



N2Africa annual progress report Phase II Year 1

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N2Africa

**Putting nitrogen fixation to work
for smallholder farmers in Africa**



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Short summary

This report documents the progress made during the first year of N2Africa Phase II. The report contains both a progress narrative, with progress made against the five project objectives, and the Key Milestones Tab.

Keywords

Annual report, progress, Key Milestones, Objectives, legumes, Nigeria, Ghana, Tanzania, Ethiopia, Uganda, DRC, Rwanda, Kenya, Malawi, Mozambique, Zimbabwe



1 Progress narrative

1.1 Progress made against the five objectives

1. Project strategy, coordination and implementation and capacity strengthening

Project strategy and coordination is largely in place. The country teams have explored possibilities for public private partnerships (PPPs) and development of stakeholder platforms to ensure functioning legume value chains. Ethiopia for example already formed seven PPPs and DRC and Kenya participate in stakeholder platforms. The MoUs that have been signed to date will be further developed into PPPs in 2015. In addition, more MoUs will be signed in the course of 2015. Partners include agricultural research institutes, universities, local governments, private input suppliers, legume processors and development partners.

In terms of project strategy, a set of Master Plans on 1) Agronomy, 2) Dissemination, 3) Monitoring & Evaluation and Data Management, 4) Rhizobiology, 5) Communication, 6) Gender and 7) Innovation Platforms has been developed. The Master Plans foster a common approach among the N2Africa Core Countries and have been used to develop the country specific plans.

Capacity strengthening is being done at multiple levels. The five PhD students from the Core Countries have started their programmes and two PhD students for Borno State have been identified. Two additional PhD students are based at WUR. In addition, students for the MSc scholarships have been identified and some started their work. Meanwhile, Tier 1 countries also continue to support university students through BSc or MSc thesis research or internships. At the non-degree level, partners receive training on a variety of topics including legume agronomy, how to establish demonstration and adaptation plots, data collection, integrated pest management, etc. in both Core and Tier 1 countries.

2. Delivery and dissemination, sustainable input supply, and market access

Development partners for dissemination of N2Africa technologies have been identified. All have started disseminating technologies to farmers via demonstration and adaptation trials. In addition, there were field days, radio and TV broadcasts, legume processing workshops and farmer training events. Overall, we exceeded our target with 137%. However, in Uganda and Tanzania, fewer farmers were reached than anticipated. Yet, we are optimistic that, with more agreements being signed, we will be back on track in year 2015 also in Uganda and Tanzania when partner-led dissemination takes off.

Africa Soil Health Consortium helps us developing extension materials

STAKING CLIMBING BEANS

Single stakes

- The most common staking method for climbing beans.
- The stakes are made of wood, bamboo or metal.
- The stakes are placed in the ground and the beans are trained to climb them.
- The stakes are spaced 1-2 meters apart.

Tripod

- The 3 legs of a tripod stake together.
- They are made of wood, bamboo or metal.
- They are placed in the ground and the beans are trained to climb them.
- The stakes are spaced 1-2 meters apart.

Flippers

- They are made of wood, bamboo or metal.
- They are placed in the ground and the beans are trained to climb them.
- The stakes are spaced 1-2 meters apart.

Benefits of staking using strong ropes and stakes

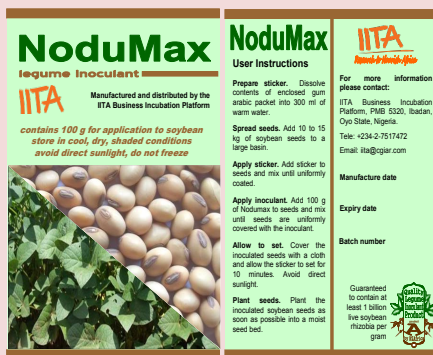
- Staking increases yields and quality of beans.
- Staking reduces the risk of disease and pests.
- Staking makes it easier to harvest beans.
- Staking makes it easier to transport beans.

We are developing sets of extension materials which are tailored to audience and country. We made a set of posters on inoculation procedures for different legume products and different staking methods for climbing beans. In addition, we develop booklets with best agronomic practices for the four grain legumes in each country (Ethiopia, Zimbabwe and Rwanda finalized).



Nodumax factory produces its first batches of soybean inoculant

The Nodumax inoculant plant in Nigeria has produced its first batches of soybean inoculant. However, not all batches produced so far meet all quality standards. When all quality standards are met, the focus will switch to create a sustainable inoculant production and supply. This includes scaling-up production, developing distribution networks, streamlining costs and maximizing labour efficiency.



The package design of Nodumax confirms with international standards in terms of product labelling and shelf life.

The Tier 1 countries have successfully involved many partners for indirect dissemination of N2Africa technologies via demonstration plots, field days, legume processing workshops, food fairs etc. In DRC, Rwanda, Kenya and Mozambique, partners have also reached thousands of farmers with input packages. In Zimbabwe and Malawi, partners start distributing input packages in the current season, which just started.

All countries are focused on sustainable input supply. Country teams are exploring possibilities to align local agro-dealers with grassroots producer groups and input wholesalers and manufacturers. Some countries already formalized partnerships and are building the capacity of agro-dealers. Meanwhile, community based seed production remains an important source of legume seed in all countries.

In terms of market access, almost all countries, including Tier 1, have started to assist farmers in collectively marketing their produce and linking them to buyers. In Nigeria for example, soybean processors already offer the farmers good market opportunities. Other countries such as Tanzania and Kenya see the demand for soybean increasing as more processors emerge. Ethiopia did not start yet to assist farmers in collective marketing, but will do so in the next season.

