data collection and establishment of a database structure that will make all of our data openly accessible to all partners within N2Africa, and soon to everybody. Part of these activities involves the use of tablets for data collection that proved to provide some fun for workshop participants.

We have N2Africa updates from all of the Core and Tier 1 Countries – with a wealth of information on exciting developments in the field with partners. In addition we report on an AGRA workshop held in Malawi to develop fertilizer recommendations in which data from N2Africa on inoculants and legume fertilizers played an important role. We provide links to three published articles from N2Africa students – the first report of soyabean rust in Tanzania from

Harun Murithi, a report on farmers' use and the economics and of inoculants in Kenya from Samuel Mutuma, and a report on identifying elite rhizobia for soyabean in Kenya from Maureen Waswa, as well as to two MSc theses that can be downloaded from the website.

In addition – we have been busy refreshing the website to enable documents to be found more easily. There is a powerful search function on the website that allows you to search using keywords which we hope you will use. Feedback is welcome of course! From my side – I have given a number of talks on our work in N2Africa at various conferences and workshops and always get a very positive response. None of what N2Africa does would be possible without the strong support of all of our partners so thanks again for your continuing contribution! If you have news to share we are always looking for stories for the next Podcaster.

Ken Giller

N2Africa Leadership Team & Country Coordinators gathered at WUR for Monitoring and Evaluation Workshop, 18-22 August 2014

Some other photos from this meeting were published on [Facebook](#) on 26 August

During the 3rd week of August, N2Africa project leadership team, core country coordinators and selected partners gathered for Monitoring and Evaluation (M&E) workshop and finalization of other Master Plans of the project.

In order to assess the progress of project implementation and its impacts, a M&E and Data management master plan has been designed to support monitoring of all aspects of the project, i.e. providing information on general progress of the project, information for learning purposes, feedback from/to partners and beneficiaries, and also assessing the final impact of the project and the effectiveness of various systems. This will enable management, donors and part-

ners to receive feedback and deduce lessons, determine the direction and magnitude of progress, and make adjustments to interventions for effective translation of project inputs into outcomes.

The objective of the workshop was therefore to refine and finalize the M&E and Data Management plan for N2Africa focusing on the key milestones, results measurements, methods, tools and approaches to capture results and data management system.

During the workshop, a number of outputs were achieved which include the following:

Monitoring and evaluation framework was agreed upon, as well as consensus on the key milestones, proposed indicators and reporting frequency reached; clarity on data collection processes, analysis and reporting procedures including responsibilities for monitoring and evaluation (including strategy for coordination at country level).

Specific methods, approaches and tools (including ICT) needed to implement the M&E and Data Management system was discussed and need further development.

N2Africa is one of the Sentinel Grants Projects under the Gates Foundation which can access additional support for M&E. Such support can be through the development and/or implementation of the project's M&E system and ALINe is the lead organization in providing such support with funding from the Gates Foundation.



The Agricultural Learning and Impacts Network (ALINE) has since 2009 provided technical research, advice, and facilitation services for monitoring, evaluation and learning in the agricultural development sector. In 2014, ALINE through the Gates Foundation began providing technical support to a portfolio of Sentinel grantees with the objective of assessing and improving their measurement and evaluation efforts.

The gathering also took the opportunity to finalize the Master Plans. N2Africa Project has seven master plans, namely, Agronomy; Dissemination; Rhizobiology; M&E and data management; Gender; Platforms; and Communications. The core country coordinators familiarized themselves with the master plans and helped in finalizing them. Country

coordinators are responsible in overseeing project activities in their countries. Therefore, it's important for all players to have an agreed and common understanding of how activities will be implemented on the ground. Though differences might occur during implementation of activities depending on realities



and circumstances on the ground, the master plans will play a key role in guiding activities implementation. Further, they will guide in the development of protocols to execute the activities in all countries. These master plans are evolving documents; hence, depending on feedback and experiences on the ground, they will be periodically updated as necessary. Based on these master plans, protocols will be developed which will be reviewed before their implementation. This will be done before planting of every season. During the workshop, the leadership team and core country coordinators had common understanding of the principles of all the master plans; buy-in from country coordinators; clarity on how to use the master plans for development of protocols; and received enough feedback to develop final versions of all the master plans.

Fred Kanampiu



Exploring the use of tablets for data collection in N2Africa

N2Africa generates large volumes of agronomic and survey data. Timely analysis of this data is essential to ensure that on-going activities are properly informed by past findings. This places high demands on both the quality of data and on the speed with which it can be processed. For this reason, we have started to explore the use of tablet devices for data collection in the field. In collaboration with the U.S.-based company Nafundi, we are converting existing data collection forms to easy-to use electronic versions, using software called Open Data Kit (ODK). ODK offers a set of simple tools for creating electronic forms that can help improving the quality of data entry and that may speed up the delivery and processing of information. Instead of having to wait for data to be transferred from paper forms to a computer, finished forms are automatically uploaded to a central data base. In addition, there is the potential for integrating other types of data such as GPS coordinates, photos or video.

During the recent Monitoring and Evaluation meeting held in Wageningen, country coordinators had the opportunity to get their first hands-on experience with the use a tablet device. Participants were introduced to the GPS capabilities of the android-based tablet and learnt how to retrieve,



fill and save an electronic survey form. Although the application of ODK enabled tablets is currently limited to a pilot study in Ethiopia, the plan is to expand the use of this technology to other N2Africa countries in the near future. This will be another contribution of N2Africa to the methodological tool box available to on-farm researchers.

Joost van Heerwaarden

Update of N2Africa project activities in Ghana

This season N2Africa together with its disseminating partners is disseminating legume technologies to over 6000 farmers cultivating cowpea, groundnut and soyabean in seven districts in northern Ghana. N2Africa currently works with about ten partner organizations in Northern Ghana. These include Ministry of Food and Agriculture, Savanna Agricultural Research Institute, Kwame Nkrumah Univer-

sity of Science and Technology and Evangelical Presbyterian and Relief Agency. The rest are URBANET, ADVANCE, ProNorth, SBF and Wienco. Farmers have finished planting their fields and most legume crops have started podding. Farmers in northern Ghana were faced with severe drought between mid-June and early July making it a challenge for most farmers to plant their crops, particularly soyabean in time. Feedback meetings and field days have been held with farmers' groups participating in N2Africa demonstrations to get their views about the N2Africa technologies and to discuss challenges faced by farmers with use of some of the technologies.

Two persons employed for the World Bank SecureNutrition



Farmer feedback meeting held at one of the N2Africa sites



A farmer demonstrating processing of soya 'kebab' to fellow women during the visit of Andrea Spray and Andrea Borgarello to Ghana



A lead farmer conducting farmers round a demo plot during a field day

Harvesting Nutrition contest, Andrea Spray and Andrea Borgarello visited N2Africa project sites in Ghana from 10-11 September, 2014. N2Africa was among the three winners of SecureNutrition contest organized by the World Bank last year. The purpose of the visit was to pull together a multimedia presentation highlighting what N2Africa is doing to increase the impact of the project on nutrition outcomes.

