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March and April 2018

Introduction

I open this Podcaster with a plea – PLEASE, PLEASE send us an email to confirm you would like to receive news from N2Africa! Due to the new EU General Data Protection Regulation (GDPR) we need your permission before we can send you our newsletter. All we need is a quick email confirming your agreement to receive the Podcaster from us.

With thanks to all of the N2Africa staff, and in particular Theresa Ampadu-Boakye and Esther Ronner, we bring you the highlights of the N2Africa Annual Report from 2017 with a link to download the full report if you are interested. We are very proud of our achievements yet of course there is much more to be done. As you read this we have teams starting up an impact survey in all of the N2Africa Core Countries (Ghana, Nigeria, Ethiopia, Tanzania and Uganda) using a 'mixed-methods approach'. We are also heading for Kigali where we will hold our annual review and planning meeting together with our Advisory Committee. The Legume Alliance in Tanzania and the Scaling-up Improved Legume Technologies project reports exciting results in terms of reaching more than 600,000 smallholder soyabean and common bean producers. We congratulate the latest N2Africa PhD graduate, Dr Esther Ronner, who provides a summary of her findings.

Beans in Rwanda Photo credit Ken Giller

We hope you enjoy reading about N2Africa and look forward to receiving your contributions for future Podcasters.

Ken Giller

Key achievements and learnings available in the N2Africa Annual Report 2017

A lot happened in N2Africa in 2017. As the core countries continued dissemination of technologies and strengthening of public-private partnerships to ensure sustainable access to these technologies, the Tier 1 countries focused on exit strategies to sustain the achieved results as N2Africa ended in these countries. The key achievements, lessons learned and focus in 2018 are summarized in the N2Africa Annual Report 2017 (http://www.n2africa.org/content/n2africa-annual-report-2017). Some of the main findings are presented below.

Key Achievements

Public-Private Partnerships: In 2017, 68 implementation partnerships were formally signed and 93% of the 2016 partnerships were consolidated. In addition, stakeholder platforms were used to address areas such as coordination and policy issues within legume value chains. The partnerships provide various models to gain access to input and output markets. The preferred and most widely used models were the "producer collective" model (44% of the partnerships), and the "buyer-driven" models (18%).

Awareness of Proven Technologies: In 2017, a total of 179,085 farmers were reached[1] (47% female) through various dissemination approaches, resulting in a cumulative total of 553,802 farmers. This number exceeded the target by 33% (Figure 1). Key dissemination approaches were the organization of demonstrations, adaptations, field days, media events, and video shows. The effectiveness of these approaches has been assessed in Tanzania and Ghana, and results indicated for instance that although radio programmes reached more farmers in a cost-effective way, demonstration plots had a stronger influence on the