3. Empower women to increase benefits from legume production

Gender is a cross-cutting theme for all N2Africa activities. Currently, most countries deliberately target >50% women in their dissemination campaigns. In addition, most countries organize legume processing workshops in which women learn new techniques to prepare nutritious food for the household or to produce food products that can form the basis for grain legume based food businesses.



The Kasuma Magani farmers group requests pre- and post-harvest labour saving tools (Kajuru LGA, Kaduna State, Nigeria).

Tier 1 countries set the example: female farmers earn an income with soybean based food products

Women groups in Tier 1 countries process soybean into soy flour, soymilk, or further processed foods such as 'Merci Madame' (fried soybean cake with vegetables).

Besides that training in legume processing can improve farmers' diets (see above), it also provides farmers with business opportunities! In Rwanda, two female led businesses have emerged, both selling soybean food products. From Kenya we know that farmers earn on average 64 KES per liter soymilk and 113 KES per kg soy flour [1US\$ = KES98].



Women produce soymilk in DRC (left) and Rwanda's 'Merci Madame' (right).



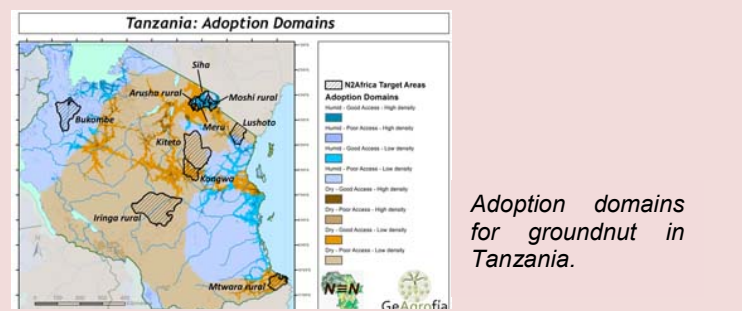
4. Tailor and adapt legume technologies to close yield gaps and expand the area of legume production within the farm

Core countries have established a set of trials to further determine which legume technologies work where, why and for whom. Diagnostic trials aim to understand the biotic and abiotic constraints to legume production. Demonstration trials co-evaluate a portfolio of *best-bet* options together with farming communities within best cropping systems. Adaptation trials evaluate how individual farming households adapt selected best-bet options and how farmer management practices and environmental factors affect their performance. This last step also provides the framework for translating *best-bet* options to *best-fit* options. The first results from the agronomy work are expected next reporting period. Two PhD studies are further unravelling the G_LxG_RxExM interactions on a farming systems level.

We stratify our action areas

Adoption of grain legume technologies depends on a multitude of factors. Certain factors, such as training, seed multiplication and diffusion, production and delivery of inputs such as inoculants and different models of adding value to produce can be controlled by the project.

However, there are other factors that cannot be controlled but do influence the 'fit' of a technology. These factors include the climate, certain soil parameters, land tenure, farm size as well as some household/farm attributes. We account for uncontrollable factors in our research design by using spatial data to stratify our action areas.



Adoption domains for groundnut in Tanzania.

Table 1. Numbers of diagnostic, demonstration and adaptation trials established in the Core Countries in 2014.

	Nigeria	Borno State	Ghana	Ethiopia	Tanzania	Uganda	
							2014A 2014B
Diagnostics	*	-	80	393	N.A.	-	283
Demonstrations	245	160	210	423	N.A.	41	44
Adaptations	5880	480	1862	3192	N.A.	-	696

*A set of research trials was established in collaboration with partners.

With the Rhizobiology focus on identification of elite strains for common bean, groundnut, cowpea and chickpea, MPN counts, bioprospecting and strain isolation are on-going in the core countries. Three of the PhD studies are investigating the effect of inoculating common bean, cowpea and chickpea. Several MSc studies also deal with the Rhizobiology work, including bioprospecting for effective rhizobia for groundnut. At the same time, Rhizobiology labs are working on increasing the quality of inoculant products and continue to characterize elite rhizobium strains.

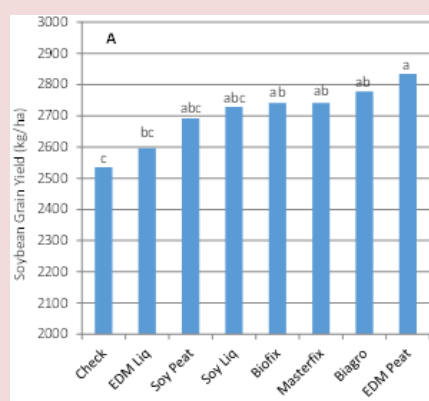
In order to standardize our Rhizobiology work, we have developed a set of protocols concerning strain collection and evaluation and quality control. The documents are currently being reviewed. In the Tier 1 countries, DRC, Kenya and Rwanda perform quality checks on imported or produced inoculants. To date, all checked Biofix inoculants contained >1x 10⁹ rhizobia/g, thereby passing industry standards. However, Biofix inoculants also contained contaminants (checked by different labs), reducing the product's shelf life. Legumefix (the other commercial inoculant used in N2Africa) passed all quality standards, with >3x 10⁹ rhizobia/g and no contaminants. DRC in addition continues to refresh rhizobium strains and is conducting pot experiments to evaluate candidate elite strains. In



Mozambique, N2Africa collaborates with the USAID Platform to evaluate several inoculant products from commercial sources and with EMBRAPA to evaluate four commercial Brazilian strains and co-inoculation with mycorrhiza.