Samuel Adjei-Nsiah

Update from Nigeria

Community mobilization

N2Africa-Nigeria is conducting an awareness campaign to inform the rural farming communities on yield enhancing technologies packaged by N2Africa for grain legume production. Therefore N2Africa organized community sensitization. The sensitization was organized in 85 communities across three states namely: Niger state, Kaduna state and Kano State. The interaction during the sensitization was meant to inform smallholder farmers on the ability of the N2Africa technology packages to close experienced

yield gaps and significantly increase grain legume yield far above what traditionally known practices can offer.

The community sensitization also gave resource-poor farmers the opportunity to share experiences with N2Africa. The farmers reported that they experience wide yield gaps due to production constraints such as low yield, poor quality of seeds, soil fertility problem, high cost of agro-chemicals, erratic climatic conditions, pest infestation and low-market value for farm produce.

Community mobilization Kano State



Community mobilization Kaduna State



Community mobilization Niger State



It is very important to share the objectives and project goals with the farmers. Therefore we also clearly identified the expected role of the farmer, the different milestones to be accomplished and expected outcomes to the participating farmers at community level. In addition, we outlined the materials and methods for the project implementation. We also discussed the details of demonstrations trials in farmers' fields, the agronomy protocol for the trial, crop varieties for specific agro-ecologies/locations, management practices for different crops and other sundry issues. There was a session for questions and answers where participants interacted freely and asked questions on different farming systems and crop production for the purpose of clarity.

training for participating farmers in all the project action sites. The aim of the training is to build the capacity of the stakeholders on the appropriate use of N2Africa package of technologies, so that demonstration and adaptation trials will be correctly installed. The overview of trials to be installed is given in Table 1.

Pre - season training in Nigeria

Prior to planting date the project organized pre-season

Table 1: N2Africa Demonstration Trials across 3 States in Nigeria

Total number of farmers				
	Soyabean	Cowpea	Groundnut	Total
Demonstration trials	151	42	52	245
Adaptation trials	3624	1008	1248	5880
Total	3775	1050	1300	6125

Pre-season training in Kano State (left), Kaduna State (middle) and Niger State (right)



Participants were drawn from 13 local government areas across the 3 states. The participants (males, females and youth) included lead farmers, extension agents (EAs), community seed producers and the contract sprayers from selected communities. In addition, agro-allied companies used the training as an opportunity to showcase their products and introduce new technologies in pest management practices.

Different subjects were taught during the training to boost the knowledge of resource-poor farmers. Subjects covered included legume agronomy in the Nigeria savannah, farming systems, pest management practices, safe use of herbicides and pesticides, community seed production, cereal-legume cultivation and post-harvest technology. The community seed production project (CSPP), to be facilitated by the project, was highly appreciated by farmers as opportunity for community business investment when introduced by N2Africa. CSPP was acknowledged with a loud applause by the farmers, who see the opportunity to engage themselves in commercial seed production in their respective communities. The training also included sessions for group discussion, where participants felt free to share their experiences in the field during farming activities.

For ease of communication, most presentations were made in the local language that the majority of the people understand. This approach contributed positively to information spread among the participants who do not understand English. All trainees were made to have a good understanding of the kind of data to be collected from farmers' fields and possible challenges that may arise in the course of implementation of the project. The quality of responses from the participants and the interactions during discussions gave the organizer of the training the assurance that trainees had a good understanding of the subjects covered during the training.

Report of training on data collection & use of ICT tools

Field demonstration trials on crop production in farmers' fields form a critical part of delivery and dissemination component of the N2Africa project. The success of a field experiment relies strongly on the kind and quality of data collected and how the trial has been set-up and managed.

A training of trainers' session was conducted for lead extension agents (EAs) in Kano, Kaduna and Niger States of Nigeria. Lead EAs were trained mainly on field trial design, data collection and use of agronomy tools. The trained EAs were then expected to further build the capacity of all extension agents involved in N2Africa trials' installation and data collection.

The training placed much emphasis on data collection from the field demonstrations and agronomy trials. The data from such field demonstrations will be used to evaluate crop performance from the applied treatments. The N2Africa research and data specialist stressed that research data should capture planting dates across locations, germination counts (in %), planting density, date of flower emergence and other crop phenological data, stress conditions such as drought, flood and pest infestation.

In terms of data collection, it is very important that yields are measured correctly. Rather than measuring yields from net-plots, it was suggested to measure yields from the full plots. When measuring a larger area, the measuring error decreases. The harvested yield is to be properly bagged and labeled according to plots, crop and location, along with the farmer's identification code. Another point which reduces measurement errors is the use of precise, digital, weighing scales. It is very important that all the scales used are of the same type!

To explain yield variations, additional data are needed. Therefore, soil sample collection was discussed as well. Emphasis was placed on soil depth, sampling tools and possible number of samples to constitute composite soil samples. 50 cm soil depth was suggested by N2Africa research and data specialist, but the consensus among the EAs was 0 – 30 cm soil depth. The samples need a proper label, representing the field or site, as well as the farmer's code and name. In addition, there were both theoretical and practical demonstrations on the use of GPS. Prior to this; it was recommended that calibration of the GPS should be in the metric system to eliminate errors in locating degrees and minutes on the digits.

Trainees were also given the opportunity to comment on the Field Book of technology, the main data collection

tool for the demonstration trials. The trainees gave useful comments, for example on the farmer's typology, and the number of demonstration trials, adaptation and diagnostic trials across the different leguminous crops and locations. Based on these comments, some adjustments were made to the Field Book.

The training ended with an interactive session where the participants were given the opportunity to express their opinions or concerns on the various topics discussed. In the end, the EAs were satisfied throughout the training session and gained new knowledge which is expected to be ploughed back into the project.

Emmanuel Sangodele

IITA Youth Agripreneurs and N2Africa flag off 3-week intensive training for Borno State youths (#SBYOUHT2014)

IITA Youth Agripreneurs in collaboration with N2Africa on the 3rd of September, 2014 flagged off the 3-week intensive training for 20 youths from Borno State proposed few months ago, which seeks to build the capacity of the youths in agribusiness as an income generating activity.

The 3-week intensive training according to the IITA Youth Agripreneurs is expected to increase the knowledge of the Borno State youths in sustainable agronomic practices and develop their entrepreneurial skills in agribusiness, while promoting self-dependence. The IITA Agripreneurs revealed that the 3 weeks will also enable the possibility of replicating their model in Borno State which is one of the objectives of the group.



In attendance were the Head of IITA Kano Station, Dr Kamara, N2Africa Project Coordinator in Nigeria, Dr. Emmanuel Sangodele, Permanent secretary/Project manager, Agricultural Development Program (ADP) of Borno State, Alhaji Sani Aliu Meedugu, and Professor Emechebe, Plant Pathologist and Independent Plant Management Specialist and other IITA Kano staff stations.