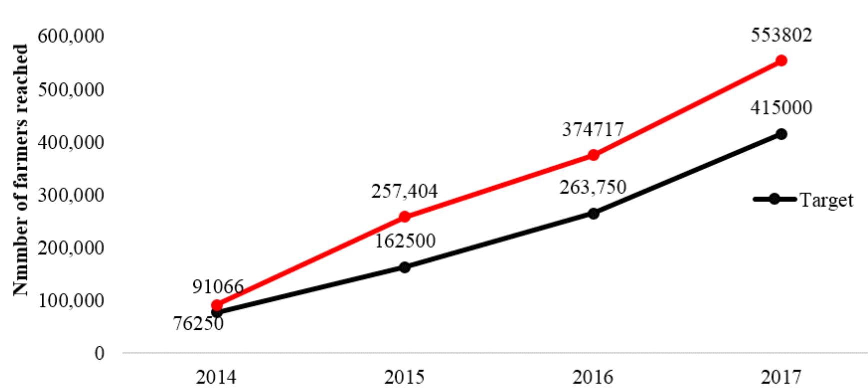


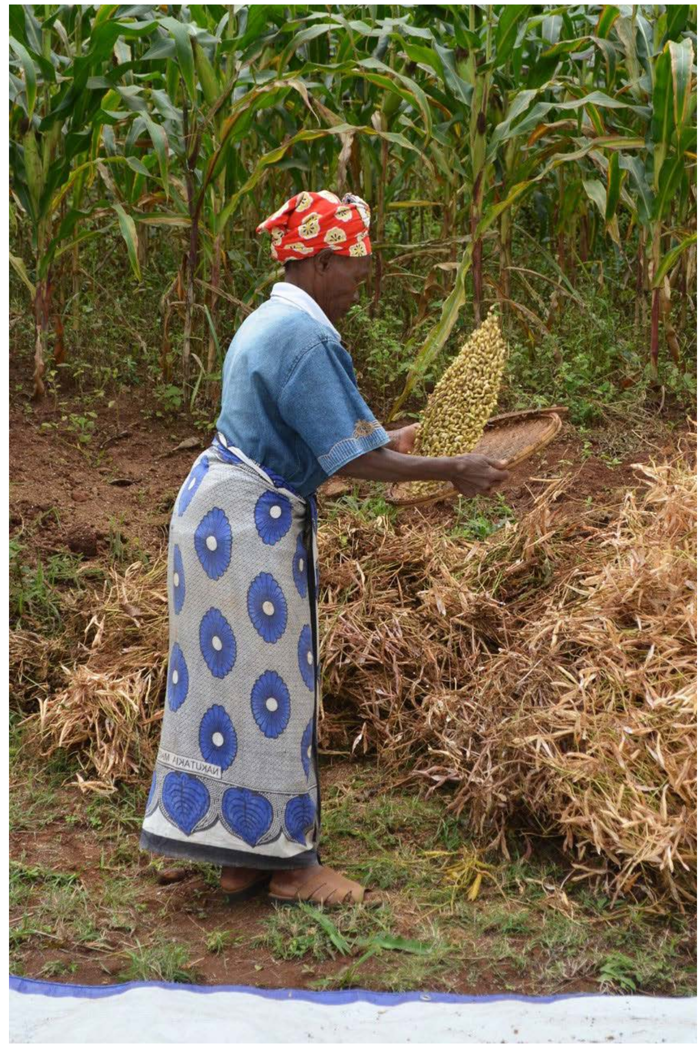
Figure 1. Total number of farmers reached from 2014 to 2017

[1] Reach means awareness and knowledge gained through dissemination approaches such as demonstrations, adaptations, field days, radio, video shows, SMS, etc.

depth of knowledge of farmers and their intention to adopt the promoted practices. Also, a mix of different approaches was found to be important to reach different audiences.

Access to Inputs: Although target volumes of sold inputs were only partly achieved (74% for seeds, 20% for fertilizers, 39% for inoculant; Figures 2A, B and C), strategies implemented in 2017 will continue to yield results as the private sector continues to invest. For instance, seed companies are contracting trained seed producers as out-growers (Ghana, Tanzania, Uganda). In addition, 136 agro-dealers in all countries were engaged and linked to various farmer groups. In Ghana, dissemination activities with YARA resulted in an increase in P-fertilizer used by farmers (from 150 t in 2016 to 194.6 t in 2017).

Output Markets: Stimulating access to profitable markets enhances investment in input usage by smallholder farmers. By the end of 2017, a total of 149,818 persons (46% female) were involved in collective marketing (mainly soyabean and common bean). Soyabean has mostly formal markets with signed agreements with companies such as Hule & Sons in Nigeria, Silverland, G2L in Tanzania and Savannah Company in Ghana. Value addition activities (e.g. processing of soyabean into various products or groundnut oil extraction) are considered critical to provide options for the food basket for the poor. About 13 farmer groups (1,692 members) have integrated processed products at a household level, whereas 120 women in 26 groups are doing legume processing at commercial level (SME). In total, 12,000 women were involved in legume processing.



Winnowing beans in Tanzania. Photo credit Ken Giller

From Best-Bet to Best-Fit Technologies: In adaptation trials, mean yields significantly increased on N2Africa plots compared with the farmers' own legume plots: from 300 to 800 kg ha-1. More than half of the farmers had a yield increase of > 50%. In Ghana, New Yara legume fertilizer was tested as a new blend against triple superphosphate (TSP) fertilizer and outperformed TSP in cowpea, groundnut, and soyabean. In Tanzania bush beans showed a good response to inoculants in demonstration trials and in Uganda liming is now recommended for climbing beans.