N2Africa Mozambique collaborates with USAID platform and EMPRABA for Rhizobiology

N2Africa’s collaboration with USAID platform shows that EDM peat and Biagro were the best performing commercial inoculant products during the 2013/2014 season. However, this does not directly mean that EDM peat and Biagro are the best products. In a similar experiment in the 2012/2013 season, Biofix and Biagro came out as the most effective products. In addition, there are significant site*product interactions.



Effects of inoculant product on grain yields of soybean varieties, averaged across four locations (2013/2014 season).

5. Enable learning and assess impacts at scale through strategic M&E

The M&E Master Plan has been developed. The plan outlines platforms to get feedback and data from our partners and beneficiaries. Timely feedback and learning will enable functioning feedback loops that allow us to incorporate recent learning in the planning for the next season. Together with ALINe, we are exploring an online M&E system to facilitate those feedback loops.

In addition, we have tested ICT tools in data collection. In Ethiopia, extension workers and technicians use tablets for data collection and farmers send information on agronomic practices by SMS. The first evaluations are positive.

1.2 Risks

A current risk in a few countries is the supply of inputs (inoculants, seeds and fertilizer) for legumes. Country teams address this risk by forming partnerships that facilitate imports and/or production as well as distribution of inputs. In addition, they scale up community based seed production and train agro-dealers on how to store inoculants. In DRC and Mozambique, a sustainable input supply is more complicated due to the poor agro-dealer network. Here, specifically tailored solutions are needed to ensure future input supply.

Although not all countries have problems with the quantity of inoculants used for dissemination, insufficient quality of the product can be a risk. Inoculant products from different brands or batches might differ in quality and we need to assure that all products promoted and disseminated through N2Africa are of high quality. For example, although sufficient rhizobia are present in MEA’s Biofix inoculants, we found levels of contamination that reduce the product’s shelf life. High quality standards and regular quality checks will help to address the risk of disseminating products of insufficient quality.

Although partner-led dissemination took off successfully in the Tier 1 countries, data collection from the dissemination emerged as an issue. In many cases it turns out difficult to request partners to collect data for N2Africa without funding. In addition, some countries, for example Zimbabwe, found a reduced interest from some partners to remain involved without receiving directing funding from N2Africa.

In addition to the more general risks mentioned above, there are a number of country specific risks. Ghana faces a particular risk in relation to staffing, due to poor remuneration and conditions of service for national staff compared to other organizations. This has caused delays in staff appointment. At the moment, IITA is actively addressing this issue. In Nigeria, the numbers of female farmers targeted are not as high as in other countries. Only 34% of farmers who were directly targeted last season were



female. However, the field days had 37% to 50% female attendance and Nigeria will try to improve female participation on all aspects in the coming years.

1.3 Sustainability

The main aim of N2Africa is to institutionalize legume research and technologies. One way we do this is through capacity building. Five African PhD and 11 MSc students have been offered a scholarship. At the end of the project, this will provide each country with well-educated scientists working on legume technologies. In addition, we train development partners and national extension staff on Rhizobiology, legume agronomy and legume processing, thereby increasing their knowledge.

Another way we aim to have a sustainable impact is working on the value chain. PPPs regarding the input supply and output sides and stakeholder platforms will help strengthen the legume value chains. For example, N2Africa is building structures for inoculant supply in each country, either through regulated imports, or through in-country production of quality inoculant products. In addition, women will be trained in legume processing, thereby adding value to their legume crops.

Finally, development partners embed N2Africa technologies in their dissemination and development programs. In combination with increased capacity of development partners, the N2Africa technologies embedded in national programs will also ensure sustainability of the project.

N2Africa in the spotlight

N2Africa was presented in keynote lectures by Ken Giller at international conferences to audiences of around 700 participants- the combined VI International Food Legume Conference and 7th International Conference on Legume Genetics and Genomics, Saskatchewan, Canada, June 2014 and the 11th European Nitrogen Fixation Conference in Tenerife, Spain, September 2014.

Exposing N2Africa to large scientific audiences also helps us to create a sustainable future for legume technologies and research.

1.4 Scalability

We have many partners which take up N2Africa technologies in their dissemination programs. These partners have a wide reach and target thousands of households per country. Embedding N2Africa technologies in development partners' dissemination program is a major goal of N2Africa. In Tier 1 countries, technologies are already widely disseminated – also beyond the Phase I impact areas – without any direct funding. This will also be the future for the current Core Countries.

1.5 Lessons Learned

Sustainable input supply is a very important factor of success, especially in the case of inoculants. As long as a regular inoculant supply is not realized yet in each country, planning needs to be done early and accurately, to be able to timely order inoculants (e.g. from the U.K.) to meet demands for research and dissemination.

A second lesson learned in this first year of N2Africa Phase II is that institutionalization of N2Africa is possible. In the Tier 1 countries, many partners have successfully continued to disseminate N2Africa technologies without funding from N2Africa. Some countries found that participation at district and national level events, such as agricultural shows and food festivals, is a strategic and cost effective way to disseminate technologies to large numbers of farmers, while at the same time attracting the attention of policy makers and other stakeholders. Current Core Countries will be able to learn from Tier 1 Countries about institutionalization of N2Africa. In Tanzania, N2Africa has already become the 'go-to project' regarding rhizobium inoculants.