Adefioye Adedayo

N2Africa-Ethiopia, update on the season's activities

In this cropping season, N2Africa-Ethiopia has planned to reach more than 5000 farmers in 24 Woredas (districts) through its research and development partners (Federal and Regional Agricultural Research Institutes and Hawassa University). The *Woredas* have been identified as potential pulse growing areas earlier and located at four regions in Ethiopia (Amhara, Benishangul-Gumuz, Oromia and Southern Region). The four clusters of agronomy activities for the 2014 season (the diagnostic, demonstration, adaptation and researcher-managed-agronomy) were executed in close collaboration between N2Africa and its partners, which altogether comprising nine implementing centers and district agricultural offices. The planting of common bean, soyabean and faba bean has been completed (end of June – early July, 2014); and chickpea planting is in progress and may extend, depending on the location, throughout September. Improved seeds and inoculants were provided along with appropriate training to participants which constituted of technical experts (trainers), districts administrators, extension workers and farmers. The N2Africa team have given technical backstopping and facilitated the linkage of input suppliers (improved seeds and inoculants) to farmers via our partners. The sources of the inoculants were private inoculant producer (Menagesha Biotechnology Industry plc) and government institutions (Holeta Agricultural Research Center and National Soil Testing Center).

The customized versions of the agronomic protocols for diagnostic, demonstration, adaptation & researcher-managed-agronomy trials; and field books for farm typology and agronomic data collection were dispatched to partners. A leaflet prepared in Amharic has been distributed to farmers with inputs for chickpea adaptation trials. In addition, plastic rain gages (sourced from Wageningen) were distributed and installed on trial sites to collect rainfall data for target sites far away from meteorology stations.

The mid-season (vegetative stage) field evaluations have been conducted in four *Woredas* (Dabat, Debark, Farta & Yelmana Densa in Amhara). These evaluations were aimed at demonstrating and getting feedback on N2Africa technologies. The events was attended by different stakeholders including research directors and technicians, Zonal and *Woreda* Officials, development agents and male and female farmers. On the occasions, two farmers' groups, women and men, were formed each making separate evaluations of the diffract treatments. The groups were chaired by elected farmers and the researcher served as secretary. The evaluation criteria were set by the farmers and based on the crop vigor, growth and development, i.e. height, stalk thickness, leafiness, flower intensity, pod setting, uniformity, resistance to disease and waterlogging. In general, the improved varieties (which have been tested during the



Figure 1. Land preparation for common bean trial at Bako



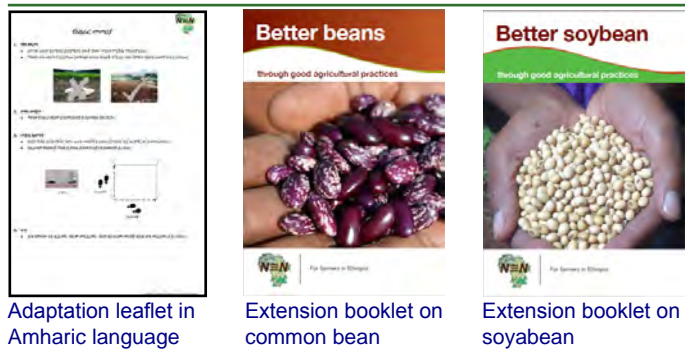
Figure 2. Active participation of women farmers in the field evaluation of faba bean trials at Dabat woreda



Figure 3. Adet Agricultural Research Center Director, Anteneh Abewa, describing the N2Africa efforts to mass-media at Farta woreda

bridging phase, 2013 cropping season) responded well to inoculation and application of P fertilizer. The impacts of legume technology (proper crop management, use of improved varieties, inoculation and P fertilizer) apparent on better performances of N2Africa plots. The demonstration and field day occasions had mass-media coverage (television and radio news coverage). Similar farmer's field days will be organized and demonstration and field evaluation of the legume technologies on N2Africa plots will continue in other target *Woredas*.

In collaboration with ASHC and WUR, two extension materials (booklets) on common bean and soyabean have been prepared, now at final stage and will be made available for extension workers and development agents to support the dissemination of legume technologies. In addition an adaptation leaflet has been translated into Amharic language and for use in adaptation activities.



Adaptation leaflet in Amharic language

Extension booklet on common bean

Extension booklet on soyabean

To strengthen the capacity of private input suppliers, their connectedness with farmers and stimulate the dissemination of technologies, N2Africa is also working with AGRA- Scaling Seeds and Technologies Partnership in Africa (AGRA-SSTP) in developing proposals for grants

Uganda Progress

Progress has been made in implementing the N2Africa project since its launch early this year and I am hereby pleased to briefly share the progress per objective:

Objective 1. M&E and capacity building

Recruitment of the staff is complete. We have a Business Development officer, a Data Analyst, two liaison Officers

to promote the commercialization, distribution and adoption of improved chickpea seeds, inoculants and other key technologies facilitating a consortium of private and public sectors.

To ensure the production of quality inoculants by private and public institutions, it is necessary to continue isolation of new strains and evaluate their symbiotic effectiveness in reference to national and international elites currently in use. To this end, the national rhizobiology team engaged in rhizobia research has been convened and shared the rhizobiology master plan of N2Africa. During the meeting, short and long term plans have been discussed and agreements reached to collect elite strains available in the different academic and research institution in Ethiopia, evaluate their symbiotic effectiveness to target legumes and make these available for inoculant producers (private and public institutions). N2Africa will take leading role in facilitating and networking of institutions engaged in rhizobiology research and development activities. In fact, N2Africa-Ethiopia is now getting recognition and being consulted (by NGOs and development projects) on issues concerning legume bio-inoculants.

In line with N2Africa's plan to contribute to national intitutional capacity building, four candidates (one PhD and three Masters) have been selected to pursue their education. The PhD student undertake his study at Wageningen University, in the Netherlands while the Msc students are liaise with universities at home (Hwassa and Haramaya Universities).

By the N2Africa-Ethiopia Team (Endalkachew, Birhan and Tamiru)

(for both Northern and Eastern regions), a Finance and Admin assistant and a driver. You can view their profiles on www.N2Africa.org. For capacity building and addressing important research questions, we also recruited a PhD candidate, Mr. Allan Ochieng. He will work on bio-prospecting of effective native rhizobium strains for bean inoculation.

To improve the infrastructure for production of quality inoculants, IITA procured laboratory equipment for the Makerere Microbiology laboratory to complement the other efforts by the COMPROII project. The N2Africa project also procured a greenhouse under this arrangement. In terms of M&E, we conducted a Baseline survey among 400 households. Data processing is underway.

Objective 2. Dissemination, delivery, input and output market

In the last season 2014a, seven demonstrations of N2Africa technologies were conducted. The demonstrations included climbing beans’ response to nutrient inputs and staking methods in Kapchorowa district (Mt Elgon highlands) and soyabean responses to fertilizer and inoculation and groundnut response to P fertilizer in Eastern and Northern Uganda by World Vision Uganda.