Standard Operating Procedures for Inoculant Quality Control: Standard Operating Procedures (SOPs) for quality control were prepared in collaboration with experts from the COMPRO project. SOPs cut across the entire distribution

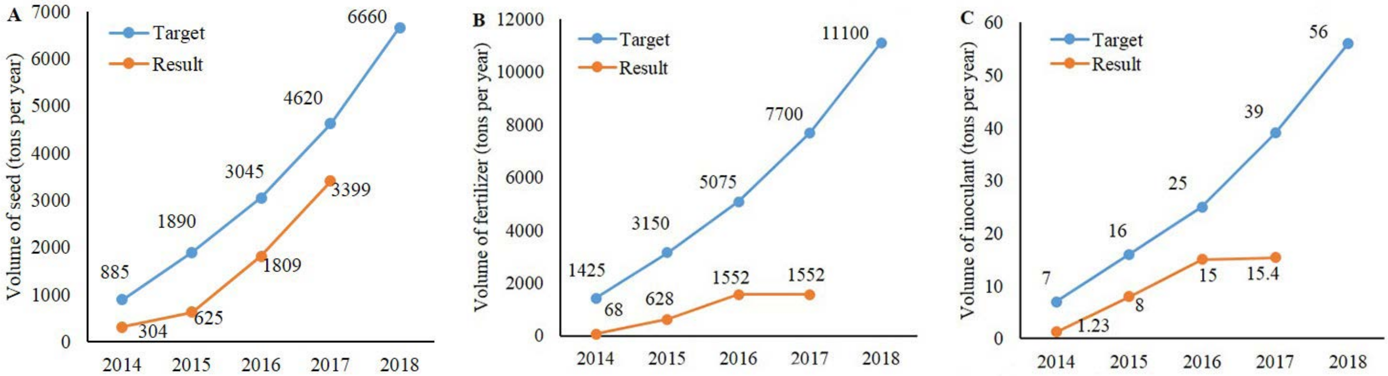


Figure 2. Target and results of the volume (tons year^{-1}) of (A) seeds, (B) fertilizer and (C) inoculant sold by seed companies, agro-dealers, and community based seed producers.

chain. Kwame Nkrumah University of Science and Technology (KNUST) in Ghana ensured independent quality control of LEGUMEFIX and NoduMax. In Nigeria, quality control of NoduMax is currently done by N2Africa but should be done by NAFDAC in future. In Uganda, quality control measures are currently being implemented. In Ethiopia, efforts are made to establish a quality control system in collaboration with the Ministry of Agriculture.

Learnings and Focus to Sustain Results

Ensuring Impact and Continuity through Partnerships: Many partners have embraced the technologies introduced through their partnership with N2Africa and have integrated these into their development programs (e.g. groundnut varieties introduced by N2Africa in Northern Ghana, CRS in Nigeria expanded activities into Sokoto State with their own funding and YARA Ghana Ltd blended the new legume fertilizer based on field results generated together with N2Africa). The focus for 2018 is to highlight gaps in the exit strategies for the core countries and to develop appropriate interventions together with partners.

Sustaining Private Sector Commitment for Input Delivery: The rigorous engagement with the private sector since 2016 has led to an improvement in access to inputs. Seed companies are key actors and specific interventions have been undertaken to resolve their challenges (e.g. capacity building in legume seed production, information on preferred varieties and market-demand quantification or access to foundation seeds of preferred varieties). Sustainable access to breeder and foundation seeds remains a bottleneck which will be addressed in 2018 through direct linkages between seed companies and institutions producing foundation seed (Ghana and Nigeria) or support to national systems (Tanzania). Similarly, farmer groups are making efforts to quantify their demands which is key to such inputs being stocked by agro-dealers in future. Partners in Tanzania have adopted the village-based agricultural advisory system for input demand quantification, and ICT systems are being piloted in Ethiopia, Ghana, Nigeria, and Uganda.

Linking Farmer Groups to Output Markets: Increased numbers of farmers have improved access to markets, either collectively or individually. The key challenge remains meeting market requirements (quality and quantity of grains produced), developing the right contracts with buyers (taking into account the needs of both buyers and farmers) and providing platforms for market information. Strategies for 2018 largely focus on building organizational capacity of farmer groups to meet market requirements.

Making Best-Fit Technologies Available for Continuous Dissemination: The use of farmers' feedback in evaluation of technologies to reshape technology packages has resulted in the dissemination of the most preferred options. The focus for 2018 is to document sets of best-fit technologies and location-specific options to ensure their availability to partners for continuous dissemination.

Compiled by Esther Ronner, Wageningen University & Research

Highlights of the Annual Report 2017

Recommendations for best-fit technologies

A large number of diagnostic, demonstration and adaptation trials was established in 2017 (see Table 1) and results of these trials have again contributed valuable information to the dataset of prior years.