In terms of productivity increase, preliminary results reassure us that rhizobium inoculants are key to increase soybean production. This also holds for the relatively new N2Africa areas such as the Southern Highlands of Tanzania. In Rwanda, we also see common bean responding to inoculants.

In a number of countries (e.g. Kenya, Tanzania), soybean emerges as an important cash crop. Increases in soybean processing capacity add demand and several new buyers are emerging. Those new buyers often offer higher prices than previously involved food and feed processors. In Tanzania, a collapse of maize prices could lead to a shift in crop production that favours soybean.

Numerous other lessons learned emerged from the various countries. For example, we were reassured that the lead farmer approach works very well for widespread dissemination. In addition, regular supervision of field staff improves data collection from field trials. Also, timely supply of inputs or being in constant contact with farmers avoids a selection of trial fields which are of poorer fertility than the other fields. Finally, feedback meetings with farmers and partners are important to identify those farmers' and partners' needs. However, we still need to reflect more deeply and experiment more with different methods for communicating research and other project findings and outputs back to development workers and farmers.

N2Africa wins top prize in the Harvesting Nutrition Contest

When more households cultivate legumes and when the yields of those legumes increase, the amount of legume grain available for consumption or sale should theoretically increase. Although causality has not been assessed, a nutrition case study pointed out that Ghanaian children (age 2-5) whose parents participated in N2Africa in Phase I had more nutrient adequate diets than children whose parents did not participate in N2Africa. Focus group discussions with Kenyan and Ghanaian farmers highlighted that N2Africa has the highest change of improving the nutrient adequacy of farmers' diets by 1) targeting female farmers, 2) focusing on legumes traditionally used for home consumption and 3) training farmers on preparation methods.

N2Africa won a multimedia report and 5000 US\$ to invest in nutrition research!



Ilse de Jager measures adequacy of diet and indicators of nutritional status in children (age 2-5).



2 Key Milestones Tab

Table 2. Progress against all Key Milestones

Objective #	Key Milestones	% target achieved	Progress Nov 2013 - Nov 2014		Period One		Grant End
					01-2014	01-2014	Dec 2018
			Progress Nov 2013 - Nov 2014		Target period end	Cumulative target grant end	
1	1.3. Partners along the legume input and output value chains cooperate actively towards achieving the overall N2Africa goals	>100%	<p>To date, 22 MoUs have been signed with partners. Ghana: 6; Nigeria: 3; Borno State: 1; Ethiopia: 4; Tanzania: 4; Uganda: in progress. DRC: 1; Rwanda: in progress; Kenya: 1; Malawi: 0; Zimbabwe: 1 Mozambique: 1</p> <p>More agreements with identified partners will be signed in the course of 2015. MoUs will be further developed into PPPs including other areas of activities and partners. Ethiopia already formed 7 PPPs. Partners include amongst others private input suppliers, buyers and development partners. See Appendix 1 for a full overview of partner agreements.</p>		11	32	
1	1.4.1. By Q3 of year 1, an internal and external communication strategy developed	90%	A strategy has been developed and will be finalized and uploaded on the N2Africa intranet beginning of 2015. In addition, our intranet has been renewed, allowing for better and faster sharing of documents and data.		1	1	
1	1.4. By Q4 of year 5, at least 320 persons trained in N2Africa technologies and approaches	>100%	<p>1,059 persons in partner organizations have been trained in both Core and Tier 1 countries. Tanzania: 30 (17% F). Nigeria: 68 (10% F). Borno State Nigeria : 291 (19% F). Ghana: 42 (7%F). Uganda: 19 (5% F). Ethiopia: 309 (24% F). Malawi: 50 (24% F); Zimbabwe: 49; Mozambique: 143 (14% F); DRC: 58 (40%F), Rwanda: NA, Kenya: 19 partners, but no. of persons not available.</p> <p>A new set of training and extension materials is being developed with ASHC for both Core and Tier 1 countries. Materials have been finalized for Zimbabwe, Rwanda and Ethiopia (available on www.n2africa.org).</p>		110	320	
1	1.5.1. By Q4 of year 1, country-specific research and dissemination implementation plans formalized, including an exit strategy.	100%	All countries developed country specific plans, based on the Master Plans.		5	5	
1	1.7.1. By Q4 of year 1, a research plan, engaging at least 5 PhD and 10 MSc candidates, developed	100%	A plan was developed and 7 PhD students started their course work and research. 11 MSc students have been offered a scholarship and some started their research. 2 additional PhD and 4 MSc students will be offered a scholarship in Borno State. Most countries are involving additional students through MPhil MSc programs or supporting students in theses and internships. See Appendix II for details and topics.		1	1	