For the season 2014b, we have a much larger number of trials (see Table 1). For climbing bean, the large farmer cooperative working with VECO has set up 15 parish level demonstrations, 75 diagnostic trials and 300 adaptive trials in Kapchorwa. The demonstrations evaluate the effect of P-fertilizer for NABE12C. For soyabean, 12 demonstration and 400 adaptation trials have been set up in northern Uganda to test the response to inoculation and P-fertilizer. The rotational effects of soyabean will be evaluated with sorghum in the subsequent season. In addition, 11 demonstrations and 60 diagnostic trials have been established for groundnut.

Table 1 Summary of trials for season 2014B in Uganda

Region	Crop	Type of trial			Partners
		Demo	Diagnostic	Adaptive	
Northern	Soya-bean	12	-	400	Makerere, IITA Uganda
	Ground-nut	11	60		NaSAARI, World Vision, IITA, Mak
Eastern	Climbing bean	15	75	300	VECO, NaCCRI, IITA
	Ground-nut	10	30	-	VECO, NaSAARI, IITA, Makerere
South-western	Climbing bean	20	50	300	A2N, NaCCRI, IITA, MAK

From the 2014a season, we have seen that the farming communities are interested in the dissemination efforts. They are keen to improve productivity of their crops using the technical knowledge they have received so far. You can read an example of groundnut dissemination later in this podcaster.

Partnerships to support dissemination, input and output markets access

A national stakeholders meeting was held in June 2014. Beside the lead dissemination partners (World Vision Uganda, VECO Uganda and Africa 2000Net work Uganda), ZOA is interested in disseminating N2Africa technologies to farmer associations they work with in parts of North-



Participants at the National partners meeting held at Kabira country club, 19-20th June 2014

ern Uganda and West Nile. In addition, Integrated Sector Support programme (ISSD) is keen to collaborate with World Vision and VECO to support capacity building in local seed business development. The National Soyabean Network likes to support brokerage in marketing of soya-bean and provision of technical information. Finally, Farm Radio International is keen to support technology dissemination by developing and implementing the Farm radio programmes.

Multi-stakeholder platforms

Some important platforms through which N2Africa can engage various stakeholders have been identified. These platforms include 1) the SNV supported Oil Seed Support Platform (OSSUP) in northern Uganda for soyabean, 2) a groundnut platform initiated by VECO in eastern Uganda, and 3) National Maize and beans platform hosted by the Ministry of Agriculture Animal Industry and Fisheries. The Business Development Officer is already engaged in the platform meetings to create awareness about the N2Africa project.

Via the OSSUP platform, Nile Agro is interested to enter a private public partnership for soyabean. NASECO, a soya-bean seed producer, is keen to disseminate the N2Africa technologies and to develop and strengthen a pipeline for the delivery of packages to smallholder farmers. These packages can include affordable seed, rhizobium inoculants from Makerere University and P-fertiliser. NASECO is also keen to work with World Vision in the promotion of soyabean and a PPP arrangement is being developed for this purpose. The Export Trading Group (ETG) is potential trader in buying bean and soyabean grain and could be included in PPP agreements. Another prospective partner is Harvest Plus to link with dissemination partners to scale out iron enriched beans (bush and climbing beans).

Alongside the involvement of new partners, Makerere University and NARO are still the main research partners to support the agronomic and capacity building efforts. We also reaching out to include CIAT Uganda.

By Peter Ebanyat, Country Coordinator

Smallholder farmer's brace for improved productivity of groundnut and market access in Uganda

Smallholder farmers have started embracing knowledge gained from the N2Africa project to improve groundnut production in Minakulu, Oyam district, Northern Uganda. World Vision Uganda engaged with 60 smallholder farmers to improve their skills on field agronomic practices for soya-bean and groundnut production using a farmer field school approach. Using small demonstration plots, the participating farmers learned about responses of improved groundnut varieties SERENUT 5 and SERENUT 6 to P-fertilizer and gypsum over the two seasons of 2013. Farmers preferred SERENUT 5 to SERENUT 6 variety because of its reddish color and better yield.



Francis Odyek and his wife harvested seven bags from half an acre and attributed the good yield to good variety, proper spacing and early weeding



World Vision's Farmer field school facilitator (bending) examining groundnut pegging on one of the on-farm demonstration trials in Minakulu Variety demonstrations

In the last season (2014A), half of the farmers applied the techniques and skills they gained from the World Vision. Each of them used two bags to plant an acre and harvested on average 5 bags (unshelled is 50 kg). Farmer Rose Mary Ayo said that *"proper spacing, good variety and early weeding is what enabled us to get good yield. Traditionally we believe that early weeding causes stunting of groundnuts, so farmers would leave weeding up until late in the*

season. Now we know that this significantly affects yields". Now that they know how to obtain a good harvest, Rose Mary Ayo's husband, Francis Odyek, notes that the main challenge is accessing markets. World Vision organized an exposure visit to VECO in Eastern Uganda to learn about collective marketing. Francis Odyek believes this is going to help them, because *"we need linkages to the markets and we hope N2Africa will help us on this"*. Following the visit to VECO, they have begun to bulk groundnut. From last season's harvest, they collectively had 80 bags brought into the store. So far, they sold 30 bags locally.

Despite the enthusiasm of the farmers, use of fertilizer is still negligible. One 50 kg bag of TSP costs 150,000 Ush. In addition, it is not easily found in the area. N2Africa continues to address this challenge and aims for innovative solutions.

By Aron Othieno, N2Africa Field Liaison Officer, Northern Uganda region

N2Africa and AfricaRice working to diversify and intensify the rice-based cropping systems of Kilombero valley in Tanzania

Kilombero Valley, located in south-central Tanzania, is a major rice production area with smallholder rice schemes occupying about 2,080 square kilometers. Rice production is largely based on rain-fed lowland cropping systems, where rice is grown over the wet season, and field left fallow over the dry season. Demographic growth and increased demand for land are forcing many farmers to intensify their rice production systems. Declining fallow length and increasing number of crops before leaving the land to extended fallow significantly reduce yield. Promising cropping system options include rotation of rice with grain legumes. However, poor knowledge of legume technology among farmers and the near complete absence of research on fallow management in this extremely diverse

lowland rice-based systems require a multiscale approach for generating and extrapolating fallow technology. N2Africa and AfricaRice aim to develop a system based on rice production in the wet season, followed by cowpea that will utilize the residual moisture in the dry season. The aim is to sustain productivity gains and provide farmer with income over a greater portion of the year.

In June, 2014, just after harvesting rice, twelve demonstration trials were established in Mkula, Kisawasawa and Idete wards to test the Good Agricultural Practices (GAPs) for cowpea (use of improved seed, planting on line at proper spacing of 60 cm x 20 cm, timely weeding and use of insecticides). Set up of the demonstration adopted the



A poorly established and growing cowpea crop at Mkula ward. The crop was planted late on a heavy clay soil. The top soil layer dries up faster limiting proper weeding.