Beans in Rwanda. Photo credit Ken Giller

	Ghana	Nigeria	Borno State	Ethiopia	Tanzania	Uganda	DR Congo	Kenya	Malawi	Mozambique	Rwanda	Zimbabwe	Total
Diagnostic trials (#)	8	-	-	34	25	20	-	-	-	-	-	-	87
Demonstration trials (#)	261	445	80	79	146	170	47	15	116	-	111	50	1,520
Adaptation trials(#)	1,679	5,148	320	2,654	4,418	13,506	-	-	-	-	-	-	27,725

Table 1. Total number of diagnostic, demonstration, and adaptation trials established per country in 2017.

The combined results of yields and farmers' evaluations of diagnostic, demonstration and adaptation trials over multiple years and seasons led to the development of best-fit recommendations for the different legumes in the core countries (table 2).

In Ghana, New Yara Legume (NYL) fertilizer (NPK, Ca, OMg_2, OB; 4:18:13:14:2.8:0.3) and TSP were compared in their effects on the yields of soyabean, groundnut and cowpea, and NYL application resulted in larger yields than TSP application ($P< 0.05$). Figure 1 shows the results for soyabean and groundnut, and also cowpea yields were

Table 2. Best-fit recommendations for legume cultivation based on diagnostic, demonstration and adaptation trials.

Country	Legume	Treatment
Ghana	Cowpea	Varieties Padi-tuya (Upper West Region) or Wang-Kae (Upper East and Northern Regions); New Yara Legume fertilizer (250 kg NYL ha^{-1}, equivalent to 20 kg P ha^{-1})
Ghana	Groundnut	Variety Samnut 22; New Yara Legume fertilizer (250 kg NYL ha^{-1}, equivalent to 20 kg P ha^{-1})
Ghana	Soyabean	Varieties Afayak (farmer preferred) or Suongpungun in Upper East and Northern Regions, or TGX 1985-10E (early maturing) in Upper East and West Regions; New Yara Legume fertilizer (250 kg NYL ha^{-1}, equivalent to 20 kg P ha^{-1}); inoculants (7g kg^{-1} seed)
Nigeria	Soyabean	Varieties TGx 1951 - 3F; TGx 1955 – 4F; TGx 1904 – 6F or TGx 1835 – 10E; farm yard manure; SSP fertilizer; inoculants
Nigeria	Groundnut	P+K fertilizer
Ethiopia	Bush bean	P-fertilizer; inoculants
Ethiopia	Chickpea	P-fertilizer; inoculants; 30 kg ha^{-1} of S (northern Ethiopia)
Ethiopia	Soyabean	P-fertilizer; inoculants; 60 kg ha^{-1} of K_2O and 4.6 t ha^{-1} of lime (acidic soils in western Ethiopia)
Tanzania	Bush bean	Variety Lyamungu 90; NPK-fertilizer (0:52:34) at 47 kg ha^{-1} of P_2O_5; inoculants at planting (northern Tanzania)
Tanzania	Cowpea	Varieties Tumaini, Raha 1; P-fertilizer 20 kg^{-1} applied 1 week after germination depending on soil moisture (eastern and central Tanzania)
Tanzania	Groundnut	Variety Pendo; farm yard manure (5 t ha^{-1}); Minjingu Rock Phosphate (MRP) - organic hyper phosphate 28% P2O5 at planting, gypsum ($CaSO_4$) 100 kg ha^{-1} at flowering
Tanzania	Soyabean	Varieties Soya 2, Soya 4, Semeki; Line 8; P fertilizers (46 kg ha^{-1} of P_2O_5); inoculants)
Uganda	Soyabean	Variety Maksoy 3N; 15 kg ha-1 P (TSP); inoculants (200g 16 kg^{-1} of seed)
Uganda	Climbing bean	NABE 12C; 2 t ha^{-1} farmyard manure, 15 kg ha^{-1} P (TSP-fertilizer)

significantly larger with NYL (1380 kg ha^{-1}) than with TSP (1250 kg ha^{-1}) inputs. The difference in performance of cowpea and soyabean varieties in different parts of the country in both diagnostic and demonstration trials led to tailored recommendations about the suitability of varieties for different parts of the country. The early maturing soyabean variety TGX 1985-10E was outperformed by the other two improved varieties Afayak and Suongpungun in terms of yield but was still considered suitable in case of late planting.