2	2.2. Dissemination partners attain/surpass the anticipated number of households targeted and continue to engage in legume intensification post-project	>100%	97,775 households have been reached in both Core and Tier 1 countries. In Core Countries dissemination was both direct (N2Africa-led) and indirect (partner-led). In Tier 1 countries dissemination was indirect. Tanzania: 2348 (59% F); Nigeria: 12137 (of which 50% direct, with 34% F); Borno State: 4000 (16% direct); Ghana: 10556; Ethiopia: 4008; Uganda: 2547 (47% F). DRC: 9226 (66% F); Rwanda: 5000; Kenya: 32603 (66% F); Malawi: 9211 (68% F); Mozambique:1139 (33% F); Zimbabwe: 5000.	71,250	555,000
2	2.3.1. By Q4 of years 1-4, at least 2 media events (e.g., radio, newspaper articles) per country implemented	>100%	82 media events have been implemented. Ghana: 1; Nigeria: 5; Borno State: -; Ethiopia: 5; Tanzania: 2; Uganda: 8; DRC: 38; Rwanda: 6; Kenya: 14; Malawi: 1; Zimbabwe: 2; Mozambique:0	10	50
2	2.3. Local agro-dealers marketing fertilizer, seed, and inoculants are aligned with grassroot producer groups and input wholesalers and manufacturers	N.A.	Country teams are exploring possibilities to align local agro-dealers with grassroots producer groups and input wholesalers and manufacturers. Some countries already formalized partnerships and are building capacity of agro-dealers. Amounts of fertilizer, seed and inoculants marketed are not yet available for all countries and are expected next reporting period.	885 tons seed; 1425 tons fertilizer; 7 tons inoculant	6660; 11,100; 56
2	2.4. A preset number of households engaged in the collective marketing and value addition of legume grains and value-added products	74%	>25,982 farmers have been engaged in collective marketing. (Nigeria: 9500 (34% F); Borno State: 1000 (60% F); Ghana: 4337 (48% F); Tanzania: >3500 (53%F); Ethiopia: -; Uganda: NA. Kenya: 7645 (70% F); Other countries: numbers not available.	35,000	275,000
2	2.5.1. By Q4 of years 1-4, inoculants available through public-private partnerships, through importation and/or local production, the latter facilitated by the inoculant production pilot plant	100%	N2Africa country teams have different strategies to ensure availability of inoculants. Zimbabwe has formed a PPP with Grasslands SPRL – Agritex-seed companies. Malawi is forming a PPP with Agri-input suppliers limited .Ghana, Nigeria, Uganda, Tanzania, Mozambique and DRC partner with other projects (COMPRO-II, Agrifuturo) to facilitate permits and registration of quality inoculant products. Inoculants are produced in country in Ethiopia, Rwanda and Kenya. The Nodumax inoculant pilot plant has been established in Nigeria and the first test batches have been produced.	2	5
3	3.2.2. By Q4 of years 4-5, at least 2 businesses led by women established per country		In Rwanda, 4 women groups are involved in 2 women-led businesses (processing and marketing of soybean products). In Kenya, 2 business opportunities have been identified for soybean processing. Other countries have started to train women in soybean processing.	0	10
3	3.3. Better knowledge of and access to household-level legume processing tools improves the nutritional status of women and children in at least 2 target countries	N.A.	Focus group discussions in Kenya and Ghana suggest that improved agricultural productivity has a positive effect on food intake (via food availability) under the conditions that farmers have received training on preparation methods, have positive attributes towards legumes, are female, or have low market accessibility. Women are trained in legume processing in both Core and Tier 1 Countries. The linkages between the topics under 3.3 are further explored in a PhD research. The number of women using processing tools will be reported in the next report.	1,000	5000



3	3.4. Women use pre- and post-harvest labour-saving tools, resulting in higher net profits from legume production and processing	N.A.	The gender specialist attended country planning meetings. Pre- and post-harvest labour-saving tools are being developed. All countries organize soybean processing training for women. Numbers are not yet known.	7,125	55,500
3	3.5.1. By Q4 of year 3, relationships between grain nutritional quality and management / environmental conditions quantified	N.A.	Core countries liaise with nutritionist and agree on which data to collect (lab analyses) from GLXGRXExM trials (link with activity 5.5)	0	5
4	4.1.2. By Q4 of years 2-4, improved legume production recommendations integrated in the dissemination campaigns	100%	In the Tier 1 countries the best bet technologies from Phase I are disseminated by partners. Core Countries develop plans together with partners so that N2Africa technologies will become embedded in partners' dissemination campaigns.	5	15
4	4.1. Recommendations for the intensification of legume production result in at least 50% increase in legume productivity	N.A.	In the Core Countries, demonstration trials and adaptation trials (hosted by targeted households) have been monitored to determine the increase in legume production. A few Tier 1 countries also monitored trials. Results will be presented next reporting period.	35,000	275,000
4	4.2. Inoculant producers avail improved inoculant formulations for the target legumes resulting in at least 10% increase in legume productivity and BNF		Not applicable yet.	0	3
4	4.6.2. By Q4 of year 5, elite strains used for inoculant production for beans, groundnut, and/or cowpea		Three PhD students have started their work to identify elite strains for common bean, cowpea and chickpea. Several MSc students will work on this topic as well. Results are expected by Q4 of year 5.	0	6
4	4.8.1. By Q4 of year 2, standard operating procedures of the production, quality control and application of inoculants used by inoculant producers and retailers	90%	The first set of guidelines and protocols for production, quality control and field testing of inoculants is almost finalized. These protocols will be made specific for each public-private supplier. Instructive leaflets for application inoculant products (different types) have been finalized. Meanwhile, IITA Nigeria, MIRCEN in Kenya, the Rhizobiology lab in Kalambo, DRC, and the Rwanda Agricultural Board perform quality control assessments of inoculants.	2	5
5	5.1.1. Throughout the project, a strategic M&E framework provides timely feedback to learning and future planning	60%	An M&E Master Plan has been developed and is accessible to all project members. An (online) platform that provides timely feedback is currently being explored.	1	1
5	5.2. Dissemination partners integrate effective and efficient dissemination approaches for legume technologies in their future development initiatives		Partners successfully started to integrate N2Africa technologies in their dissemination programs in Tier 1 countries. In the Core countries, the N2Africa technologies will be embedded in partners' programs over the coming years.	0	16
5	5.5.1. By Q4 of year 4, the relative importance of GL, GR, E, and M understood for specific legumes and production environments and integrated in improved recommendations		N2Africa's agronomy work in the form of diagnostic, demonstration and adaptation trials is designed to answer these questions. In addition, PhD and MSc research addresses these questions in more detail.	0	16