N2Africa approach of development to research and adaptation. The Results so far indicate that crop establishment and growth varies with site and management. Poor crop establishment and growth are observed on heavy soils, compounded by poor crop management (late planting and inadequate weeding). Inherent low soil fertility and poor soil structures as a result of wet cultivation for preceding rice also limit crop establishment and growth. Management of soil moistures is also key in this rice-grain legume rota-



A well performing demonstration on cowpea GAPs at Idete ward in Kilombero district. The crop was planted after harvesting rice to utilize the residual moisture. A farmer (a woman in the picture) applied rice straw as mulch to conserve the soil moisture.

tion system. Agronomic and management strategies need to be developed to minimize these constraints. Nevertheless, farmers are excited and show potential for adoption of cowpea and accompanying GAPs such as early planting, retention of rice straw as mulch and use of improved seed. More experiments to examine the effect of these treatments on cowpea production and the effect of cowpea on subsequent rice will be implemented in June 2015.

Freddy Baijukya

N2Africa DRC forms more partnerships and continues Rhizobiology activities

N2Africa and the Humid Tropics

On 29th July 2014, the N2Africa DRC team attended a workshop at Bodega hotel to plan activities for the Mega Program Humid Tropics. Many organizations and their partners¹ joined this meeting to familiarize themselves with the activities undertaken by every program or project, to detect the complementarities between these projects/programs and to identify the gaps to be covered for the East of DR Congo.

The Mega Program Humid Tropics has five entry points: Productivity, Natural Resource Management, Nutrition, Politics and Markets, and Gender and Youth. In the workshop, we planned all activities around these five entry points. All the stakeholders identified the gaps and targeted the general theme to cover for the season A 2015 (starting early September 2014). The following themes were maintained by all the stakeholders:

- Nutrition
- Markets and credit access
- Integrated management of banana-legume system

- Credit access
- Integration of livestock in the cultivation systems
- Integration of trees in cultivation systems
- Post-harvest handling of cassava, banana and soybean

N2Africa's expertise will be used to contribute to the program in different ways. Firstly, N2Africa will introduce soyabean varieties rich in protein. This contributes to the nutrition goal. Secondly, N2Africa will assist in dissemination of cultivation systems that improve productivity of legumes associated with other cultures like cassava, banana and maize. Related to this, N2Africa will disseminate the use of inoculants for legume production. Thirdly, N2Africa will provide its expertise in capacity building by training master farmers and farmers using radio and other means, like demonstration and participative monitoring and evaluation.

N2Africa's partnership with Women for Women

On 30th July 2014, the N2Africa DRC team and the direction team of Women for Women (WfWi) met at IITA's Kalambo

¹ The workshop participants included the projects or programs SARDC/IITA, DIOBASS, CIALCA, IFAD, Legume CHOICE, HARVEST PLUS, ICCO Cooperation, SARCAFF, ACOSYF, BIVERSITY and N2Africa Program, the research institutes INERA and CRSN Lwiro, the government services SENASEM and IPAPEL, the universities U.E.A and U.C.B), and local organizations and agro-dealers.

station. In this meeting we discussed and formalized the partnership between the two organizations for the second phase of N2Africa. In the first phase, WfWi already trained more than 837 female household heads in Uvira (South Kivu) and Goma (North Kivu) in N2Africa technologies (Inoculum, ISFM, business plan, market and credit access). The approaches used to achieve this goal were demonstrations trials, seeds multiplication fields and sharing experiences between farmers. For the second phase, N2Africa and WfWi target to train 4000 women per year. At the end of the meeting, the N2Africa coordinator and the WfWi direction team renewed and updated the MoU and agreed to meet for further planning the activities of Season A, 2015 that starts early September.



Image 1: Meeting participants



Image 2: From left to right: WfWi officer in charge of partnership, WfWi vice director, WfWi income generator, N2Africa DRC coordination, WfWi field technician and N2Africa Research technician

Rhizobiology activities continue in Phase II

One of the goals of the N2Africa Rhizobiology activities is to discover new and better strains for use in legume inoculants. In the projects' first phase, the D.R. Congo Rhizobiology team completed the collection of isolates and the characterization of strains. They also assessed the symbiotic capacity of strains and compared strains currently included in inoculants. 107 isolates were recovered and tested for effectiveness and competitiveness in the greenhouse. From those experiments, four strains were identified as effective and highly competitive compared to the commercially used strains USDA110 and SEMIA 5019. The identified strains are presented as candidate elite strains from DRC.

Rhizobiology activities are continuing during Phase II. So far, the following activities have been performed:

- Culture refreshment and database updating;



Image 3: Culture refreshed



Image 4: Cultures concentration on rotary shaker

- Comparing the four candidate elite strains with the inoculants Biofix Legume Inoculant from Kenya and Rhizobium from Rwanda in pot experiment in the greenhouse;
- Long storage of the candidates elite strains (by lyophilization);



Image 5: Ultra freezer for long storage facility



Image 6: Rhizobia culturing media preparation

- Quality control of inoculants (including Biofix);
- Production of inoculants using different carrier materials.

Jeanmarie Sanginga

Results from demonstration plots on inoculation of climbing bean combined with different methods of staking in Rwanda

During the long rains season (March – July 2014), 5 demo plots were established in the Northern province of Rwanda in collaboration with N2Africa partner DRD and farmers' associations and individual farmers as well, with the objective of promoting the best method of staking and the use of inoculants on climbing bean. Results have showed a good response to inoculants in all sites and on all varieties used.

Three methods of staking were compared: wooden stakes, maize stems, and sisal strings. The sisal strings proved to be the best method in terms of yield and quality of grain produced. A farmer field day was organized around each

demo plot. Farmers selected the sisal strings as the best method of staking.

There was a net difference between inoculated plots and non-inoculated plots, regardless the variety and the site, even where the yield was not good, that difference between inoculated and non-inoculated plot is clear. Maize stems method gave poor results because the stakes became very weak to hold the weight of bean pods after flowering.

Speciose Kantengwa

Table 1. Results on grain yield from 4 sites

Site	Variety	Yield in kg/ha					
		Wooden stakes		Maize stems		Sisal strings	
		With inoculants	No inoculants	With inoculants	No inoculants	With inoculants	No inoculants
Cyabingo	RWV1129	2111	1389	1556	972	2139	833
Rwaza	RWV2872	3194	2556	2583	2028	3611	1056
Kinoni	RWV1129	3542	3306	3083	2500	3306	2778
Kamubuga	RWV1129	1700	1233	1400	1000	1500	1333



Maize stems methods at Rwaza site



Sisal strings method in Kinoni site

Kenya Update

In Kenya the five main objectives are 1) expanding awareness of BNF technologies, 2) dissemination of proven BNF and grain legume production technologies, 3) conduct training in BNF technologies, 4) design field demonstrations of N2Africa best practice that are conducted by others, and 5) backstop Kenya's inoculant industry. Here is a brief description of our approach to each objective.