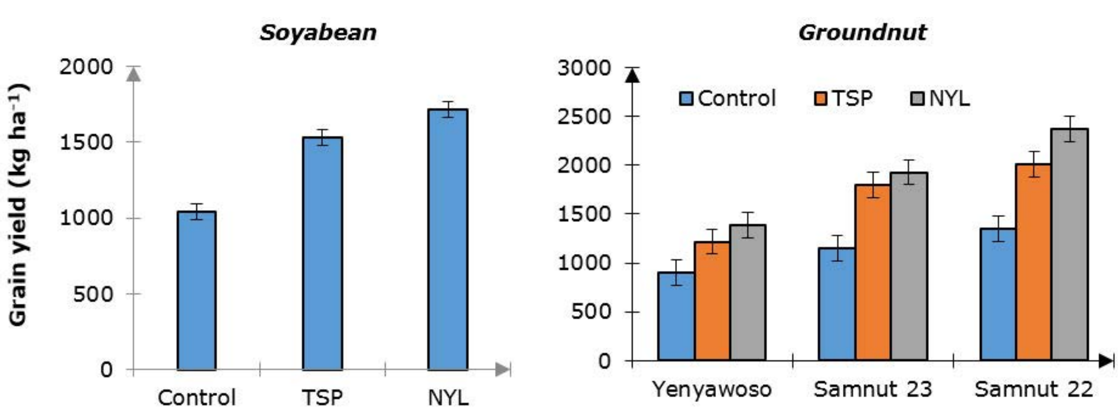


Figure 1. Grain yields of soyabean (left) and groundnut (right) without and with TSP or New Yara Legume (NYL) in Ghana.

In Ethiopia, agronomic studies to develop recommendations for soils non-responsive to inoculation and P-fertilizer showed that additional application of 30 kg ha^{-1} of S (sulphur) was recommended for chickpea production in Northern Ethiopia. A combined application of K_2O (60 kg ha-1) and lime (4.6 t ha^{-1}) was recommended for soyabean production in acidic soils in Western Ethiopia.

In northern Tanzania, largest bush bean yields were achieved when (N)PK fertilizer was applied in combination with inoculants. For groundnut a combined application of farm yard manure, Minjingu Rock Phosphate (MRP), and a little gypsum is recommended. Farmers gave positive feedback on that combination of inputs because those inputs are readily available and not considered very costly. Aflasafe – a bio-control agent against aflatoxin-producing fungi – was applied in addition to the fertilizer treatments to assess the impact of agronomic practices on its efficacy. Aflasafe reduced aflatoxin levels up to about 95% in all treatments.

In Uganda, diagnostic trials were conducted to identify the nutrients that are needed to close the yield gap related to soil fertility. Previous trials with soyabean and climbing beans have shown that the combined application of P in combination with either inoculant or manure was not enough to close yield gaps. For soyabean, inoculation and lime resulted in significant increases in yields compared to the control or lime alone, and yields of inoculation and liming with P were significantly better (1,526 kg ha^{-1}) than without P (1,383 kg ha^{-1}). The addition of K, N, Mg, Ca, and micro-nutrients did not result in a significant change in yield until manure was added, resulting in a maximum yield of 1,872 kg ha^{-1}. The economic viability of the nutrient combinations – particularly inoculants alone, inoculants + P, and inoculants + P + manure – should be assessed and related to farmers' capacity to purchase. Climbing bean grain yields showed significant responses to lime application and combined application of lime + P. This reiterates the need to manage soil acidity in the highland areas to improve climbing bean productivity. It could also explain the responses to manure and P application in some demonstration trials in previous years; manure may have provided partly the same function as lime. The liming contribution of manure needs to be evaluated, as manure could be a potential alternative option to agricultural lime in climbing bean production for those who can access it.

Adaptation trials

In the adaptation trials, mean legume yields varied from 300 to 2,600 kg ha^{-1} on the N2Africa plots, and from 400 to 2300 kg ha^{-1} on the own legume plots (measurements on 10 x 10 m plots) (Table 3). Mean yields significantly increased on all N2Africa plots compared with the own legume plots, except for Uganda (differences not significant). Farmers generally saw an increase of 300 to 800 kg ha^{-1} on the N2Africa plot compared with their own legume. In relative terms, farmers growing cowpea or bush bean in Tanzania and soyabean in Nigeria on average (more than) doubled their yields. Generally, more than half of the farmers had a yield increase of > 50% (except for Uganda). Note, however, that there is an experimental error associated with using measurements from sub-plots which may inflate the proportion of fields with more than 50% yield gain.