5	5.7.1. By Q4 of year 4, the sustainability of legume interventions for smallholder farmers evaluated through impact assessment studies		Not applicable yet.	0	1
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Appendix I

Table 3. Overview of partner agreements

Country	Partner ¹	Signed date:	Active-not signed	Pillars
ALL	Legume Technology UK		Y	Input supply
DRC	Women for Women International (WfWI)	28-Nov-14	N	Dissemination
Ethiopia	Menagesha Biotech Industry P.L.C. (MBI)		N	Dissemination
Ethiopia	Bale Green Spice and Grain Development Plc.		N	Input supply
Ethiopia	Amhara Region Agricultural Research Institute (ARARI)	16-Jul-14	N	Dissemination
Ethiopia	Ethiopian Institute of Agricultural Research (EIAR)	16-Jul-14	N	Dissemination
Ethiopia	Hawassa University (HwU)	16-Jul-14	N	Dissemination
Ethiopia	Oromia Agricultural Research Institute (OARI)	16-Jul-14	N	Dissemination
Ethiopia	Tsehay Union		N	Input supply
Ethiopia	Chewaka Union		N	Input supply
Ethiopia	Alema Koudijs		N	Input supply
Ethiopia	ACOS Ethiopia		N	Input supply
Ghana	Evangelical Presbyterian Development and Relief Agency YENDI (EPDRA-Yendi)	29-May-14	N	Dissemination
Ghana	Urban Agriculture Network (UrbANET)	29-May-14	N	Dissemination
Ghana	Sungbawiera Foundation (SBF)	29-May-14	N	Dissemination
Ghana	Evangelical Presbyterian Development and Relief Agency - CHEREPONI (EPDRA- CHEREPONI)	29-May-14	N	Dissemination
Ghana	Savanna Agricultural Research Institute, Ghana (SARI, Ghana)	08-Jul-14	N	Variety evaluation
Ghana	Kwame Nkrumah University of Science and Technology (KNUST)	08-Jul-14	N	Rhizobiology
Ghana	The Agricultural Cooperative Development International/Volunteers in Overseas Cooperative Assistance (ACDI/VOCA)	07-Nov-14	N	Dissemination
Ghana	BUSAKA Agribusiness Company Limited	22-Dec-14	N	Dissemination
Ghana	AgDevCo Ghana Limited	07-Jan-15	N	Input supply
Kenya	Western Region Agricultural Technology Evaluation (WERATE)	07-Mar-14	N	Dissemination
Malawi	Interchurch Organization for Development Cooperation (ICCO)		N	Capacity Building
Mozambique	The USAID AgriFUTURO (AgriFUTURO)	10-Sep-14	N	Dissemination
Nigeria	Kaduna State Agricultural Development Project (KADP)	15-Jul-14	N	Dissemination
Nigeria	Sasakawa Global 2000 (SG2000)	23-Jul-14	N	Dissemination
Nigeria	Niger State Agricultural and Mechanization Development Authority (NAMDA)	24-Jul-14	N	Dissemination
Nigeria	The Borno State Agricultural Development Project (BOSADP)	12-Aug-14	N	Dissemination
Nigeria	Catholic Relief Services (CRS)	09-Jan-15	N	Dissemination
Nigeria	United States Agency for International Development/Maximizing Agricultural Revenue and Key Enterprises in Targeted Sites II Project (USAID/MARKETS II)		N	Input supply
Nigeria	Da-Allgreen Seeds Limited, Zaria		Y	Input supply
Nigeria	Notore	01-Mar-14	N	Input supply
Nigeria	ICRISAT		Y	Input supply
Nigeria	MASLAHA SEEDS		Y	Input supply
Nigeria	National Agricultural Extension and Research Liaison Services (NAERLS)		Y	Dissemination
Nigeria	Diamond Development Initiative (DDI)		Y	Dissemination
Nigeria	AGRA SOIL HEALTH PROGRAMME		Y	Dissemination
Nigeria	EGALF VENTURES		Y	Dissemination



Rwanda	Caritas Rwanda (CARITAS)		Y	Input supply
Rwanda	CONSEIL CONSULTATIF DES FEMMES /COCOF		Y	Input supply
Rwanda	Rwanda Agriculture Board		Y	Rhizobiology
Rwanda	EPR		Y	Input supply
Rwanda	DRD		Y	Input supply
Tanzania	Nelson Mandela Africa Institute of Science and Technology (NM-AIST)	27-Aug-14	N	Rhizobiology
Tanzania	iLogix		N	Dissemination
Tanzania	Catholic Relief Services (CRS)	09-Jan-15	N	Dissemination
Tanzania	SNV Netherlands Development Organisation		N	Dissemination
Tanzania	Rural Urban Development Initiatives (RUDI), Tanzania		N	Dissemination
Tanzania	The Clinton Foundation		N	Dissemination
Tanzania	Export Trading Group (ETG)		N	Input supply
Tanzania	Agricultural Research Institute, Makutupora (ARI Makutupora)	13-Jan-15	N	Dissemination
Tanzania	Agriculture Research Institue -Uyole (ARI-UYOLE)	14-Jan-15	N	Dissemination
Uganda	World Vision, Uganda		Y	Dissemination
Uganda	Makerere University (Uganda)		Y	Dissemination
Uganda	VECO Uganda		Y	Dissemination
Uganda	Africa 2000 network (Uganda)		Y	Dissemination
Uganda	Makerere University (Uganda)		Y	Rhizobiology
Uganda	National Agricultural Research Organization (NARO), Uganda		Y	Research
Uganda	NARO-NaSAARI		Y	Agronomy
				Research
				Agronomy

[†] Including active partnerships with partners with whom MoUs have been signed, active partnerships without signed MoUs and partners who have been indentified for partnerships in 2015.



