



## **Dissemination Tools Produced**

Milestone 4.2.1

Anne Turner

Submission date: 22 October 2011

# **N2Africa**

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



---

N2Africa is a project funded by The Bill & Melinda Gates Foundation by a grant to Plant Production Systems, Wageningen University who lead the project together with CIAT-TSBF, IITA and many partners in the Democratic Republic of Congo, Ghana, Kenya, Malawi, Mozambique, Nigeria, Rwanda and Zimbabwe.

Email: [n2africa.office@wur.nl](mailto:n2africa.office@wur.nl)  
Internet: [www.N2Africa.org](http://www.N2Africa.org)

Authors of this report and contact details

Name: Anne Turner  
Address: IITA-Malawi, PO Box 30258 Lilongwe 3, Malawi  
E-mail: [a.turner@cgiar.org](mailto:a.turner@cgiar.org)  
Partner acronym: IITA

If you want to cite a report that originally was meant for use within the project only, please make sure you are allowed to disseminate or cite this report. If so, please cite as follows:

Turner, A., 2011. Dissemination tools developed, [www.N2Africa.org](http://www.N2Africa.org), 17 pp.



Disclaimer:

This publication has been funded by the Bill & Melinda Gates Foundation through a grant to Wageningen University entitled "Putting nitrogen fixation to work for smallholder farmers in Africa". Its content does not represent the official position of Bill & Melinda Gates Foundation, Wageningen University or any of the other partner organisations within the project and is entirely the responsibility of the authors.

This information in this document is provided as it is and no guarantee or warranty is given that the information is fit for any particular purpose. The user thereof uses the information at their own sole risk and liability.



## Table of contents

<b>1</b>	<b>By month 6 of years 2, 3&amp; 4, at least one new dissemination tool related to legume and inoculant use are produced per impact zone, resulting in about 24 different tools by the middle of year 3 (Milestone 4.2.1).</b>	<b>4</b>
1.1	Background information	4
1.2	Clarification of “Technology Packages”	4
1.3	Summary of dissemination tools by month 18 of project	5
<b>2</b>	<b>Description of dissemination tools by country</b>	<b>7</b>
2.1	Rwanda	7
2.2	DRC	7
2.3	Kenya	8
2.4	Malawi	9
2.5	Mozambique	10
2.6	Zimbabwe	12
2.7	Ghana	13
2.8	Nigeria	13
	<b>List of project reports</b>	<b>15</b>

## Table of tables

Table 1: Number and Type of Dissemination Tools Developed for Use by N2Africa Country by 30 September 2011 (tools not yet tested indicated by *)	5
--	---



# **1 By month 6 of years 2, 3& 4, at least one new dissemination tool related to legume and inoculant use are produced per impact zone, resulting in about 24 different tools by the middle of year 3 (Milestone 4.2.1).**

## **1.1 Background information**

Dissemination tools used by N2Africa project countries are comprised of written/illustrated extension materials, farm inputs and technology packages deployed in the Delivery and Dissemination (D&D) trials. In the first year of project activities, many of the written/illustrated extension materials were based on the booklet, “Biological Nitrogen Fixation (BNF) and Grain Legume Enterprise: Guidelines for N2Africa Master (or Lead) Farmers, written by P. Woomer et al (2010). These guidelines had been extracted from a large (188 pages) training tool titled Master Farmer Training in Biological Nitrogen Fixation and Grain Legume Enterprise, written by P. Woomer et al in 2010 (updated and reprinted in 2011). Three different versions (in English) of the booklet BNF and Grain Legume Enterprise Guidelines for N2Africa Master (or Lead) Farmers (referred to in the following report as BNF and Grain Legume Enterprise Guidelines for Master/Lead Farmers) were developed, one each for East and Central Africa (EAC), Southern Africa and West Africa. These were in several cases translated into local languages to facilitate their use with and comprehension by Master/Lead farmers.