The lack of increase in legume yields on the N2Africa plots in Uganda may have been caused by dry spells in parts of the country which limited the number of trials that could be harvested and depressed legume yields. In Tanzania, the positive effect of the use of P-fertilizer in adaptation trials with cowpea was larger in eastern Tanzania than in other parts of the country, suggesting that P-fertilizer is especially recommended for cowpea in eastern Tanzania.

Learning pathways

In 2017, we also captured the "learning pathways" that have led to changes in demonstration trials from 2014 up to 2017; describing the main reasons behind moving from best-bets to best-fits (http://www.n2africa.org/content/tailoring-and-adaptation-n2africa-demonstration-trials). Common reasons to discard varieties in demonstrations were poor yields (often the result of increasingly irregular rainfall patterns). Introduced varieties were therefore in most cases selected based on their drought tolerance (early maturing varieties replacing late maturing varieties) and better yields. For groundnut, there was also a clear selection towards varieties with high oil content and with a good taste to accommodate market demand. Changes in inputs described specifically for 2017 were that LEGUMEFIX was added to bush beans in demonstration trials in Tanzania because results elsewhere (Ethiopia, Rwanda) indicated a response to inoculation in common bean. In Ghana, TSP was replaced by New Yara Legume for fertilizing cowpea and soyabean. In Uganda, herbicide Beans Clean was introduced in 2015B to produce bush beans, climbing beans, and soyabean to reduce the labour intensity of weeding. Some weeds persisted after the application of Beans Clean so a stronger, broad-spectrum glyphosate herbicide was introduced in 2017 to use in combination with or instead of Beans Clean.

Feedback from farmers was very often the basis of changes. Evaluations with farmers are clearly necessary to steer practices towards best-fits within a regional context with its specific weather and market conditions. Other lessons learned from capturing these changes were the need for varieties that are more tolerant to changing and irregular weather conditions while still being high-yielding and marketable. The availability and accessibility of legume-specific inputs such as certain rhizobium strains (Ethiopia), TSP (Tanzania, Uganda) or DAP (Ethiopia) were often a problem, stressing the importance of networking with partners and of lobbying with policymakers.

The N2Africa impact design

The project impact evaluation will be based on the theory of change and its related results framework with distinct results at output, outcomes, and impact levels. The design will combine both quantitative and qualitative methods to ascertain the impact of the project. The assessment of the baseline indicates the absence of relevant baseline data in different countries that include all the outcomes of interest against which the end-line is going to be compared. This has conditioned the type of approach to be used for the impact assessment. Areas of potential impact have

Table 3. Preliminary results from adaptation trials in 2017.

Country	Legume	Mean yield N2A	Mean yield own	Mean absolute increase	LSD*	Mean relative increase	Proportion of plots with gains > 50%	Sample size
		kg ha^{-1}	kg ha^{-1}	kg ha^{-1}		%	%	N2Africa vs. own plot comparisons (#)
Ghana	Cowpea	1045	647	407	83	86	63	41
Ghana	Soyabean	1484	940	550	80	64	59	73
Nigeria	Soyabean	1369	656	713	126	144	80	10
Ethiopia	Faba bean	2205	1470	735	215	58	50	10
Tanzania	Bush bean	1603	849	753	87	126	76	80
Tanzania	Cowpea	1216	407	806	66	514	90	143
Uganda	Bush bean	322	425	-103	220	-16	20	5
Uganda	Climbing bean	2617	2272	346	384	37	21	29
Uganda	Soyabean	749	415	334	491	77	38	13

**Fisher's Least Significant Difference test* been selected across all core countries regardless of the existence of baseline data. A mixed approach will therefore be used to collect data as well as to estimate impact. The quantitative methods will include the use of Propensity Score Matching (PSM) and Endogenous Switching Regression (ESR) to compare the beneficiaries with non-beneficiaries of the project. Due to the challenge of assessing the effects between the treated and non-treated using the PSM which focuses on observed variables, the ESR will be used in addition to model the counterfactuals through the inclusion of an instrument in the survey tool to measure the unobserved.

With regards to qualitative methods, focus group discussions and key informant interviews will be used to collect additional information across areas that the impact evaluation might not cover and also areas where the project was implemented but the country teams do not expect observable change. These cases and the reasons for the lack of change will be assessed based on the experiences of country teams and partners, with additional focus group discussions with farmers and other key stakeholders where necessary. The assumptions underlining the theory of change will be tested here as well, forming the basis of the guiding questions. Also, institutional information and community level data will be collected using qualitative methods. Assessment of the effectiveness and efficiency of dissemination approaches and input supply strategies has been conducted in Tanzania, Ghana, and Nigeria. A similar study is to be done in Ethiopia, Nigeria and Uganda. These studies can serve as additional background information to the impact assessment.