Appendix II – PhD and MSc student overview

Table 4. Overview of PhD students involved in N2Africa Phase II. 44% are women.

Country	Name	Gender	Research
Ethiopia	A. H. Gunnabo	M	Understanding host legume x rhizobium strain interactions in common bean and chickpea
Ghana	D. B. Akakpo	M	Grain legume residues as a livestock feed resource for smallholders in Northern Ghana
Nigeria	C. T. Ojo	F	Exploring the potential benefits of rhizobium inoculation with cowpea in Nigeria
Tanzania	E. K. Nassary	M	Intensification of common bean cultivation on smallholder farms in the Northern Highlands of Tanzania
Uganda	A. Ochieng	M	Understanding the need for inoculation of common bean in smallholder farming in Uganda
Borno State	F.G. Umar	M	To be defined
Borno State	B.A. Zongoma	F	To be defined
The Netherlands	E. Ronner	F	Co-design of 'baskets of options' of improved legume technologies for African smallholder farmers.
The Netherlands	I. de Jager	F	Agricultural productivity and nutrition: linkages and drivers of smallholder farmers in Ghana and Kenya

M= male, F=female

Table 5. Overview of M.Sc. students involved in N2Africa. 29% are women.

Country	Name	Gender	Topic
Ghana	G. Wilson	M	Bio-Prospecting for effective rhizobia isolates for groundnut and cowpea
Ghana	F.J. Kumah	F	Influence of P source on growth, nodulation and nitrogen fixation by different soybean genotypes in two acid soils in northern Ghana
Ghana	G. Mensah ¹	M	
Ghana	K. Ahlija	M	Response of soybean to rhizobial inoculation and nitrogen management
Ghana	J.T. Dankwa	M	Effect of rhizobial inoculation and P application on growth, n-fixation and yield of soybean
Ethiopia	Dagmawit Getachew	F	Factors influencing the Adoption of agricultural technology
Ethiopia	Yitbarek Tegegne	M	Relating Farmers' Technology Adoption with their Livelihood Performance: Symbiotic effectiveness and Host range of indigenous rhizobia isolated
Ethiopia	Getahun Negash	M	from root nodules of different varieties of faba bean (<i>Vicia faba</i>)
Nigeria	I.M. Mustapha	M	Cowpea rhizobiology. Topic to be finalized
Nigeria	A.N. Okpobo	M	Effects of tillage, variety and starter nitrogen on soil physical quality, root profile, biological nitrogen fixation and inoculated soybean performance at Minna, Nigeria
Nigeria	M. Musa	M	Response of cowpea to mycorrhizae and rhizobium inoculum for the management of <i>Striga gesnerioides</i>
Nigeria	M. Haliru	M	Determinants of input demand and adaptation of grain legumes and associated technologies of N2Africa in Kano state Nigeria.
Nigeria	Gambo Umar ¹	M	Determinants of input demand and adaptation of grain legumes and associated technologies of N2Africa in Kano state Nigeria.
Tanzania	Y. Namkeleja	M	Response of soybean to rhizobial inoculation and phosphorus application
Tanzania	-		Isolation, authentication and evaluation of symbiotic effectiveness of elite rhizobia strains for <i>Phaseolus</i> bean in Hai District, Tanzania
Tanzania	-		
Uganda	-		



Borno State	M.N. Isa ⁴	M	Soil Microbiology (Rhizobiology). Topic to be finalized
Borno State	A.M. Sherrif ⁴	M	Legume Agronomy. Topic to be finalized
Borno State	A.A. Ghide ⁴	F	Agricultural Economics. Topic to be finalized
Borno State	M.M. Baba ⁴	F	Agricultural Economics. Topic to be finalized
Zimbabwe	V. Chekanai ²	F	Common bean agronomy using both improved and local varieties
Zimbabwe	T. Taguta ³	F	
The Netherlands	L. van Reemst ¹	F	Evaluation of smallholder adaptation of climbing bean technologies in Kapchorwa district, Uganda
The Netherlands	W. Marinus ¹	M	Opportunities and constraints for climbing bean cultivation by smallholder farmers in the Ugandan highlands: A basket of options?
The Netherlands	J. Huskens ¹	M	Climbing bean (<i>Phaseolus vulgaris</i> L.) cultivation and its diffusion in Kapchorwa district, Uganda