The technologies originally used in the dissemination trials were drawn up by the first D&D specialist with input from other team members, partners and other stakeholders during the first planning meeting in each country in West Africa and Southern Africa. The selection of technologies to be used in Rwanda and DRC was based upon earlier experiences of the CIALCA project in the region, following a demonstration – participatory evaluation approach. In western Kenya, the technologies selected were based upon the extensive experience of the team members and other stakeholders working in the region. In the three EAC countries, results from the first two seasons (short and long rains) were used to further refine the packages for the dissemination trials deployed in the third season (long rains 2011).

## **1.2 Clarification of “Technology Packages”**

In finding that the term “Technology packages” was applied rather loosely and differently from one N2Africa country to another, with resulting variances in reporting on dissemination tools, one single definition was drawn up which should be applied in all N2Africa project reports from October 2011 onwards. The new, unified definition of technology packages is composed of the following elements:

**Dissemination tool:** Something (combination of knowledge and technologies) which enhances dissemination and adoption of legume and inoculants use.

**New:** Includes at least one new component, for a given crop, which was not employed in previous seasons’ N2Africa D&D trials in a given country.

**Technology package:** set of inputs for a given legume (seed, fertilizer, inoculants, etc) plus management practices combined in various different ways towards the goal of increasing BNF; accompanied by extension guidelines to explain application of treatments as well as other recommended management practices. For a technology package to count towards this milestone, it must have been tested in at least one season’s D&D trials in the country in question.



**New Technology package:** package (as defined above) with a component not previously included in combination with the other components in previous seasons' trials in a given country.

**New component:** For a given legume: varieties in general, fertilizer (including formulation), strain of rhizobium, type of adhesive, plant spacing, crop arrangements (inter- and relay cropping), inoculants formulation, size of inoculant sachet, novel application of an input, e.g. lime/P seed coating.

### 1.3 Summary of dissemination tools by month 18 of project

An attempt was made to apply the above definition in the following report, however inadequate information was available to use same when describing the technology packages in some countries. A summary of N2Africa dissemination tools developed by the end of September 2011 is displayed in Table 1 below. Figures presented refer to existing dissemination tools at the time of compiling this report, with indications of tools which have yet to be tested.

**Table 1: Number and Type of Dissemination Tools Developed for Use by N2Africa Country by 30 September 2011 (tools not yet tested indicated by \*).**

Country	Extension Manuals (Written/Illustrated)	Technology Packages	Farm Inputs
Rwanda	Farmer Field Book (in Kinyarwanda) Master Farmer Training in BNF and Grain Legume Enterprise (in Kinyarwanda) BNF and Grain Legume Enterprise for Master Farmers (in Kinyarwanda)	5 (soybean, bush bean and climbing bean)	
DRC	Farmer Field Book (in Mashi) BNF and Grain Legume Enterprise for Master Farmers (French and Mashi)	8 (soybean and bush bean)	
Kenya	BNF and Grain Legume Enterprise for Master Farmers (in English and Kiswahili) Master Farming Training in BNF and Grain Legume Enterprise (188 pp) Best Practices to Achieve High Yields of Soybean Grain and Improved Productivity of Maize and Sorghum (English and Kiswahili)* Soybean Reference Board	6 (soybean, bush bean and climbing bean)	1 (fertilizer blend)
Malawi	BNF and Grain Legume Enterprise for Lead Farmers (English, Southern Africa version) Simplified Guidelines for N2Africa Lead Farmers (English and Chichewa)*	7* (soybean, groundnut, bush bean and cowpea)	



Mozambique	Simplified Guidelines for N2Africa Lead Farmers (English, to be translated into Portuguese, and Chichewa)*	11 (soybean and groundnut) (8*)	
Zimbabwe	BNF and Grain Legume Enterprise for Lead Farmers (English, Southern Africa version) BNF and Grain Legume Enterprise for Lead Farmers (Shona, Southern Africa version)*	7 (soybean, groundnut, bush bean and cowpea) (3*)	
Ghana	BNF and Grain Legume Enterprise for Lead Farmers (English, West Africa version)	5 (soybean, groundnut and cowpea)	1 (inoculant packet)
Nigeria	BNF and Grain Legume Enterprise for Lead Farmers (English, West Africa version)	8 (soybean, groundnut and cowpea)	
<b>TOTAL No.</b>	<b>14</b>	<b>57</b>	<b>2</b>

As shown in the table above, N2Africa project developed 73 dissemination tools by the end of September 2011; of these, 22 are to be tested for the first time in the upcoming growing season in Malawi, Mozambique and Zimbabwe. A description of the packages and other dissemination tools, as well as how they were developed in each project country follows.



