

N2Africa Podcaster no. 28

October, November and December 2014

Introduction

Welcome to the last Podcaster for 2014! We realize that this drops into your mailbox when you are rushing to finish all of those urgent tasks before the end of the year. Yet we hope you'll find some time to read through as we have lots of exciting news from all over the continent with articles from DRC, Ethiopia, Nigeria, Rwanda and Sierra Leone – where our N2Africa colleagues are managing to continue some very interesting work despite the problems. We also report on our review and planning workshop hold in Arusha in October and summarise our Master Plans. These documents share our ideas of how we hope to implement a common strategy across all of the N2Africa countries. This will allow a comparative analysis of what works where, why and for whom, which is a key goal of N2Africa.

We had a truly great review and planning workshop in October and we are grateful for the constructive feedback and advice on our Master Plans which we received there. In addition, we are grateful that Noel Ellis of the Grain Legumes CRP and NVPR Ganga Rao of the Tropical Legumes project could both join us for the workshop and we made concrete plans to strengthen our collaboration. As a first step we are mapping all N2Africa activities to the different CRPs (sorry for the CGIAR gobbledygook) and I contributed a blog on [Closing Yield Gaps](#) to the November issue of the Grain Legumes Newsletter¹. In addition, I had the pleasure of making a short video clip for N2Africa with the help of Catherine Njuguna and Gloriana Ndibalema of

IITA that was screened on prime-time TV in the Netherlands. You can watch the “College Tour” programme on this [link](#) - it is a fascinating question-and-answer session with Bill Gates about his life. On the different note, N2Africa was highlighted in an [article on the Guardian website](#) that bemoaned the problems that farmers face in Uganda to access fertiliser.

I am currently on sabbatical leave in Arusha, Tanzania with IITA and the Nelson Mandela African Institution of Science and Technology (NM-AIST) and just spent the past few days with Freddy Bajjukya, the National Coordinator for N2Africa, at a workshop on Integrated Legume Value Chain Development – my last workshop for 2014! I'll be staying here until the end of April and spending as much time as possible in the field with farmers.

Please make sure you read through right to the end of this Podcaster as we have some links to the most recent N2Africa extension leaflets and we hope you will use them!

Wishing you all a very peaceful festive season and I look forward to working with you in 2015!

Ken Giller

¹ Subscribe to the Grain Legumes Newsletter by clicking on this [link](#)

Field visit during the N2Africa Annual Planning Meeting

Published before on [N2Africa Facebook](#), November 4, 2014

One of the strategies of N2Africa is to open new opportunities for poor farmers and vulnerable groups by working with other players in the legume value chain and get them aggregated and linked to markets. In Tanzania there are already field based farmer organizations emerging.

During the annual planning meeting we visited Jikuzeni Kware SACCOS /AMCOS (Hai District, Kilimanjaro region in Tanzania), a collection of farmers which is considered to be successful in providing services to members. This SACCOS, founded in 2002 from more than 5 farmers



groups, now counts 696 members of which almost 50% women. Objectives are to gain access to training and credits and to establish a collective voice. Members now can get loans like agricultural and small business microfinance. The SACCOS participation to P4P initiative by WFP lead to the formation of Agricultural marketing Cooperative Society (AMCOS) wing, which is responsible for crop marketing. Next to that, the SACCOS developed good skills for the

whole chain of production, storage, entrepreneurship, business management, administration and other skills needed for providing good services to their farmers and selling the produces to various buyers.

The purpose of our visit was to learn about partnerships, which is an important new issue in Phase II of N2Africa. Strategies and practices were discussed. N2Africa is in



SACCOS chairman Samora Ndossi and Thomas Sillayo, leader of FAIDA MALI (NGO specialized in Market linkages)

progress to engage this SACCOS/AMCOS to market beans through the Patient Procurement Platform (PPP) lead by WFP with facilitation from FAIDA MALI.

It was a very interesting visit and we have learned a lot from each other.

Charlotte Schilt and Freddy Baijiukya

Finally N2Africa Master Plans are ready for use

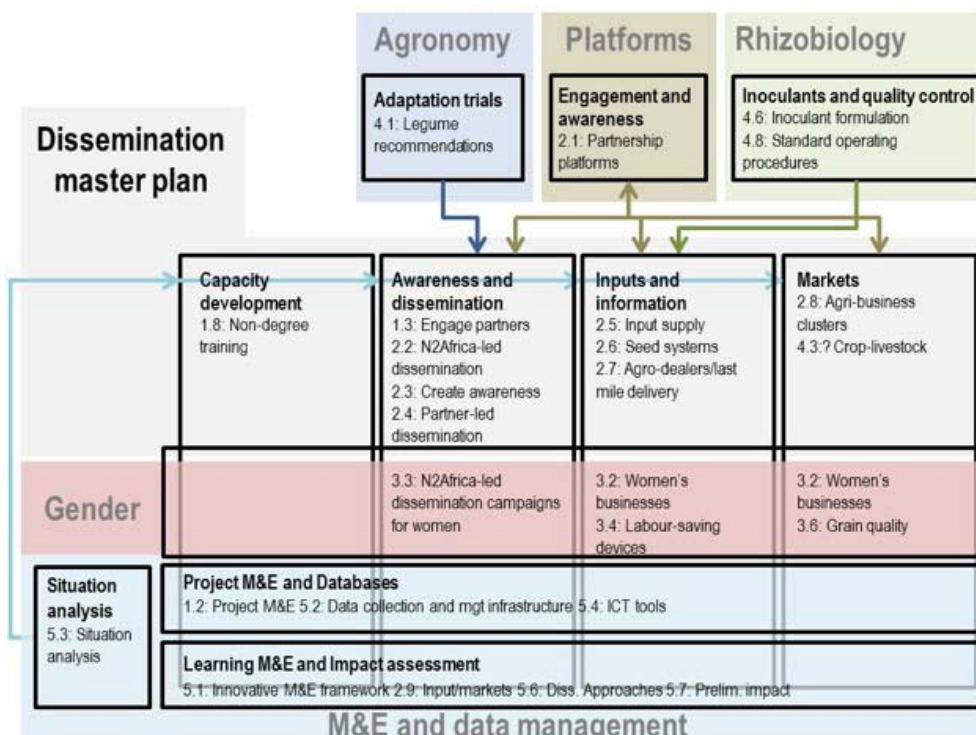
The N2Africa Master Plans¹ are documents intended to foster a common approach across the five Core Countries. So far seven master plans have been developed. These are Agronomy, Dissemination, Monitoring & Evaluation and

Data Management, Rhizobiology, Communication, Gender and Innovation platforms. The plans are designed to achieve the N2Africa Vision of Success and the objectives set out in the Research Framework of the approved project proposal.

This means all Master Plans need to ensure timely delivery of the outputs and outcomes.

We have focused considerable attention on developing Master Plans. During our 2014 Annual Review and Planning Meeting in Arusha, Tanzania we received inputs and feedback on all master plans from the N2Africa Advisory Committee and project staff. These feedbacks have been incorporated into the current versions of the Master Plans. It is now time to start using these master plans and improve on them based on feedback from the field.

Fred Kanampiu



The diagram of the of master plans as published before in Podcaster 26 of May/June 2014, but now showing the interactions among the plans

¹ Four of the Master Plans are available via the N2Africa website already. See the links in their subject lines below. The others will follow soon.



The N2Africa Agronomy Master Plan

The agronomy master plan aims to create a common understanding of the guiding principles, key activities and timelines related to N2Africa's agronomic research. It directly addresses objectives 2, 4 and 5 of the results framework, which deal with dissemination, improving legume productivity and situation analysis, respectively. The most important goals are understanding the major constraints to legume productivity, identifying the causes of yield variability and finding technological interventions to reduce this variability. Agronomy within N2Africa is characterised by an emphasis on on-farm trials and the use of a wide variety of data-collection and survey tools to obtain reliable information on important agronomic and socio-economic variables.