Expanding awareness of BNF technologies

Awareness of BNF technologies was promoted through a three-day stakeholder meeting attended by 36 participants (33% women) representing 32 organizations including five private sector interests. This meeting served as a clearing-house for technologies from four projects relating to BNF and grain legume technologies. At the request of its partners, N2Africa designed and printed 12,000 one-kg paper bags for KINOKO brand soy flour. These packages are fully compliant with Kenyan regulations, include a certified bar code for ease in retail sales, and cooperators are expected to meet our standards before they may fill these bags with their milled soybeans. Presently, five cooperators have done so.

Dissemination of proven BNF and grain legume production technologies

In Kenya, the lead party through which we indirectly disseminate the N2Africa best practices is the Western Regional Agricultural Technology Evaluation (WeRATE), an umbrella organization of 22 farmer associations and other stakeholders. In addition, eight one-stop BNF technology shops were established. These shops sell improved grain legume seed, inoculants and blended fertilizers.

Alongside the above, a new area with huge potential for expansion of soyabean production was identified in Kuria, and incentives offered to a new farmer association started there. Furthermore, N2Africa continues to produce and distribute branded bags to its partners, in this case 4,000 fifty-kg woven polythene grain sacks, 2,000 twelve-kg woven seed bags and 4,000 two-kg two-ply paper seed bags. Just as this article is being prepared, an order was received for 200 tons of soyabean and logistics for this opportunity are being formalized through appointing a short-term marketing officer.

Conduct training in BNF technologies

Training in BNF technologies and grain legume enterprise continues. It now focuses upon extension agent liaison skills, grain legume marketing and legume processing, with 47 trainees scheduled for 2014. Training relies upon extension materials developed during Phase 1, with 4500 copies of the "green booklets" reprinted and distributed through various means. N2Africa Master Farmers now lead training in BNF technologies organized by other organizations using N2Africa's training materials (the abovementioned green booklets).



Figure 1. Farmers working with N2Africa have mastered soyabean production using recommended disease-resistant varieties, inoculants, fertilizer and spacing as illustrated by the performance of SC Squire at Ongai Farm, Vihiga

Design field demonstrations of N2Africa best practice that are conducted by others

Technology demonstrations were installed during both the 2014 long rains and the 2014-2015 short rains. Farm input suppliers donated seeds, inoculant and fertilizers. Special thanks are extended to MEA Fertilizers, SeedCo and Western Seed Company!

During the 2014 long rains, seven field demonstrations were conducted with N2Africa soyabean best practice involving rust tolerant varieties inoculated with BIOFIX and fertilized with Sympal. The demonstrations were conducted across the West Kenya Action Site and served as the focus for farmer field days in June. In addition, seven soyabean variety tests were conducted, with SC Squire emerging as the best performing variety.

During the 2014-2015 short rains 86 technology tests were installed. These demonstrations were supported by N2Africa (25 sites) as well as three other projects with interests in legume management; the Humidtropics Program (25 sites), NIFA Better Beans (18 sites) and IFAD-Cassava Intercropping (18 sites). Field protocols for these tests are available on request.

Backstop Kenya's inoculant industry

N2Africa continues to work closely with the University of Nairobi MIRCEN by supporting quality control testing of every batch of BIOFIX inoculant produced by MEA Fertilizers at its Nakuru factory. Every batch contains in excess of one billion rhizobia per gram of inoculant, but contaminants, mostly fungal spores, are on the rise. Therefore, quality control remains very important.

Meanwhile, MIRCEN is working with COMPRO through funding by NIFA to conduct molecular characterization of its four best NAK isolates for both bean and soyabean. Some of these candidate elite isolates (e.g. NAK 117 and 135) were shown to be the same strain, but in general the best strains were shown to be distinct from one another and their counterpart industry standards.

Finally, MIRCEN is also examining some lower cost culture media for its best NAK rhizobia, including substitution of yeast extract and mannitol for lower cost substitutes. More information on this development will follow in later articles.

The story continues

So progress by N2Africa continues in Kenya. Our ability to foster dissemina-



Figure 2. Recovery of cured BIOFIX inner packages prior to sealing into outer sachets. Every batch of BIOFIX undergoes independent quality inspection by MIRCEN-Nairobi under arrangements with N2Africa.

tion largely relies upon the commercial availability of improved BNF technologies and the interests of Kenyan farmer associations and other's innovation platforms in grain legume enterprise. We have attracted participation by other developmental research projects as well, and now coordinate our joint efforts through a novel technology clearinghouse approach. One emerging issue is that when others conduct BNF technology tests under our guidance, they are no longer obligated to collect data on our behalf. To solve this, we have recently recruited a fulltime farm liaison officer to assure that important information from these on-farm activities are not lost.

By Paul L. Woome (Kenya Country Coordinator), Macdonald Wasonga (WeRATE Chairman) and Nancy K. Karanja (MIRCEN-Nairobi Director)

Mozambique update

Progress in partnerships:

N2Africa-Mozambique signed a Memorandum of Understanding (MoU) with The USAID AgriFUTURO (AgriFUTURO). This MoU facilitates an effective partnership between AgriFUTURO and N2Africa towards the shared objective of providing expertise on agronomy and rhizobiology to increase the use of inoculants among smallholder producers producing soyabean.

The country coordinator participated in a series of meetings:

The Soil Health Country Policy Node meeting held in Maputo on April 17 to explore the possibility for dissemination of N2Africa technology to improve soil fertility and smallholder farmers' productivity as part of institutionalization of N2Africa technologies.

The launch of the Seed Sector Platform meeting in Maputo (24th - 25th April) This is a public private body formed to address seed sector constraints in Mozambique.

A meeting with 33 agro-dealers in Chimoio (22th - 23th August) to discuss the possibility of including N2Africa technologies in an integrated packages (maize, soyabean, fertilizers, herbicides and inoculants) to be disseminated by agro-dealers.

Dissemination and training activities:

IITA's N2Africa (N2Africa-Mozambique) finished with the harvesting of 2013-14 demo plots in Manica, Nampula, Tete and Zambézia provinces. In total of 87 plots were harvested and the data still being analyzed.

As part of institutionalization of N2Africa technologies, N2Africa-Mozambique in collaboration National Directorate of Agricultural Extension (Ministry of Agriculture), organized two non-degree training of trainers event for government extension officers in two provinces (Cabo Delgado and Tete). The training focused on soyabean production and establishment of on-farm soyabean demonstrations plots. A total of 92 extension officers were trained (87 male and 5 female).

As follow up on the MoU between N2Africa and AgriFUTURO, the two institutions developed training and dissemination material on [soyabean production](#) and on the importance of inoculants. Each leaflet was two pages. The material was developed in Portuguese, targeting smallholder farmers. The leaflets will be distributed to about 18000 smallholders from Nampula, Zambezia, Manica and Tete provinces.

Several contacts have been made with N2Africa partners involved in soyabean value chains such as the *Compania do Zembe* to explore opportunities for non-degree training on processing soyabean for cake as part of women empowerment.