## 2 Description of dissemination tools by country

### 2.1 Rwanda

A Farmer Field Book was produced, translated into Kinyarwanda and distributed to all participating farmers. The Field Book was adapted from a CIALCA publication, and covers three types of cropping systems (bush bean-cassava intercropping, soybean-maize intercropping and climbing bean-maize rotation), inputs (seeds, fertilizers and inoculants) and management techniques (application of organic and mineral fertilizers, spacing within and between rows) as well as being used to record data on field operations, yields and how both the farmers and community members who visit their trials rate the technologies being demonstrated. Project staff find that the Field Book helps to build capacity in technicians, local facilitators and master farmers who in turn assist other farmers to install, manage and monitor the N2Africa technologies. The five technology packages are comprised of the following components:

1. Soybean-maize rotational system: soybean seed, DAP fertilizer, soybean inoculant, maize seed (variety ZM607). One of two soybean varieties is utilized: Peka 6 or SB24.
2. Bush bean-cassava intercropping system: bean seed, NPK and cassava cuttings. One of two bean varieties is utilized: RWR1668 or RWR2245
3. Climbing bean-maize rotation system: bean seed (variety Gasilida), maize seed (variety Pool A) and DAP fertilizer.

The packages were developed based upon the needs of the farmers in the impact zones, and finalized in N2Africa planning meetings held at the beginning of each growing season. For the two rotational systems, maize is planted in all plots in the second growing season to measure the residual effect of the legume on maize yield.

Additional dissemination tools used in Rwanda are the Master Farmer Training in BNF and Grain Legume Enterprise produced by N2Africa, translated into Kinyarwanda and the BNF and Grain Legume Enterprise Guidelines for N2Africa Master Farmers, also produced by N2Africa and translated into Kinyarwanda.

Total number of dissemination tools developed for Rwanda by September 2011 is therefore eight: three extension manuals in Kinyarwanda and five technology packages.

### 2.2 DRC

Dissemination tools were developed in DRC in a manner similar to that of Rwanda: a Farmer Field Book was adapted from a CIALCA publication and translated into local language. The French version of BNF and Grain Legume Enterprise Guidelines for Master Farmers was also employed, after being translated into Mashi, a local language.

The technology packages developed for dissemination trials were comprised of the following:

1. Soybean-maize intercrop: soybean seed variety SB24, inoculants, fertilizer and maize seed.
2. Soybean-maize intercrop: soybean seed variety PK6, inoculants, fertilizer and maize seed.



3. Soybean-cassava intercrop: soybean seed variety SB24, inoculants, fertilizer and cassava cuttings.
4. Soybean-cassava intercrop: soybean seed variety PK6, inoculants, fertilizer and cassava cuttings.
5. Bush bean-maize intercrop: bean variety CODMLB001, fertilizer and maize seed.
6. Bush bean-maize intercrop: bean variety AFR708, fertilizer and maize seed.
7. Bush bean-cassava intercrop: bean seed variety CODMLB001, fertilizer, cassava cuttings.
8. Bush bean-cassava intercrop: bean seed variety AFR708, fertilizer, cassava cuttings.

Following the results of the 2011B rainy season, it was decided to use only one bush bean variety, namely CODMLB001, due to its high yields.

By the end of September 2011, a total of ten dissemination tools had been developed for DRC, however decisions were made to reduce this to eight (two written/illustrated tools and six technology packages) based on the better performance of one bush bean variety over the other, leaving six technology packages and two extension manuals.