The master plan is structured around four activity clusters that consist of coherent sets of activities and tasks. The **diagnosis** cluster aims to identify the main biophysi-

Dissemination Master Plan

The Dissemination Master Plan outlines strategies to effectively engage public and private partners required for delivering the vision of success of N2Africa phase II. It directly addresses Objective 2: **Delivery and dissemination, sustainable input supply, and market access.**

The diagram in the introduction shows the linkages and interdependencies among the different master plans. Following the "Development to Research" approach of N2Africa, dissemination forms the core of the activities and leads the project from within. Given the ambition of N2Africa to reach more than 0.5 million smallholders within five years, partnerships are key to achieving this ambition.

Following the description of Objective 2, N2Africa is in part a legume value chain project of which dissemination of proven technologies is an important component but it also needs to consider achieving private sector led sustainable input supply systems on P-blended fertilizers, certified seeds and inoculants, market access for improved production, value addition to increase profitability and household nutrition and to address constraints in labour availability especially for women.

Rhizobiology Master Plan

N2Africa is committed to ensuring the best legume technologies reach smallholder farmers across sub-Saharan Africa (SSA). This Master Plan (MP) is specifically intended for core countries to address the rhizobiology component of Objective 4: **Tailor and adapt legume technologies to close yield gaps and expand the area of legume production within the farm.** It suggests a single and integrated rhizobiology research plan to instigate a common approach, which will lead to significant improvements on relevant issues such as the consistency in research designs, data collection to feed databases used for meta-

cal constraints to enhanced legume productivity, primarily by on-farm trials across a wide range of environmental conditions. The **researcher-managed Agronomy** cluster consists of specialized agronomic trials meant to identify solutions to known constraints and to identify and remedy soils that show limited response to inputs. Within the **demonstration** cluster, on-farm, participatory technology evaluations are implemented to establish the performance of promising technologies and to serve as a platform for co-development and dissemination of new technologies. In the **adaptation** cluster, these technologies are evaluated by large numbers of farmers to determine their appropriateness for different farm types and conditions. Results obtained from the four activity clusters are meant to inform activities in subsequent seasons, thereby contributing to N2Africa's feedback loops.

Joost van Heerwaarden

In striving to achieve the above, N2Africa has the opportunity to leverage, seek synergies and complementarities with other legume value chain initiatives which comprise a melange of public and private sector actors willing to take up their required roles. The master plan explains how to engage these actors and design meaningful and accountable partnership agreements, thereby making N2Africa an accumulation of partnerships whose targets total what the project aims to achieve.

The master plan explains that by structuring N2Africa along 4 Pillars i.e. (1) Capacity Building, (2) Dissemination, (3) Input Demand Information and Supply and (4) Marketing, a clear format is obtained for these agreements that is compatible with other value chain initiatives. So far promising partnership agreements have been effectuated with the CRS Soya ni Pesa project, ACIDI-VOCA, The USAID AgriFUTURO, Women for Women International (WfWI), AgDevCo. A range of others are being finalized to set the landscape early in the project to reach the intended half a million beneficiaries.

Edward Baars

analysis, etc., across N2Africa core countries. Other advantages of the MP include assurance of timely delivery of expected project outcomes / outputs.

The rhizobiology MP is built mostly upon lessons learnt from phase I, but also on achievements in legume technologies across SSA. While previous research efforts focussed on soybean, current evidence suggests that several other grain legumes (e.g. cowpea in Ghana and chickpea in Ethiopia) have great response potential to inoculation with rhizobia. Therefore, phase II will focus on bio-prospecting

to identify new elite rhizobia strains for four other major grain legumes – common bean, cowpea, faba bean and groundnut. The aim is to isolate elite strains from nodules of each target crop and evaluate the potential of these strains to increase yields such that inoculation becomes worthwhile. Thus, any significantly better strain to come, using proper statistical methods to ascertain differences up to 10% at least, that is robust and stable under screen house and field conditions, could be advanced for inoculant production.

Meanwhile, when dealing with promiscuous legumes such as cowpea, that nodulate readily with soil native rhizobia, advances in inoculant technologies depend upon clearly understanding success or lack of success of inoculation. This requires competition studies of background populations of indigenous rhizobia and tracing the inoculant strains in nodules. Standard methods of molecular typing will be used to characterize the role the rhizobial genotype,

from both soil and inoculant sources, in the $(G_L \times G_R) \times E \times M$ interaction, and its contribution to yield in farmer's fields.

The rhizobiology MP consists mainly of four activity clusters, each containing a set of activities involving specific tasks. These clusters are structured to ensure a relative flexibility that allows participating countries to adapt their rhizobiology plans to locally available facilities. Two activity clusters namely (1) Bioprospecting and (2) Identify elite strains, are expected to be implemented by almost all core countries; Two others, (3) Inoculant formulations and (4) standard operating procedures, will be implemented mostly by the inoculant factory at the central level. In addition, bridges are suggested between the rhizobiology MP and the others, especially with the Agronomy Master, in order to ensure interactivity across N2Africa interventions.

Mahamadi Dianda

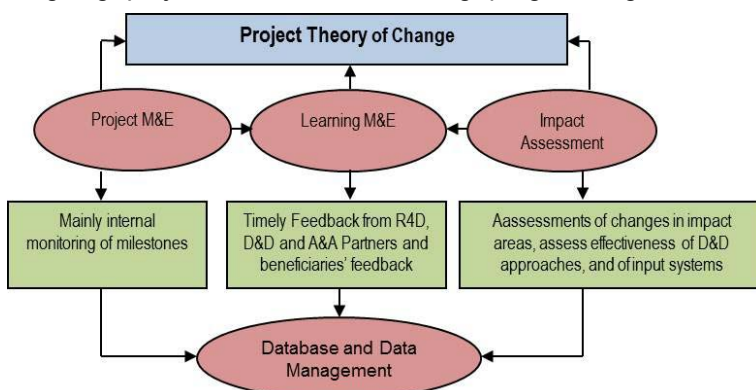
Master Plan - Monitoring & Evaluation and Data Management

The M&E and Data Management master plan aims to provide guidance on the principles of how monitoring and evaluation is conducted in N2Africa. It allows for learning across all focal areas of the project, i.e. agronomy, rhizobiology, dissemination, platforms, gender and communications based on monitoring experiences, and makes adjustments and/or adaptations to the project implementation.

Given the objective of M&E in N2Africa (strategic framework allowing for learning, timely feedback loops and desired level of consistency in design (of research and dissemination), there are four components of M&E in N2Africa: project M&E, learning M&E, impact evaluation and data management. These components cut across the 5 objectives of the project and the entire project theory of change.

The diagram below indicates the connections and interdependencies among the 4 components of the M&E plan and the theory of change. Given the objective of M&E in N2Africa, a structured M&E system that monitors the entire theory of change process is key to achieving this ambition.

Project M&E mainly is to guide the close supervision of on-going project activities, monitoring progress against



agreed milestones/indicators to ascertain the achievement of the set targets. **Learning M&E** is the feedback obtained from R2D activities, demonstrations and adaptations led by N2Africa and from adaptation and adoption activities led by partners on the other hand in the form of partnerships and how such feedback is integrated into further actions. With this, intended learning questions on technologies disseminated, dissemination approaches used and partnerships for dissemination will be answered through case studies, surveys, etc. Examples of learning questions include: What works where, why and for whom?, To what extent are technologies tailored to the needs of households?, Which of the dissemination approaches is effective (in terms of getting smallholder farmers to adapt and adopt technologies), To what extent are private sector actors involved in inoculant production and sales? **Project impact assessment** examines if and to what extent the project activities actually benefited the intended recipients. The focus is on the efficiency, relevance, effectiveness, impacts and the sustainability of results and interventions.