Wilson Leonardo and Steven Boahen

Malawi, May – August 2014: Progress with implementation

- A second demand driven training-of-trainers workshop on harvesting and post-harvest management of legumes was conducted in May 2014 in collaboration with the Ministry of Agriculture and Food Security's Department of Agricultural Research Services (Crop Storage). Twenty-five extension workers comprising of 21 men and 4 women were trained.
- A Stakeholder Conference hosted by N2Africa-Malawi was held on the 5th of June 2014, in Lilongwe, Malawi. The meeting reviewed achievements and challenges of Phase I and mapped the best way forward for Phase II. The conference drew 37 participants (9 women and 28 men) from World Vision Malawi, National Smallholder Association of Malawi (NASFAM), Catholic Development Commission of Malawi (CADECOM of the Catholic Relief Services), Department of Agricultural Research Services (DARS), Department of Agricultural Extension Services (DAES) in the Ministry of Agriculture and Food Security, Agri-Input Suppliers Limited (AISL), Malawi Mangoes Limited, CIAT, ICRISAT, IITA, AGRA, and Malawi Oilseed Sector Transformation.
- N2Africa-Malawi in collaboration with personnel from the Ministry of Agriculture and Food Security (DARS and DAES) developed two training and dissemination materials on two thematic topics titled 1) *Soyabean production* and 2) *Inoculants: importance and how to use*; by way of adapting/adopting available information. Translation into local language was also done and leaflets based on the second topic were produced and are being distributed.
- Hosting of an MSc student: successfully hosted Hyejin Lee, an MSc student from Wageningen University from April to June 2014. She did a survey on the 'Impact of legume technology of N2Africa on food security and livelihood'.
- Participation at the National Agriculture Fair: N2Africa in conjunction with other projects at IITA-Malawi and DARS, participated at the 11th National Agriculture Fair which



Brenda Sopo of IITA takes the Malawi Minister of Agriculture, Allan Chiyembekeza (in Dark suit) through IITA activities

ran from 28-30 August 2014. The Malawi President, Prof Mutharika, officially opened the Fair. Outputs from the Fair included increased visibility of IITA and its work in Malawi; 281 people patronised the stand comprising 164 males and 117 females; 1000 flyers on IITA's work in Malawi and 200 flyers on use of inoculants in soyabean production were distributed to the general public. The Malawi Minister of Agriculture and his entourage were briefed on IITA's work in Malawi.

- Profiling and training needs assessment for agro-dealers: conducted an exercise to up-date and profile as well as assessing training needs for thirty-eight agro-dealers active in the impact districts of Lilongwe, Dedza, Ntcheu, Salima, Dowa, Kasungu and Mchinji. One of the findings during the exercise showed that some agro-dealers who manage to access inoculants (both local and through informal importations) were just displaying the product on the shelf unaware of the consequences of such actions on efficacy of inoculants. Training on handling inoculants will be scheduled once supply of the product in large enough quantities is guaranteed.
- Collaboration between N2Africa and SIMLESA: discussions were held between the two project's personnel and areas of collaboration such as conducting ToTs on legumes production, inoculants technologies, demonstrations and legume fertiliser trials were identified.
- PPP establishment: execution of plans to commercialise production of local inoculants is on-going; Agri-Input Suppliers Limited with support from Malawi Oilseed Sector Transformation may start brand-packaging and distributing local inoculants (produced at Chitedze) in October 2014.
- Challenges: the biggest challenge is the uncertainty of availability of inoculants to meet soyabean farmers' demands.



Lloyd Phiphira of IITA-N2Africa illustrating displays to patrons at the Agriculture Fair in Blantyre

Lloyd Phiphira

Experts advise the Malawian government to give grain legumes a central role in the Farm Input Subsidy Program

The Farm Input Subsidy Program (FISP) in Malawi has been a tremendous success in improving maize yields and reducing hunger in the country. The FISP is however plagued by inefficiencies in the implementation and the use of inputs and as a result, donor countries have been hesitant to contribute to the funding of the program in recent years. AGRA organised a technical meeting with agricultural experts in Salima, Malawi, on August 27-28 to derive recommendations for the Malawian government to improve the FISP.

There was wide consensus at the meeting that the baby - the FISP - should not be thrown away with the bathwater, but it is high time to make the bathwater more transparent. This has led to the advice to manage the FISP and especially the input procurement by a body independent from the government, and to limit the subsidy inputs to 70% of the free market price. To improve the input use efficiency in farmers' fields, it was advised that blanket fertilizer recommendation should gradually be replaced by site-specific ones, to expand fertilizer blending capacity in the country, and to increase the role of grain legumes in the FISP. To achieve the latter, it was recommended to increase farmer access to improved legume seeds and to high-quality inoculants for soyabean, to promote fertiliser blends targeted to legumes, and to improve extension services around legumes. To make inoculants widely available to farmers, the government should ease import regulations and set-up a quality control system for inoculants.



The work implemented through N2Africa in Malawi has been key in providing a basis for recommending a central place for grain legumes in the FISP. The meeting provided a great opportunity to advise ministers and other policy makers in Malawi. Let's hope Malawi's government will follow the experts' recommendations!

Linus Franke

Agricultural Shows and Nutrition workshops major activities during the off-season in Zimbabwe

During the period June-September, N2Africa activities in Zimbabwe focused on local level value addition of grain legumes through nutrition workshops that involved mostly women farmers and dissemination of project technologies at both ward and district agricultural shows, which are annual events. These activities were held in all the five districts where N2Africa is implementing activities, in



Figure 1. N2Africa beneficiaries were among some of the farmers who won at the 'ward' shows and subsequently brought their produce to the district agricultural shows during August

line with N2Africa's increased dissemination of technologies thrust. We intend to make the active participation of N2Africa at these annual district agricultural shows a key strategy of implementing the N2Africa D&D philosophy (Figure 1).

For effective communication, we produced and distributed banners to all our key stakeholders in the districts (Figure 2). The banners attracted a lot of attention from farmers, NGO partners and government representatives at the agricultural shows. Two Members of Parliament attended one of the agricultural shows and we took the opportunity to explain to them the objectives of N2Africa.



Figure 2. Banners with the N2Africa message (left) were distributed to partners and attracted attention at agricultural shows as the message was coherent with the N2Africa exhibits (right)



Figure 3. 'Judges' assessing quality of grain legumes brought to the agricultural show by farmers in Makoni district

The Cluster Agricultural Development Services (CADS), a local NGO, has emerged as an important N2Africa partner implementing activities primarily in Goromonzi, Murehwa and Mutoko districts. During August and early September,

we facilitated CADS to implement several nutrition workshops with farming communities. The workshops were structured at two stages:

1. Formal 'classroom type' training of trainers (left picture below) involving community leaders, women groups leaders and local extension, and
2. Stage 1 participants training more farmers in different villages, ensuring reaching out to hundreds of farmers.