## 2.3 Kenya

Dissemination tools developed in Kenya by the end of September 2011 included six written/illustrated tools and numerous technology packages. The written/illustrated tools are comprised of the English and Swahili versions of the BNF and Grain Legume Enterprise Guidelines for Master Farmers, the English and Swahili version of Best practices to achieve high yields of quality soybean grain and improved productivity of maize and sorghum, a laminated single-page sheet on good production practices compiled with input from N2Africa soybean farmers in Western Kenya and the original Master Farmer Training in BNF and Grain Legume Enterprise, originally produced in 2010, updated and reprinted in 2011. An additional tool developed is the "Soybean reference board", a clip-board displaying small samples of the different soybean varieties together with their names. This used by farmers to identify and grade seed according to the different varietal types.

Technology packages developed for N2Africa activities in Kenya fall into a class of their own, and therefore the numbers are calculated differently. One set of packages was developed for the short rainy season, and another for the long rains (called Seasons A and B in Rwanda and DRC). The packages were further refined according their target beneficiary, Lead Farmers receiving different packages from New Farmers. The different packages are as follows:

1. Package No 1 Field demonstration kit with six technologies: Soybean SB 19 (400 g), Bush Bean Kenya Umoja (200 g), Climbing bean Tamu (200 g), SSP fertilizer 4 kg, BIOFIX inoculant (10 g pre-inoculated), field protocol and report forms contained in mixing bucket planted on 200 m<sup>2</sup>, for Lead Farmers in the long rainy season.
2. Package No 2 Introductory BNF Technology kit: Soybean SB 19 (400 g), SSP fertilizer (2 kg), BIOFIX inoculant (5 g pre-inoculated) planted on 100 m<sup>2</sup>, for New Farmers in the long rainy season.
3. Package No 3 Field demonstration kit with six technologies: Soybeans SB 19, Namsoy and Gazelle (400 g each), Climbing bean (200 g), SSP fertilizer 4 kg, BIOFIX inoculant (2 x 20 g), field protocol and report forms contained in mixing bucket planted on 200 m<sup>2</sup>, for Lead Farmers in the short rainy season.
4. Package No 4 Introductory BNF Technology kit: Soybean SB 19 (1 kg), SSP fertilizer (2 kg), BIOFIX inoculant (20 g), 16 pp extension manual planted on 200 m<sup>2</sup>





5. Package No 5 Field demonstration kit with eight technologies: Soybean SB 19 (1 kg), Climbing bean Temu (500 g), SSP fertilizer 4 kg, BIOFIX inoculant (2 x 20 g), bamboo poles (60), string trellis (100 m), Amistar fungicide, field protocol and report forms contained in cardboard box planted on 300 m<sup>2</sup>, for Lead Farmers in the long rainy season.
6. Package No 6 Introductory BNF Technology kit: Soybean SB 19 (1 kg), SSP fertilizer (2 kg), BIOFIX inoculant (20 g), 16 pp Kiswahili or English extension manual planted on 200 m<sup>2</sup>, for New Farmers in the long rainy season.

An additional dissemination tool developed by N2Africa in Kenya is the “Kenya Seed Collection Point” package, designed to facilitate collection of soybean seed from project partners at the end of the 2011 long rainy season for planting by project farmers during the 2011/12 short rainy season. The package contained all materials needed to conduct seed germination tests and items to clean, weigh and pack the seed. The Soybean Reference Board (mentioned above) was also included in the package, along with a germination test protocol.

A farm input was also developed in Kenya, which will be utilized in some of the other N2Africa countries; Sympal PKS+ (0:23:16 +Mg&S) is a fertilizer blend specially developed by the project to promote good legume growth, and now commercially manufactured and sold by MEA, an agricultural input company in Kenya.

The total number of dissemination tools developed by N2Africa in Kenya by the end of September 2011 is fourteen: six written/illustrated tools, seven technology packages and one farm input product.

## 2.4 Malawi

Dissemination tools developed in the first year of activities in Malawi were comprised of the BNF and Grain Legume Enterprise for Lead Farmers, adapted for Southern Africa and technology packages designed for soybean, common bean, groundnut and cowpea.