The plan finally outlines various strategies, processes and methods, roles and responsibilities to obtain and access data and information at various levels of implementation (i.e. beneficiary, partner, country and project levels). Such information is stored at central point (**central database**) for easy management and access.

Finally, various platforms (e.g. end of season evaluation with participating actors, planning sessions with partners, etc) have been outlined to obtain feedback from especially beneficiaries and how such feedback can be integrated in the R4D activities and other aspects of the project.

Theresa Ampadu-Boakyee



Gender Master Plan

N2Africa recognizes the critical importance of women in legume production. The fact that their access to appropriate technologies and necessary resources is often constrained by gender and institutional barriers a **Gender Master Plan** is developed to identify and incorporate gender research and analysis, and other gender-related issues at all levels of project planning. We seek to identify interventions that will be spread over the time frame of the N2Africa Project and steer the efforts towards achieving gender- equitable impacts at all levels.

The **Gender Master Plan** directly addresses **Objective 3: To empower women and increase their benefits from legume production**. As gender is integral to all the other components, the **Gender Master Plan** interacts actively with all the other Master Plans and serves as instrumental guide to interrogate their objectives to ensure that specific gender concerns are captured. In other words, this plan has a cross cutting role to ensure that the necessary 'best fit' technologies to close the gender gaps on yields, income,

nutrition, labour allocation and enhance gender and NRM responsive R&D capacity in the NARS. This includes documentation of whether key technologies developed are (or are not) benefitting women to the degree expected, particularly in terms of drudgery reduction, nutrition, and income.

The **Gender Master Plan** will be translated into action by bringing on board gender-based partner organizations with experience in agriculture research & extension to take the lead in implementing Objective 3. Major focus will be on further gender capacity strengthening activities following a training of trainers (TOT) approach (a Training Manual on Gender and Legume Value Chain has been developed). This will enable N2Africa to go beyond the technical training needs, develop a culture of gender inclusiveness, and eventually steer the combined efforts towards achieving gender-equitable impacts at all levels.

Amare Tegbaru

Platforms Master Plan

The first phase of N2Africa demonstrated the possibilities for increasing legume productivity through use of improved inputs but there were unanswered questions around practicable delivery mechanisms for such inputs. Phase II addresses these questions through a stronger emphasis on partnerships with existing input suppliers and through development of organizational innovations to enhance input supply. These include PPP's for sustainable supply of inoculants and fertilizer, private-sector or community based legume seed system development, fostering the capacity of agro-dealers and establishment of agri-business clusters around legume marketing and value addition. The establishment of multi-stakeholder processes including platforms to facilitate such innovations is a core mechanism of N2Africa Phase II.

The broad aim of work under the Platforms Masterplan is to engage as a project in multi-stakeholder processes including stakeholder platforms to catalyse innovation around input supply for enhanced legume productivity. This is achieved through 4 activity clusters:

1. Mapping existing networks - This cluster identifies existing structures upon which N2Africa can build. This is to avoid duplication and diffusion of effort.
2. Engaging in existing platforms/networks - This cluster

identifies key opportunities for action to achieve N2Africa goals and objectives through collaboration in multi-stakeholder processes.

3. Committing to actions in the interests of N2Africa as part of ongoing multi-stakeholder processes - This activity involves some practical steps to make progress on some key actions identified in Cluster 2.
4. Monitoring the outcomes of platform engagement - Learning is a key element of the platform process and a simple but systematic methodology for monitoring platform processes and the actions emerging from platform functioning is key to success. This activity cluster will involve systematic collection of simple indicator information to track effectiveness of platform engagement.

In summary, N2Africa's approach to multi-stakeholder platforms will be to engage as a strong partner in existing initiatives where possible. Through this engagement the project will identify and capitalize on opportunities to use platform processes to meet N2Africa objectives and will conduct some light monitoring of our engagement and the outcomes that emerge from this engagement.

Alan Duncan

Communications Master Plan

N2Africa focuses on knowledge generation and learning at all levels. Communication is thus central to our success as the sharing of new insights and approaches is key to the success of the project. Therefore we decided to develop a Communications Master Plan alongside our other Master Plans.

The approach to the development of the Communication Plan has been one of wide consultation and reflection both within N2Africa and with leaders of similar projects in both the public and private sectors. Essentially what we have learned from these discussions is that the external communication from N2Africa has been successful! The project

is well known among both the research and development community in most of the countries where N2Africa is active as well as internationally.

However, we also felt that there is room for improving our internal communication. Besides sending our messages into the world, we need to focus on communication and sharing of ideas and knowledge within N2Africa. Given that the N2Africa project is developed around a model of iterative learning through feedback loops, internal communication is central!

The aims of the **Communications Master Plan** are four-fold: 1) To ensure alignment and common understanding of the N2Africa Theory of Change and the general philosophy underlying our approach; 2) To share continuous learning as part of the N2Africa feedback loops both among partners within countries and among countries; 3) To attract interest and new partnerships for N2Africa dissemination

activities; and 4) To inform and share the excitement of N2Africa within target countries and beyond. We are still in the process of developing this plan and if you have advice on how best to fulfil these aims, particularly with regard to internal project communications, we would be pleased to hear from you.

What I have learned in my own career is that you can never do enough when it comes to communication! I think this is particularly true within large projects such as N2Africa and applies from sharing information with your closest colleagues to sharing essential knowledge with partners at all levels and in different countries. Our challenge is to move from a culture of pushing out information, to one where the people we want to communicate with are actively seeking the information we provide. This calls for action on both sides of the fence!

Ken Giller

The use of tablets and Short Message System (SMS) for data collection: Demonstration from case study in N2Africa-Ethiopia

In the 2014 growing season, two digital data collection methods were explored in Ada'a and Damot Gale districts of Ethiopia. The first approach is using Google Nexus tablets by extension workers and research technicians to collect both agronomic and socio-economic data. The second approach is using SMS method in which farmers send information on agronomic practices using SMS (Crowdsourcing). The SMS method is being carried out in Ada'a district, where 50 farmers are participating in the pilot test. For the tablet version of data collection, existing paper based questions (Fieldbook) were converted to easy-to use electronic versions (XML). The Open Data Kit (ODK) was installed in the android based nexus tablets and used to read the XML file and collect information both at the household and field level.

GPS features of the tablet to collect other types of data. In the pilot test, the GPS coordinates of the household and N2Africa fields are collected, and the camera feature is used to capture any incidences in the N2Africa field (e.g. incidence of pests and disease).

For the SMS data collection method, free desktop software, FrontlineSMS application, was installed in the national office and used to manage all incoming SMS messages from the farmers. A GSM modem together with a local SIM card was used to connect the FrontlineSMS to a mobile network. FrontlineSMS does not require the internet to work, but does need to be connected to a mobile network. In order to simplify the data sending process and overcome the illiteracy of farmers, laminated A4 paper with all the short codes written in the local languages was provided to the farmers so that the farmers could refer to this paper for the codes when they needed to send SMS related to their agronomic activities. For example farmers send "1" for date of land preparation, "2" for planting date etc. In addition, farmers received air time credit to their mobile phones to cover the cost of sending SMS.