Link to the N2Africa Annual Report 2017

Compiled by Eva Thuijsman, Wageningen University & Research

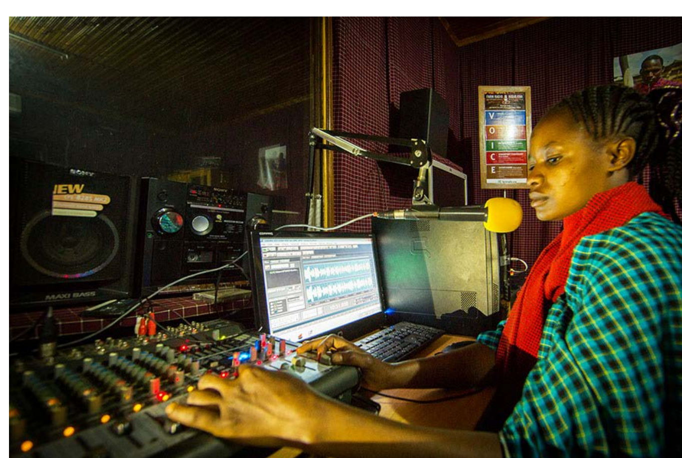
Scaling-up Improved Legume Technologies in Tanzania through the Legume Alliance

During its Nov-2015-Feb-2018 implementation period, Scaling-up improved Legume Technologies in Tanzania (SILT) promoted improved soyabean and common bean technologies reaching 600,000 farming family members. 100,000 farmers started to use more than one promoted practice. This was achieved by developing a series of integrated campaigns targeting different family members with nuanced information. The results were achieved in the Northern and Southern Highlands of Tanzania through multi-media campaigns incorporating different combinations of leaflets, posters, comics, interactive radio, SMS messages and demonstration plots and farmers training sessions.

These results were shared in the project close report in April 2018 with the main funders of the project Canada's International Development Research Centre (IDRC) and Global Affairs Canada (GAC). The partners implementing SILT were Farm Radio International (FRI), Centre for Agriculture and Biosciences International (CABI), N2Africa-Wageningen University & Research (WUR) - International Institute for Tropical Agriculture (IITA), Agricultural Seed Agency (ASA), Africa Fertilizer & Agribusiness Partnership (AFAP).

SILT operated as one of a family of projects that included phase two of the African Soil Health Consortium (ASHC), N2africa, Putting Nitrogen Fixation to work for Smallholder Farmers in Africa, UP-scaling Technology in Agriculture through Knowledge and Extension project (UPTAKE), Gender and the Legume Alliance (GALA) all of which also aimed to increase uptake and adoption of agricultural innovations promoted under the African Green Revolution for Africa (AGRA) Scaling Seeds and Technologies Partnerships (SSTP) in Tanzania. The alliance furthermore works in formal partnership with several value chain development projects e.g. CRS-Soya ni Pesa, AGRA-RUDI and the Clinton Foundation Anchor Farm.

Farmers listening to an interactive radio program on all aspects of legumes, programs ran 16 weeks coinciding with planting to harvesting topics. Photo credits Simon Scott



Salome Thomas from Orkonerei Radio Service (ORS) in Terrat Simanjiro Manyara on air. Photo credits Simon Scott

The Legume Alliance' started in 2015 when a group of like-minded organizations came together to explore whether working together on a campaign-based communication and extension approach could make a significant contribution to our understanding of development communications for impact and scale. The Alliance approach has since expanded to Ghana, Nigeria, Uganda and Kenya while eyeing Ethiopia.

The way forward, as suggested by Duncan Sones, part of the CABI delivery team, 'A Supra-SILT could be fun'. This could explore the whole Bill & Melinda Gates, AGRA, USAID portfolio and the local NARS led initiatives and how to bank on the Alliance approach of working in synergetic partnerships and leveraging resources to maximize impact.

Soon to come: Links to an interactive results map to illustrate reach and the SILT end report.

Edward Baars, Senior Business Development Officer for N2Africa

From targeting to tailoring: Baskets of options for legume cultivation among African smallholders

On the 4th of April I successfully defended my PhD thesis, entitled *From targeting to tailoring: Baskets of options for legume cultivation among African smallholders*, in the aula of Wageningen University. It was a day with interesting discussions and a great celebration afterwards. Unfortunately, co-promotor Peter Ebanyat, who played an important role during the times of my fieldwork in Uganda, could not attend the ceremony at the last minute.