¹ Student having collaborative research or internship with N2Africa

² New Mphil student

³ Mphil student finalizing from Phase I

⁴ Enrolment not yet formalized



List of project reports

1. N2Africa Steering Committee Terms of Reference
2. Policy on advanced training grants
3. Rhizobia Strain Isolation and Characterisation Protocol
4. Detailed country-by-country access plan for P and other agro-minerals
5. Workshop Report: Training of Master Trainers on Legume and Inoculant Technologies (Kisumu Hotel, Kisumu, Kenya-24-28 May 2010)
6. Plans for interaction with the Tropical Legumes II project (TLII) and for seed increase on a country-by-country basis
7. Implementation Plan for collaboration between N2Africa and the Soil Health and Market Access Programs of the Alliance for a Green Revolution in Africa (AGRA) plan
8. General approaches and country specific dissemination plans
9. Selected soyabeans, common beans, cowpeas and groundnuts varieties with proven high BNF potential and sufficient seed availability in target impact zones of N2Africa Project
10. Project launch and workshop report
11. Advancing technical skills in rhizobiology: training report
12. Characterisation of the impact zones and mandate areas in the N2Africa project
13. Production and use of rhizobial inoculants in Africa
18. Adaptive research in N2Africa impact zones: Principles, guidelines and implemented research campaigns
19. Quality assurance (QA) protocols based on African capacities and international existing standards developed
20. Collection and maintenance of elite rhizobial strains
21. MSc and PhD status report
22. Production of seed for local distribution by farming communities engaged in the project
23. A report documenting the involvement of women in at least 50% of all farmer-related activities
24. Participatory development of indicators for monitoring and evaluating progress with project activities and their impact
25. Suitable multi-purpose forage and tree legumes for intensive smallholder meat and dairy industries in East and Central Africa N2Africa mandate areas
26. A revised manual for rhizobium methods and standard protocols available on the project website
27. Update on Inoculant production by cooperating laboratories
28. Legume Seed Acquired for Dissemination in the Project Impact Zones
29. Advanced technical skills in rhizobiology: East and Central African, West African and South African Hub
30. Memoranda of Understanding are formalized with key partners along the legume value chains in the impact zones
31. Existing rhizobiology laboratories upgraded
32. N2Africa Baseline report
33. N2Africa Annual country reports 2011
34. Facilitating large-scale dissemination of Biological Nitrogen Fixation



35. Dissemination tools produced
36. Linking legume farmers to markets
37. The role of AGRA and other partners in the project defined and co-funding/financing options for scale-up of inoculum (banks, AGRA, industry) identified
38. Progress Towards Achieving the Vision of Success of N2Africa
39. Quantifying the impact of the N2Africa project on Biological Nitrogen Fixation
40. Training agro-dealers in accessing, managing and distributing information on inoculant use
41. Opportunities for N2Africa in Ethiopia
42. N2Africa Project Progress Report Month 30
43. Review & Planning meeting Zimbabwe
44. Howard G. Buffett Foundation – N2Africa June 2012 Interim Report
45. Number of Extension Events Organized per Season per Country
46. N2Africa narrative reports Month 30
47. Background information on agronomy, farming systems and ongoing projects on grain legumes in Uganda
48. Opportunities for N2Africa in Tanzania
49. Background information on agronomy, farming systems and ongoing projects on grain legumes in Ethiopia
50. Special Events on the Role of Legumes in Household Nutrition and Value-Added Processing
51. Value chain analyses of grain legumes in N2Africa: Kenya, Rwanda, eastern DRC, Ghana, Nigeria, Mozambique, Malawi and Zimbabwe
52. Background information on agronomy, farming systems and ongoing projects on grain legumes in Tanzania
53. Nutritional benefits of legume consumption at household level in rural sub-Saharan Africa: Literature study
54. N2Africa Project Progress Report Month 42
55. Market Analysis of Inoculant Production and Use
56. Identified soyabean, common bean, cowpea and groundnut varieties with high Biological Nitrogen Fixation potential identified in N2Africa impact zones
57. A N2Africa universal logo representing inoculant quality assurance
58. M&E Workstream report
59. Improving legume inoculants and developing strategic alliances for their advancement
60. Rhizobium collection, testing and the identification of candidate elite strains
61. Evaluation of the progress made towards achieving the Vision of Success in N2Africa
62. Policy recommendation related to inoculant regulation and cross border trade
63. Satellite sites and activities in the impact zones of the N2Africa project
64. Linking communities to legume processing initiatives
65. Special events on the role of legumes in household nutrition and value-added processing
66. Media Events in the N2Africa project
67. Launch N2Africa Phase II – Report Uganda



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68. Review of conditioning factors and constraints to legume adoption and their management in Phase II of N2Africa
 69. Report on the milestones in the Supplementary N2Africa grant
 70. N2Africa Phase II Launch in Tanzania
 71. N2Africa Phase II 6 months report
 72. Involvement of women in at least 50% of all farmer related activities
 73. N2Africa Final Report of the First Phase: 2009-2013
 74. Managing factors that affect the adoption of grain legumes in Uganda in the N2Africa project
 75. Managing factors that affect the adoption of grain legumes in Ethiopia in the N2Africa project
 76. Managing factors that affect the adoption of grain legumes in Tanzania in the N2Africa project
 77. N2Africa Action Areas in Ethiopia, Ghana, Nigeria, Tanzania and Uganda in 2014
 78. N2Africa Annual report Phase II Year 1



Partners involved in the N2Africa project



A2N



Bayero University Kano (BUK)



Caritas Rwanda



Diobass



Eglise Presbyterienne Rwanda



Kwame Nkrumah University of Science and Technology



ZIMBABWE



Resource Projects-Kenya



SARI



Sasakawa Global; 2000



Université Catholique de Bukavu



University of Nairobi MIRCEN



University of Zimbabwe



Urbanet



Wocan



World Vision