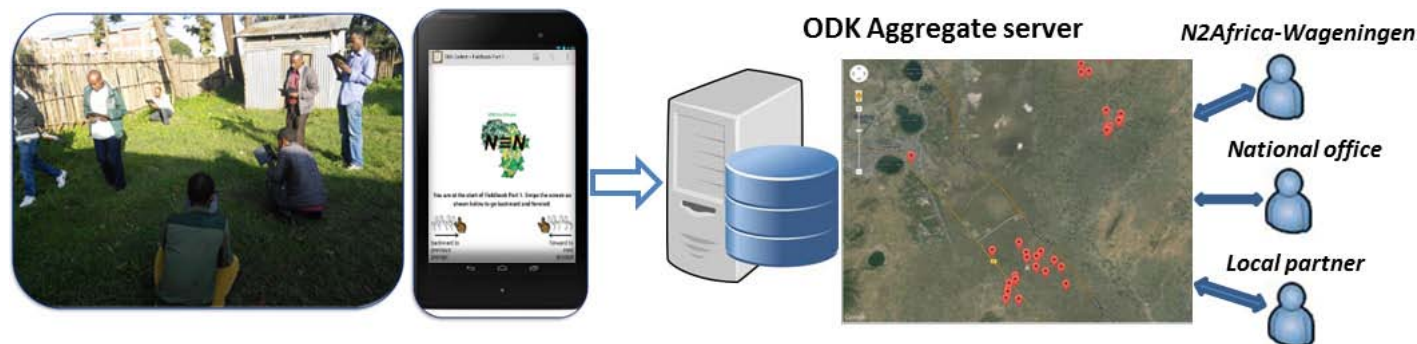


Figure 1: An overview of the data collection process using tablets by extension workers from field data collection to central data storage and access by different users

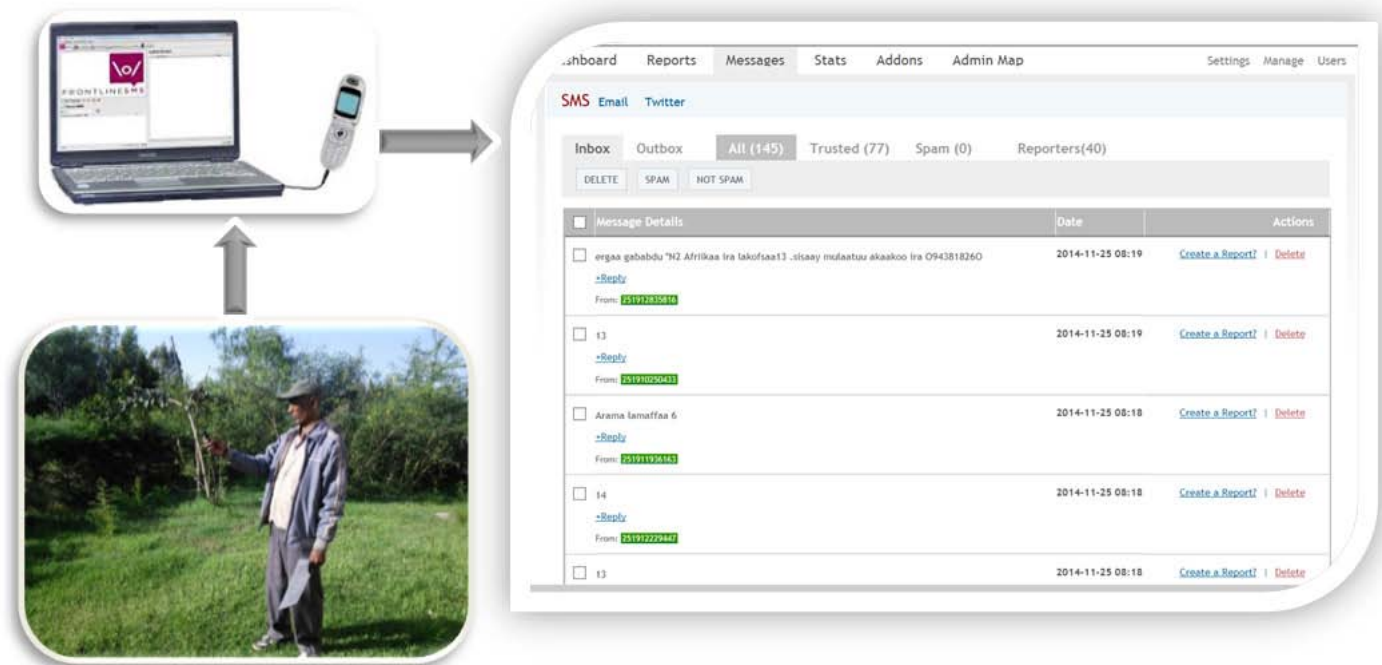


Figure 2: A farmer participating in N2Africa trials sending SMS (left) and an overview of the SMS messages send by participating farmers in Ada'a district (right).



Figure 3: Extension workers hands-on training on how to use the tablet and use the ODK application to collect data



Figure 4: Training of farmers on how to use the short codes and send cropping calendar of N2Africa field using SMS

Before the start of the growing season, training was given both to extension workers and to farmers on how to use the technology. Extension workers received hands-on training on how to operate the tablets and use the ODK application installed on the tablets. Farmers who did not have the experience of sending SMS were briefed on how to send SMS using their own basic phones. During this time, farmers were asked about their motivations for sending SMS and the majority of them indicated that they feel considered part of the research and were very enthusiastic.

Future potential of SMS data collection in N2Africa projects

With the current set up, farmers who are participating in

the adaptation trials do not have frequent contact with extension workers and researchers. As a result, there is limited opportunity for the researchers to get feedback from farmers about the performance of the trials managed by farmers. The experience from the pilot test can be a starting point to use the SMS method to gather feedback from large numbers of farmers participating in the adaptation trials if needed. The SMS method can also be used by implementing partners to send reminders to the farmers about a specific activity or event, to provide information about agricultural input suppliers and even to connect farmers with potential buyers.

Eskender Beza

Training Youths from Borno State, Nigeria on Agribusiness

In August 2012, a group of Nigerian Youth Corp (NYSC) members, trained at the International Institute of Tropical Agriculture (IITA) Headquarters, Ibadan (Nigeria) established the IITA Agripreneurs (IYA) as an independent agribusiness enterprise involved in the production, processing and marketing that cuts across value chains of several crops as well as the production and marketing of vegetables and fish. The overall objectives of IYA is to re-orientate rural youths towards more productive engagement in agriculture through expanded opportunities in agribusiness, service provision, and market-oriented agriculture.

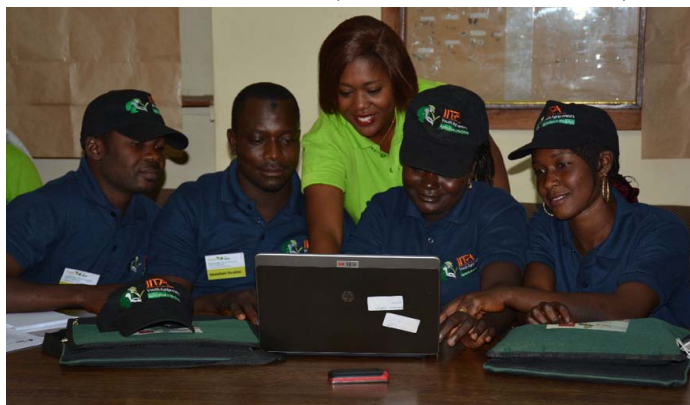
Also in Borno State, Nigeria, there is an urgent need to empower youths. At the same time Agriculture is a means to generate wealth and reduce empowerment among youth by providing opportunities in agribusiness. Therefore, the IYA, in collaboration with N2Africa project, organized a training workshop on “**Agribusiness, a Key to Productive Youth Engagement**” from 3rd – 24th of September, 2014 at the IITA Kano Station, Kano (Nigeria). The workshop was supported by the Bill and Melinda Gates Foundation under the N2Africa Borno Program.