We will report on the details of the recipes that farmers learnt during the next issue of Podcaster! We are now preparing for the next cropping cycle that normally starts late November.

Regis Chikowo

Harun Murithi article published: Soybean rust: A major threat to soybean production in Tanzania

Efforts of the government and development partners have stirred the interest of soybean production among farmers in Tanzania. The crop that is mainly cultivated for human consumption, utilization in animal feeds, soil fertility improvement and as source of income has increased in demand over the recent years.

Globally soybean rust poses a major threat to soybean production. Soybean rust (SBR), caused by a fungus-*Phakopsora pachyrhizi*, was first reported on soybean in Africa in Uganda, Kenya and Rwanda in 1996 and rapidly spread to several other countries in the continent. The disease that significantly reduces yields, is threatening soybean production in Tanzania. Information on its distribution, variability and potential spread through prevailing winds in Tanzania is not known. Through N2Africa support, field surveys were conducted in the major soybean growing regions of Tanzania namely: Ruvuma, Songea, Mbeya and Morogoro in the 2012-2013 growing seasons. Symptoms of SBR included yellowing of leaves and tan sporulating lesions. These symptoms were observed at flowering through seed maturity. From fields surveyed in 2012

and 2013, SBR was observed in 5 of 14 and 7 of 11 fields respectively. Incidence and severity ranged between 35 to 63% and 20-80% respectively. To confirm the pathogen, DNA was extracted from asymptomatic soybean leaf tissue and subjected to PCR analysis. The samples were confirmed positive of soybean rust. Fungicides are commonly used for controlling rust however they increase the cost of production and pose threat to the environment. Host resistance is considered as the best control option however, there are no resistant varieties available due to the variability of the fungus. Therefore, further studies to understand the virulence and genetic diversity of soybean rust population in Tanzania are on progress. Information from these studies will assist breeders deploy screen, and develop resistant germplasm to the dominant rust populations in the country to help in controlling the disease in Tanzania. The first report of soybean rust in Tanzania was published in the Plant Disease Journal.

Harun Muthuri Murithi (Graduate Research Fellow) International Institute of Tropical Agriculture (IITA) & Wageningen University -Laboratory of Phytopathology. h.murithi@cgiar.org

Maureen Waswa et al. article published: Identifying elite rhizobia for soybean (*Glycine max*) in Kenya

Bio-prospecting was conducted in Kenya to identify elite isolates of rhizobia capable of effectively nodulating promising soybean varieties. One hundred isolates were recovered from nodules of wild and cultivated legume hosts. These isolates were authenticated and tested for effectiveness on soybean (*Glycine max*) var. SB 19 in sterile vermiculite, and

the twenty-four most promising isolates screened in potted soil to assess their competitive abilities on two varieties ("promiscuously nodulating" SB 19 and specific SC Safari). The six best performing isolates were then evaluated under field conditions, comparing them to strain USDA110. Test isolates were classified into; non-infective, ineffective, partly

effective, effective and highly effective based on their performance relative to controls and industry standards. In potted soil, native rhizobia isolates nodulated promiscuous soybean (SB19) but only 46% of them nodulated specific soybean (Safari). In the field experiment, isolate NAK 128 performed best on both promiscuous and specific soybean varieties, significantly ($p < 0.05$) outperforming USDA110 by 29% and 24%, respectively. Partial economic return to inoculation with NAK 128 was about 21:1, justifying inoculation as a field

practice and producing up to 2.5 million nodules (334 kg ha^{-1}), significantly ($p < 0.05$) more than USDA 110. The best isolates from this investigation have commercial potential.

The article written by Maureen Nekoye Waswa, Nancy K. Karanja, Paul L. Woomeer and George M. Mwenda is published in the African Journal of Crop Science Vol. 2 (2), pp. 060-066, June, 2014. Available online at www.internationalscholarsjournals.org

Samuel Mutuma *et al.* article published: Smallholder farmers' use and profitability of legume inoculants in western Kenya

Research on the use of *Rhizobia* inoculants has been conducted in Africa since 1950s. However, the technology has not been widely applied by farmers on the continent. In Kenya, wide-scale adoption of this innovation among the smallholder farmers is still low. The aim of this study was to examine factors that drive the use of BIOFIX® *Rhizobia* inoculant, a product of Kenya, and its profitability in smallholder farms. Data were collected from 210 soybean (*Glycine max*) farmers in western Kenya. Logit and tobit regression models were used to assess drivers of the inoculants use and gross margin analysis to examine profitability. The area under the crop, distance to local markets, knowledge of legume root nodules, education

level, contacts with organisations promoting biological N fixation (BNF) technologies, group membership, soybean market and location of the farm based on agro-ecological zone were factors that determine the use of the inoculants. There was a significant difference in yields between farmers who inoculate soybean (864 kg ha^{-1}) and those who do not (686 kg ha^{-1}) ($P < 0.01$). The difference in gross margin achieved by inoculant users (US\$ 278 ha^{-1}) and non-users was highly significant ($P < 0.01$).

The article by S.P. Mutuma, J.J. Okello, N.K. Karanja and P.L. Woomeer is published in the Africa Crop Science Journal, Vol 22, No 3, pp. 205 - 213.

MSc research in the Usambara Mountains, Tanzania: Thesis reports

This was published on Facebook on September 9th

Last year we conducted our Masters theses for N2Africa in the Usambara Mountains in Tanzania. You might have seen some of the updates about our research on the N2Africa Facebook page. From October until February we did fieldwork in the Usambaras where we worked together with local farmers to study the nutrient deficiencies for the production of common bean. We performed factorial field trials with inoculation and phosphorus and potassium fertilizers as inputs. During the research we collected leaf and soil samples and interviewed farmers. Back in Wageningen all the collected data was statistically analysed and reported. We are happy to share with you that our master theses are completed!



Elise (left) and Jori presenting their research outcomes. Photo credits Rik Schuiling



The outcomes pointed at potassium and phosphorus deficiencies as the major soil fertility constraints for the production of common bean in the Lushoto district. The P+K(+Inoculation) treatment gave the best results in terms of grain yield. Farmers in the Usambara mountains are not used to apply (chemical) fertilizers to their bean crops, which highlighted the need to support them with high quality inputs and information on how to manage their (bean) production systems in an adequate way.

We would like to thank our research supervisors prof. Dr. Ken Giller, prof. Dr. Patrick Ndakidemi, Dr. Kelvin Mtei and Dr. Freddy Baijukya for their guidance, enthusiasm and useful critiques during our thesis work. It was a great experience to perform our thesis work within the N2Africa framework!

If you are interested in our research you can find our theses on the N2Africa website ([Thesis Jori](#), [thesis Elise](#))

Elise and Jori

Gender report available via the N2Africa website

Shared before on [Facebook](#) on August 7th

The [gender report](#) for Phase I, related to milestone 4.5.2. was published on our website on August 7th. It presents a lot of information on womens' involvement in the N2Africa activities stated in numbers. You might already have opened it from our Facebook website.

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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