The aim of my thesis was to identify niches for sustainable intensification of agriculture through legumes for different types of smallholder farmers in sub-Saharan Africa. In my thesis, I looked at two legumes: soyabeans in Nigeria and climbing beans in Uganda. In on-farm try-outs of soyabean in Nigeria (*Chapter 2*) we observed a strong variability in grain yield and response to treatments. Averages of on-farm performance of technologies proved of little value to estimate the benefits of a technology for individual farmers. Although we explained a reasonable percentage of the observed variability in soyabean yield, the potential to use this information to predict the performance of technologies or to target technologies to a new group of farmers remained limited.

Yet, even if we understand where legume technologies work best, this does not necessarily lead to adoption of

these technologies. Participatory methods applied in the co-design (i.e. technology development with farmers, researchers and other stakeholders) of improved climbing bean production practices in Uganda (*Chapter 3*) showed that farmers use a wider range of criteria for the evaluation of legume technologies than yield only. The co-design process resulted in a basket of options for climbing bean cultivation that included alternative options for farmers with varying production objectives, resource constraints and in different agro-ecologies. The options developed through intensive interactions with a small group of users could be used as a starting point for out-scaling to new regions through the application of an 'option-by-context' matrix developed as part of the study.

Monitoring of farmers' use and adaptation of the co-designed options on their own fields over multiple seasons (*Chapter 4*) revealed that the large majority of farmers did not use the combination of practices that would lead to the largest yield, but adapted the climbing bean technology. Again, we observed variability in grain yields on farmers' fields and in farmers' use of practices. Further, we found that the use of practices was inconsistent between years, which complicated the formulation of recommendations about the suitability of technologies for different types of farmers. An *ex-ante* assessment of the farm-level effects of climbing bean cultivation (*Chapter 5*) demonstrated that although climbing beans improved food self-sufficiency and income, they often required increased investment and always demanded more labour than current farm configurations. Combined with a discussion with farmers, these findings improved our understanding of farm-level opportunities and constraints for the adoption of climbing beans and helped to explain why certain choices that seem obvious at field level, may work out differently at the farm level.

Throughout my thesis work I was confronted with variability in yields and use of practices, and with inconsistencies in explanatory relationships. This complicated the identification of recommendations about the suitability of technologies for different types of farmers. I therefore considered a basket of options, tailored to local conditions, to be a more useful concept than narrowly specified technology packages for pre-defined farm types. Only recommendation domains at the regional level were considered to have predictive value for targeting of technologies. The inclusion of users' perspectives in technology development improved the relevance of technologies, but there is an inevitable trade-off between the level of detail and the time invested in obtaining these perspectives. The incorporation of farmers' evaluations of demonstration trials and their feedback on testing technologies on their own field in technology re-design are two components of this study that are relatively easy to apply in other large-scale research-for-development projects. I found only limited options to improve the benefits of legume technologies for poorer farmers. Agricultural innovations therefore need to go hand in hand with institutional innovation (e.g. through public-private partnerships) to truly impact the livelihoods of poor farmers.

Helena Posthumus, Jim Sumberg (Examiners), Marcel Zwietering (Deputy rector), Esther Ronner, Ken Giller (Promotor), Katrien Descheemaeker (Copromotor), Thom Kuyper (Examiner), Conny Almekinders (Coporomotor), Renske Hijbeek, Ilse de Jager (Paranymphs), Bettina Haussmann (Examiner). Missing in the picture is co-promotor Peter Ebanyat who, unfortunately, could not join the ceremony. Photo credit: Sara Kemper Fotografie

For more information, please contact me at: esther.ronner@wur.nl.

Esther Ronner, Wageningen University & Research

N2Africa in the news

Article in the Ethiopian Herald: Over 50,000 smallholders benefit from inoculation technology.

Reports and other output uploaded on the N2Africa website

- N2Africa poster - general information

Related newsletters

- FAO news items: Family farmers must remain central to agroecology scale-up, Agroecology can help change the world's food production for the better, and
- Hunger uptick in Africa can be reversed;
- ICRISAT news: African smallholders can double their yields with half the water;
- IITA bulletin 2425 with a story on "Food security: The balance of quantity, nutrition, and safety";
- Soybean Innovation Lab Newsletter: February 2018, with a link to the "Field Guide to Soybean Diseases and Pests" Green Ef research, which is specifically designed for use in Africa.

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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