The objectives of the training workshop were to:

- Build the capacity of youths to embrace agriculture and agribusiness as income generating activities by training them on the best practices across value chains of appropriate commodities.
- Develop their entrepreneurial skills in agribusiness to promote self-dependence.
- Facilitate the replication of the IYA model in Borno State.

These objectives were achieved through lectures, practical demonstrations, plenary discussions, and field trips. At the end of the training, the trainee participants were provided materials in the form of e-books and removable disks containing the presentations.

The trainees consisted of 20 participants (13 males and 7 females) from southern Borno State while the trainers were five members of IYA (3 males and 2 females). The



resource persons were scientists of IITA Kano Station and ICRISAT-Nigeria.

The training workshop covered the following three themes:

- Sensitization and changing the mindset of youths.
- Production, marketing and utilization of crops (sorghum, pearl millet, cowpea, soybean and groundnuts) and fish.
- Facilitating the establishment of a viable youth in agribusiness group in Borno State.

1. Presentations to sensitize and change the mindset of youths comprised the following:

- (i) Key note address by N2Africa Country Coordinator;
- (ii) Exploiting agribusiness to unlock jobs;
- (iii) Agribusiness: Key to productive youth employment;
- (iv) ICT in agribusiness;
- (v) Using stakeholders' platform to increase productivity of cropping systems in the Nigerian savannas;
- (vi) Improving productivity of small-holder farmers in the dry savannas of West Africa through research and extension partnership.

2. Presentations aimed at improving trainees' knowledge of producing, handling and marketing of fish and selected crops addressed the following:

- (i) Cowpea production;
- (ii) Soybean production;
- (iii) Maize production;
- (iv) Sorghum production;
- (v) Pearl millet production;
- (vi) Groundnut seed production;
- (vii) Guide to certified seed production of maize, cowpea and soybean;
- (viii) Safe and effective use of pesticides;
- (ix) Fish farming: Catfish hatchery and production;
- (x) Fish farming: Fish pond systems and management.

3. Presentations aimed at facilitating establishment of viable youth in agribusiness in Borno State as a pioneer model: These included:

- (i) The IYA organizational structure;
- (ii) Introduction to business development;
- (iii) Concepts of entrepreneurship;
- (iv) Book-keeping and accounting;
- (v) Fish farming logistics and profitability.

The trainees and their IYA trainers visited the following research fields on three different occasions:

- (i) ICRISAT pearl millet and sorghum trials at Minjibir Research Farm;
- (ii) ICRISAT groundnut trials at Minjibir Research Farm;
- (iii) IITA Agronomy trials at Shika, Zaria.

The training ended on September 24, 2014 with closing remarks by the Director General of IITA who was represented by Dr. Gbassey Tarawali, the Station Manager of IITA Kubwa Station.

Alpha Kamara and team

Effect of cattle manure, mineral fertilizer and Rhizobium inoculation on climbing bean production in Burera district, Rwanda

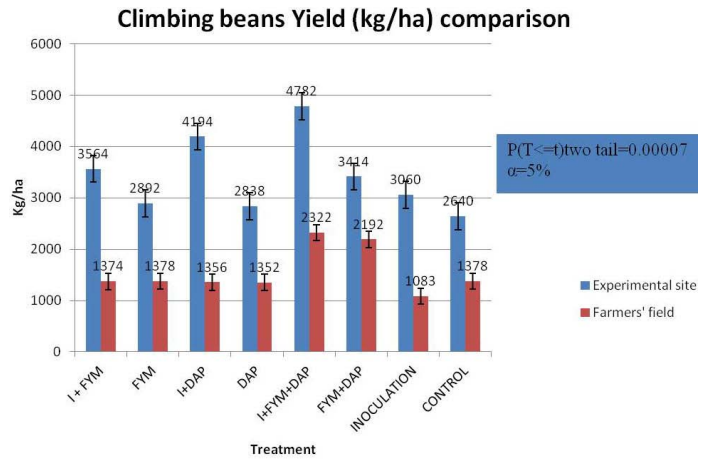
Rwandans are among world's top consumers of beans as it is a preferred legume across livelihood zones and wealth groups. This staple is considered as meat for the poor or a near complete food, mainly due to its nutrition nature; common beans contain proteins, resistant starch, dietary fiber, vitamins and minerals.

Although growing climbing beans involves tedious work, climbing types have the advantage of yielding three times more than bush beans.

During my research we tested the effects of rhizobium inoculation and other soil amendments on yield of climbing bean. Yield was highest, reaching 4,782 kg/ha, when Inoculation+Cattle manure+DAP were all applied together and was smallest in the untreated control (2,640 kg/ha). Comparisons of data from farmers' fields and our own findings showed that farmers' yields were lower, though we

Table 1: Effect of treatments on yield and nodule number

Main plot	Yield kg/ha	Main Plot	Nodule number
Inoculation	3900 ^a	Inoculation	60 ^a
No inoculation	2946 ^b	No inoculation	15 ^b
P Value	0.0001	P Value	0.0001
LSD	101	LSD	19.2
CV	3.30%	CV	3.7%



had the same treatments. Differences in yield were most likely attributed to farmer management practices. This should attract the attention of extension services. Inoculation as an input for legume production in Rwanda is not yet well adopted; however, efforts are on course to engage all possible bean farmers.

Nadia Musaninkindi, Chemonics International Inc.

My sincere gratitude goes to The Alliance for Green Revolution in Africa (AGRA); who sponsored my MSc course and research works. I also enormously thank Kenyatta University staff, especially my supervisors and Rwanda Agriculture Board (RAB); my host farmer for their precious support.



Climbing beans at various stages of growth: From our research trials in Burera District

N2Africa in the news

Jeff Ehlers as key note speaker

On November 13th Jeff Ehlers was key note speaker in the CSIS conference, “From the Ground Up: Translational Research Pathways to Improve Lives of Smallholder Farmers.” Washington D.C where he talked about the N2Africa project and its research loops in his presentation “Challenges and Examples - Research for Farmers” from the Gates Foundation Perspective”.

Jeff is 3rd speaker (introduction from 52:00) on the [video](#). You can find his presentation [under the same link](#).

Ojo Comfort meeting Bill Gates and Dr Akinwunmi Adesina

It were two remarkable days, 13th and 14th of November 2014, as I, Ojo Comfort Tinuade from the Southwest (Ekiti State) region of Nigeria, had the opportunity to meet with Bill Gates and Dr Akinwunmi Adesina.

On November 13th the N2Africa project, within which I am a PhD candidate, was showcased during the interview with Bill Gates. Professor Ken Giller, my promoter, gave an overview of what the project is about. One of the comments by Bill Gates is the readiness of his foundation to improve Agriculture in Africa. Another part of the visit of Bill Gates was a TV interview for the prime-time programme College Tour, in which N2Africa was one of the many subjects and profiled in a short video clip. All 5 new PhD students from N2Africa attended the recordings of this interview, but none of us was invited to pose a question. The [interview was broadcast](#) on November 18th.

On the 14th of November 2014, Dr Akinwunmi Adesina, the Right Honourable Minister of Agriculture Federal Republic of Nigeria, gave a powerful speech on Unlocking Africa’s

Potential for Growth and Prosperity at Wageningen University, the Netherlands. The Executive Director of the Forum for Agricultural Research in Africa (FARA, Dr. Yemi Akinbami) and Nigeria Ambassador to the Netherlands (Dr. Mrs. N.N. Akanbi) both attended. Together with Ken, we presented the aims of N2Africa to the delegates, who were highly impressed. The speech enumerated various developmental projects in Nigeria. One of those projects was the encouragement of youth participation in Agricultural development in Nigeria. The speech was concluded with a statement from the Minister saying that Africans must



The Right Honourable Minister of Agriculture Dr Akinwunmi Adesina (right) with Wageningen University students (on the left Comfort Ojo)

improve in development outcomes, strengthen economic, social and political systems and build an enduring Africa that is prosperous, peaceful and stable.

Comfort Ojo

Product development of NoduMax soyabean inoculant continues

NoduMax is a new legume inoculant for soyabean recently developed at the IITA Business Incubation Platform and the N2Africa Project. The inoculant contains $>1 \times 10^9$ *Bradyrhizobium japonicum* strain USDA 110 per g and is packaged in an alumino-laminate bag along with gum arabic adhesive and user instructions. A series of 28 product runs resulted in 79% acceptance of this adopted threshold.

During production, rhizobia in mature cultures increased by 66% upon dilution in 0.1 strength YMB “jump broth” but then suffered and 79% died off immediately upon mixing with dried, powdered peat. During a 10 day curing interval rhizobia increased ten-fold again. But, problems were encountered with sterilizing the peat carrier. It contained about 25,000 unwanted contaminants per g that were

reduced by only 64% during autoclaving. These contaminants increased throughout inoculant preparation and only 38% of the finished product batches contained fewer than 1×10^6 CFU per g. Plans are under way to treat the carrier by gamma irradiation in Ghana.

Each package of NoduMax costs about \$1.03 to produce with carrier and broth the least expensive, and packaging and gum arabic adhesive the most expensive components. With manufacture’s and retailers’



Packing room team at IITA



NoduMax team May 2014

profits, it is expected to sell for about \$2.60 per packet, sufficient to inoculate 10 to 20 kg of soybean seed. The current product compares favorably to inoculants produced in other countries where product quality is closely regulated. Product development and efficacy testing continues, and the first packages of NoduMax intended for sale are now being produced. COMPRO II is assisting in registering the product for commercial distribution in Nigeria. The first peak production run is just starting and we plan to produce 16 tons of soybean inoculant by April 2015. Anyone with ideas on how to reduce the large rhizobial die off during mixing is encouraged to contact Paul Woomer at plwoomer@gmail.com.

Paul Woomer and Dianda Mahamadi

Research prize for DR Congo at the 16th conference of African Association of Biological Nitrogen Fixation in Rabat Morocco

During this conference the last day of the congress, I presented summary results of my two papers and posters on “Improving shelf life of legume inoculant in East Africa”. And “Performance of Indigenous Rhizobia Strains on grain yield of two Promiscuous Varieties of Soyabean in South-Kivu soil”. The first poster on improving shelf life of legume inoculant in East Africa won a prize of 1000 DH = 120\$ for its high quality content and clarity.



Figure 1: During presentation and discussion with the audience chaired by Prof. Felix Dakora



Figure 2: Isaac receiving the prize (a Mobile projector that should be used to disseminate research knowledge to farmers) from Professor Mustapha, the president of AABNF

The conference was a great and useful opportunity to exchange ideas with other scientists from all over Africa on how to increase biological nitrogen fixation on smallholder farmers in Africa. We updated ourselves on what was done during the last two years in this research field since 2012. The next meeting will be held in Gaborone in 2016.

At the end of this meeting recommendations were as follows:

1. Collaboration between research at different country

N2Africa at the annual meeting of the CGIAR Consortium for Spatial Information

At the end of September I attended the annual meeting of the CGIAR Consortium for Spatial Information (CSI). The meeting was supposed to be part of the African Agricultural GIS Week in Accra, Ghana but was relocated to ITC in Enschede due to Ebola fears.

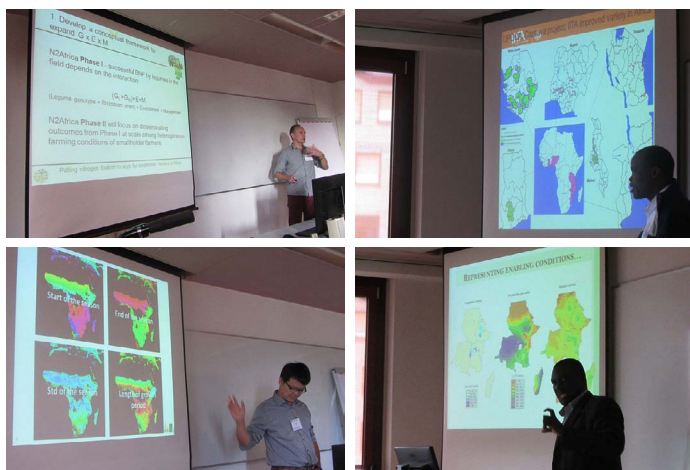
The meeting provided an opportunity to show some of the spatial analysis work that we are conducting in N2Africa.

1. levels.
2. Our research should be to solve African problems for farmers.
3. Facilitate capacity building of graduate students.
4. Involve policymakers in the field of legumes and biofertilizers.
5. Encourage women to join research program on legumes.

Isaac Balume

I presented [this short presentation](#) highlighting the use of spatial information for site selection, both at the country level for target sites as well as at the local level for the location of diagnostic and demo/adaptation trials.

There was very little time for questions but there was some interest in the model used to predict yield response to inputs, especially the independent variables used in the



Clockwise from top-left: N2Africa, IITA, ASARECA and IFPRI presentations

model. There was also interest in the market access layers used in the adoption domains and the difference between adoption domains and existing domains such as ASARECA development domains.

Visit N2Africa Project Coordinator to DR Congo

N2Africa coordinator Fred Kanampiu visited N2Africa activities in DR Congo from October 6 to 10, 2014.

Highlights of his visit were to see:

Rugwasa nye women group under Partner SARCAF Site Miki axe Katana. The group has 300 members of which 110 are women. Each member has two plots for growing maize and/or beans, one at INERA and one at their own land. Members received a loan from PADIEK (a micro-finance organization) and repayment is on schedule. The loan assisted them to conduct weeding: family labour is limited at weeding time. A challenge is the marketing of produce after harvest (poor prices, unreliable market).

Development Action against Hunger Organization, ACFD site Kavumu Axe Katana. This is an umbrella organization of 74 groups under the catholic diocese. Each group has 20-30 members, of which 90% are women. Training-of-Trainers was conducted by N2Africa. These groups started this season with planting maize-soyabeans or beans. After harvest, each farmer gets legume seed for planting in the next season. Produce is sold through the diocese, but the groups need to be linked with input suppliers, micro-finance organizations and markets. They also need to develop group leadership and empower women. Constraints of the groups include input supply, access to credit and output marketing.

Women for Women International (WFW). N2Africa is involved in capacity building and gave training on legume production, choice of crops, general crop management and supply of inputs. Cassava or maize was intercropped

As a result of conversations with participants, N2Africa was invited to produce some key maps showing the adoption domains which will appear in the e-Atlas of African Agriculture Research & Development <http://agatlas.org/>. Additionally there was an invitation for N2Africa to feature in ESRI's Geoplatform for global development.

All of the presentations of CG Centre and partners are online and can be seen [here](#).

Of particular relevance for N2Africa were the existing IATI ontologies, vocabularies, standards and protocols for geolocation in partner mapping. Also pertinent were the implications of OpenData and OpenAccess which is being implemented in the CGIAR, and ICT for surveys such as the sms surveys (e.g. GeoPoll), which might be considered for narrow questions in N2Africa.

Andrew Farrow, GeAgrofia

with beans and soyabeans. Soyabean was planted with or without inoculation. A challenge is that the demonstration plots were poorly executed. This needs follow-up after the training, and repeat training will be conducted before planting in the next season.

Muku Agriculture Secondary School, Axe Walungu. Teaching at this school focuses on Science, Education and Agriculture. N2Africa is facilitating demonstration plots executed by students on intercropping cassava and soyabean and the use of fertilizer. Students are looking for opportunities from N2Africa as field assistants, for exchange visits and for demonstration kits for planting at their homes.

PAIDEK – Micro-Finance. This organization is working closely with N2Africa in linking farmer groups to credit. The organization has 25 years of experience and has been giving loans to groups without repayment problems. They use the group as a guarantee. N2Africa helps PAIDEK to identify good farmer groups so that more farmers can benefit from this facility.

Agrodealer shop Pharmacie Lobiko Bukavu. Farmer groups could be linked to this shop for access to inputs (fertilizer and inoculants).

Radio Maendeleo Media event. Radio Maendeleo has a weekly, 30 minutes local radio program on farming. Feedback on this program is needed to find out its effectiveness.

Rhizobiology activities. Activities in the Rhizobiology laboratory and greenhouse include refreshing of NAK strains and updating of the database; quality control of BIOFIX



Development Action against Hunger Organization, ACDF site Kavumu Axe Katana



Agrodealer shop Pharmacie Lobiko Bukavu



Women for Women International

(batch no11031402S) and Kalambo inoculants; testing of four elite strains from DRC and one strain from Rwanda compared to SEMIA5019 and USDA110 in the greenhouse; and field testing of the effectiveness of four outperforming NAK strains on two varieties of soyabean (SB24 and Imperial) compared to the commercial strains USDA110 and SEMIA5019.

Linkage with IFAD project / IITA Murhesa activities. In a new initiative, IITA collaborates with a catholic church. N2Africa has some activities in the Murhesa site, including a demonstration plot, a soyabean evaluation trial and the dissemination of a number of packages to farmers around Murhesa.

In a nutshell “N2Africa has done and achieved a lot in DR Congo building on Phase I achievements and maintaining the momentum” remarked Fred Kanampiu N2Africa Coordinator. However, still a lot needs to be done during Phase II. “There is need to formalize existing collaboration with partners, link farmer groups to market to sell their produce, facilitate the creation of a One-Stop Shop closer to farmers to address the demand for inputs and information, link farmers to micro-finance for credit and monitor the feedback on the Radio Maendeleo program to have a feel on how many farmers we are reaching” said Fred Kanampiu.

Jean Marie Sanginga

Soyabean grain yield and seed quality under rain fed conditions in Sierra Leone

Sierra Leone falls within the humid forest agro ecological zone. Based on meteorological data, type of vegetation, and length of growing period for crops under rain fed conditions, the country is divided into different agro climatic zones. As an incredibly versatile plant with different maturity groups, soyabean is adaptable to a wide range of climatic conditions. Date of planting exposes soyabean plants to environmental factors (water, temperature, relative humidity, and day length) that can adversely affect the growth and development of its vegetative and reproductive components under rain fed conditions. Water stress is the main limiting environmental factor that contributes to soyabean crop failure in Sierra Leone. Despite its high demand in the country, soyabean grain yields are low and the seed quality poor on smallholder farms.

With support from the N2Africa project, field trials were conducted to determine when and where to plant different maturity groups of in Sierra Leone in order to obtain optimum grain yields with good seed quality during the 2012 and 2013 cropping seasons. Delay in planting soyabean significantly affected the performance of TGX 1448-2E and TGX 1904-6F in the rain forest, transitional rain forest, and savannah agro climatic zones when planted on June 7, June 28, August 15, and September 5 during the 2012 cropping season. Date of planting significantly affected seed emergence, biomass yield, nodulation, and days to 50%

flowering, grain yield and physical grain quality. Planting in June gave the highest grain yields, but with poor physical grain quality, whereas planting in August and September resulted in lower grain yields, but with good physical grain quality. Thus, a trade-off was observed between the quantity and the quality of grains produced (Figure 1).

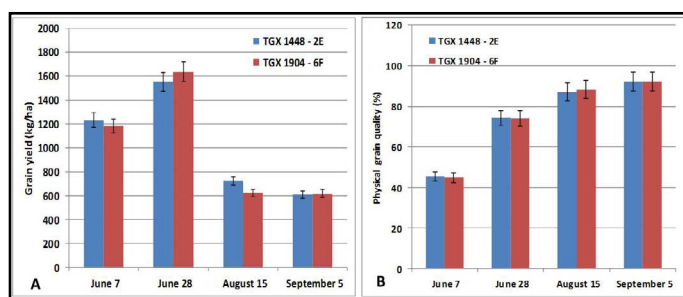


Figure 1: Mean values for grain yield (A) and physical grain quality (B) for soyabean genotypes under different planting dates

In all agro climatic zones, date of planting also significantly affected grain yield, biomass and stover yield, number of field pods per plant, number of grains per pod and 100 grain mass of different maturity groups of soyabean when planted on June 7, June 28, July 14, August 15 and September 5 during the 2013 cropping season. A consistent decrease in mean values for grain yield was observed for the early (TGX 1951-3F), medium (TGX 1904-6F) and late (TGX

1448-2E) soyabean genotypes when planting was delayed after the June 28 in all agro climatic zones (Figure 2). All maturity groups of soyabean genotypes flowered early and were exposed to water deficit when planted late on August 15 and September 5 and consequently, had less time to develop vegetative and reproductive components. As a result, short soyabean plants with few branches and nodes with flowers, and relatively low number of filled pods per plant developed. In addition, water deficit during seed development significantly reduced the number of grains per pod and 100 seed mass. In all agro climatic zones, grain yield varied among soyabean maturity groups. However, the highest mean value (date of planting and agro climatic zone) for grain yield (1223 kg/ha) was obtained from early maturity soyabean type TGX 1951-3F.

To conclude, date of planting determines the soyabean grain yield and seed quality under rain fed conditions in Sierra Leone. For optimum grain yield and seed quality, mid July seems to be an appropriate date for farmers to plant different maturity groups of soyabean in the rain forest, savannah, and transitional rain forest agro climatic zones in Sierra Leone.

Keiwoma Mark Yila

Integrated management of cowpea insect pests in Sierra Leone

Cowpea is the second most important grain legume in Sierra Leone after groundnut. The grain is valued for its nutritive content and short cooking time, and also favoured by farmers because of its ability to maintain soil fertility through its ability to fix nitrogen. Despite the high potential for production, yields have been generally low. Total yield losses and crop failure may occur due to several factors including the use of local varieties by farmers, time of planting, low soil fertility and insect pests. The most damaging of all insect pests are those that occur during the flowering and podding stages. Generally, the peasant farmers in Sierra Leone do not spray their crop with insecticide. Thus they rely on control through natural enemies.



Maruca caterpillar on cowpea

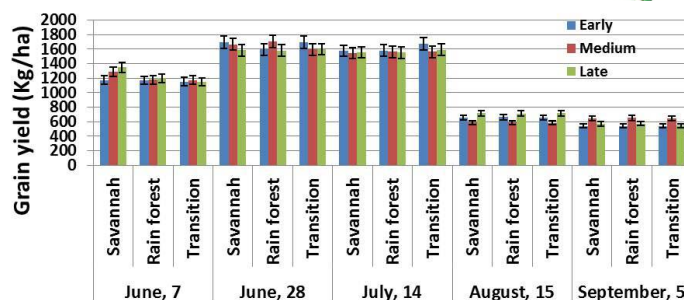


Figure 2: Mean values for maturity groups of soyabean across different agro climatic zone at different dates of planting

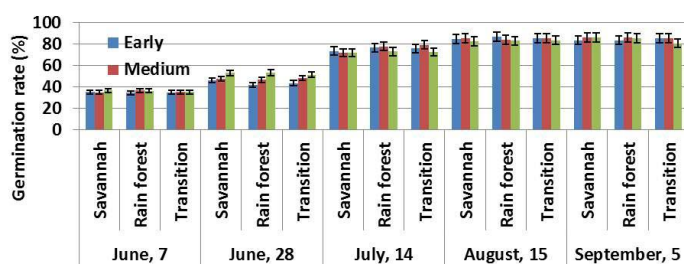


Figure 3: Mean values for germination rate of soyabean maturity groups for different dates of planting across different agro climatic zones

With support from N2Africa, trials were conducted in 2012 and 2013 to see how yields can be improved by reducing the population of both flowering and podding pests through integrated pest management options that combine the use of improved cowpea cultivars, planting date and well timed minimal insecticide application in three locations representing the forest and forest transition agro-ecologies.

Results from the study reveals significant differences ($P < 0.05$) in grain yield, haulm yield, biomass, number of nodules per plant, days to 50% flowering, days to 50% podding, days to maturity, pod load, number of thrips per flower and number of maruca per flower with respect to cultivar, date of planting and spraying regime. Grain yield was higher for the five improved varieties compared to the local variety across all locations, spraying regimes and time of planting with IT99K-573-1-1 recording the highest yield (Table 1). For spraying regime, yields were one and half times higher in sprayed plots compared to unsprayed plots as spraying killed most of the yield limiting insect pests. In addition, higher yields with better grain quality were produced when planting was done in September compared with the June planting.

Thrips and maruca populations were generally low across spraying regimes and times of planting; however populations of these pest were higher in September compared to June with the un-sprayed plots recording significantly higher pest populations compared to the un-sprayed plots (Table 1).

Table 1: Effect of variety, spraying regime and planting date with respect to grain yield (blue columns), number of thrips/flower (yellow columns), and number of maruca/flower (green columns)

Planting date	Variety	Grain yield (kg/ha)			Number of thrips/flower			Number of maruca/flower		
		Spraying regime			Spraying regime			Spraying regime		
		Sprayed	No-sprayed	Mean	Sprayed	No-sprayed	Mean	Sprayed	No-sprayed	Mean
June	IT99K-573-1-1	829.92	362.14	596.03 b	0.35	1.22	0.73 b	0.17	0.31	0.24 c
	IT99K-573-2-1	709.80	309.76	509.77 e	0.46	1.02	0.74 b	0.21	0.28	0.24 c
	IT89KD-391	822.96	486.13	654.54 a	0.40	0.66	0.53 c	0.41	0.35	0.38 b
	IT89KD-288	716.02	439.00	577.51c	0.50	1.00	0.75 b	0.35	0.35	0.35 b
	IT97K-277	711.98	334.47	529.22 d	0.51	1.10	0.80 b	0.21	0.38	0.29 c
	Local (tabae)	374.94	317.08	360.01 f	1.80	2.00	1.90 a	0.74	0.94	0.84 a
	Mean	694.26 a	374.76 b	537.84 b	0.67 b	1.16 a	0.90 b	0.34 b	0.43 a	0.39 b
September	IT99K-573-1-1	1,181.18	623.61	902.39 a	0.44	1.38	0.91 d	0.64	0.93	0.78 b
	IT99K-573-2-1	932.45	710.26	821.35 b	1.02	2.27	1.64 b	0.32	0.42	0.37 d
	IT89KD-391	930.91	545.87	738.38 d	0.42	2.07	1.15 c	0.46	0.69	0.57 c
	IT89KD-288	826.36	433.02	629.69 e	0.52	1.74	1.13 c	0.54	0.92	0.73 b
	IT97K-277	1,065.23	545.86	805.55 c	0.67	1.82	1.24 c	0.61	0.93	0.77 b
	Local (tabae)	438.73	332.04	385.38 f	1.52	3.45	2.48 a	1.14	1.76	1.45 a
	Mean	895.81 a	531.77 b	713.79 a	0.73 b	2.12 a	1.42 a	0.61 b	0.94 a	0.77 a

Means in column with the same letter are not significantly different at P>0.05 (SNK)

In conclusion, cowpea yields can be improved in Sierra Leone by planting improved cultivars in September with

spraying at flowering and podding stages.

Augustine Mansaray and Moses T. Moseray

Autumn debate of the Wageningen Journalists's cafe 'the correct multimedia mix'

Ken Giller attended a [debate for a journalist collective \(link in Dutch only\)](#) on October 9th. Yael de Haan, teacher Cross-

medial communication of the University of Applied Sciences of Utrecht, led a discussion about the added value of using multimedia as ways to reach specific target groups In the debate Ken Giller told why he made so many films for the N2Africa project. "I wanted to show the financiers in Seattle what daily life of the African farmer in the villages looks like." He now also tries to find ways to reach the African farmers themselves.



Edwin van Laar, editor in chief of the Wageningen University magazine, contributed "Depending on the group you want to reach the channel to be used will vary: For reaching students Facebook works really well, For researchers however, other channels are needed".

We continue to think about using different channels to reach different audiences and communicate different messages.

Using the search function on the N2Africa website

The website is made more accessible recently. You will find the content is better organised and the search function has improved. To get the most out of your search you can

use AND and OR searches. To assist you Marcel Lubbers wrote some [guidelines](#) for this function.

The Wageningen N2Africa team

MSc research in the Salima District, Malawi: Thesis report

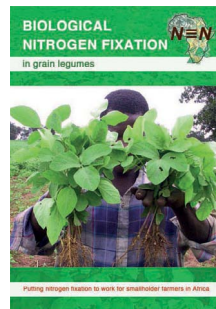
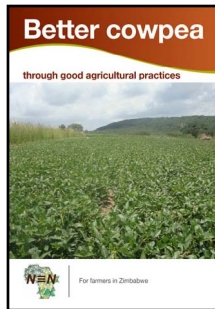
Hyejin Lee completed her [MSc thesis](#) entitled "Assessment of changes in households food availability, access, utilization and stability using farm stratification associated with the introduction of legume technology in Salima district,

Malawi" at the University of Hohenheim, Stuttgart as part of an Erasmus exchange programme between Wageningen University and the University of Hohenheim early December.

New training materials

Published before on [N2Africa Facebook](#), November 17th, 2014

Half November we uploaded a number of new training materials for Training of Trainers and Lead Farmers. Most of these were written by N2Africa together with the African Soil Health Consortium. Photos show two of the cover pages. The booklets can be downloaded from [our website](#) and via the separate links below.



Titles made available are:

For all countries:

[Biological nitrogen fixation in grain legumes](#).

For Zimbabwe:

[Better cowpea](#) through good agricultural practices: Zimbabwe;
[Better groundnut](#) through good agricultural practices: Zimbabwe;
[Better sugar bean](#) through good agricultural practices: Zimbabwe;
[Better soybean](#) through good agricultural practices: Zimbabwe.

For Rwanda:

[Better soybean](#) through good agricultural practices: Rwanda;
[Better beans](#) through good agricultural practices: Rwanda.

International Conference on Building a New Generation of Agricultural Scientists” held at Kenyatta University, Nairobi-Kenya (1st - 5th December, 2014)

I was delighted to present a keynote address to roughly 250 budding young agricultural scientists at this international conference. Great to interact with such a talented group and we had lots of opportunities for photos! There were many contributions from the AGRA funded students on topics related to N2Africa and nitrogen fixation in legumes and we look forward to seeing these published in due course. Thanks to AGRA for the opportunity to speak and for organizing this important meeting with a focus on the next generation of scientists.

Ken Giller



Rechiatu Asei, Onawumi Olufisayo Adeyinka, Ken Giller, Mavis Badu and Benedicta Essel (from left to right)

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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