The designs were based on needs of farmers in the impact zones together with experience of the first D&D specialist along with recommendations from the national Department of Agricultural Research Services.

Feedback from participating farmers and partners lead to significant revisions of the technology packages for the 2011/12 growing season. A total of four soybean packages testing different combinations of varieties, inoculants (including of different sources) and TSP fertilizer were deployed. For common beans, three packages comprised of different varieties and mineral fertilizers (TSP and Compound D) were tested. Two packages for groundnuts comparing varieties and fertilizers (TSP and Compound D) and one package for cowpea (varietal comparison) were also deployed. Many farmers found the first year’s protocols to be too complicated, and use of mineral fertilizer in groundnuts was resisted by all as this goes against recommendations established by the Government of Malawi, namely that only organic soil amendments should be applied to groundnuts. Additionally, since farmers in Malawi often tend to plant groundnuts late (leaving this until all maize has been planted), importance of timely planting was selected to be demonstrated. Recognition that there are different varieties of soybean and cowpea (both crops considered Malawian farmers to made up of just one variety) and the impact inoculants on soybean and of mineral fertilizers (rich in phosphorus) on soybean, bean and cowpea were identified as being important aspects to demonstrate to farmers in the second growing season. Insect pest management, especially for the prevention of insect-vectored virus infections was also identified as being important for cowpea crops. The following technology packages were therefore developed for Malawi by the end of September 2011:

1. Soybean input trials: soybean seed (either variety Makwacha or Nasoko), SYMPAL fertilizer, inoculants (source Biagro, Argentina).



2. Soybean variety trial: soybean seed (varieties Makwacha and Nasoko), inoculants (source Biagro, Argentina) and SYMPAL fertilizer.
3. Groundnut variety and planting date trial: groundnut seed (varieties Nsinjiro and Chalimbana), two planting dates separated by two weeks.
4. Bean variety and fertilizer trial: bean seed (varieties Napilira and Kholophete) and Compound D fertilizer.
5. Cowpea variety and fertilizer trial: cowpea seed (varieties Sudan 1 and IT81E-16), Compound D fertilizer and seed of Tephrosia vogelii together with planting and botanical insecticide preparation instructions.

The BNF and Grain Legume Enterprise Guidelines for Lead Farmers was found by most partners in Malawi to be too complicated for the N2Africa farmers, as was reported to be the case in most project countries during a workshop convened in May 2011. Additionally, research conducted by an N2Africa M.Sc. student in Malawi in the first year of the project found that most farmers are much more concerned about income generation and food security than soil fertility. A much simpler version was therefore developed, which emphasized the importance of legume crops for income generation and food security, as well as savings on fertilizer for subsequent maize crops, and the role they can play in the diet as a high quality substitute for meat – which is not affordable to many small scale farmers in Malawi. More information was also provided on harvest and post harvest handling of grain legumes, and activities which are handled more by extension staff and partners were omitted, for ease of simplification. This version was translated into Chichewa (the most common local language) and will be tested as an unbound paper copy which will be distributed to N2Africa Lead Farmers for the 2011/12 growing season.

The total number of dissemination tools developed for and in current use in Malawi by the end of September 2011 is eight: three written/visual extension materials and five technology packages.

## 2.5 Mozambique

Dissemination tools developed for Mozambique were comprised solely of technology packages, as there was no translation of the BNF and Grain Legume Enterprise Guidelines for Lead Farmers into Portuguese.<sup>1</sup> For the first year of N2Africa activities in Mozambique, technology packages were developed based upon IITA's previous work in the country, using a plot design adapted from that which had been used by the main partner, Technoserve. Different soybean varieties were used, but not considered as part of the technology package in the first year. With a full plot size of 5000 m<sup>2</sup> (divided into five sub-plots of 1000 m<sup>2</sup> each, which were split into two), the ten treatments used were as follows:

1. Soybean – inoculated vs. non-inoculated
2. Soybean – early vs. late planting
3. Soybean – narrow vs. wide spacing (40 cm x 10 cm vs. 50 cm x 10 cm)
4. Soybean – application of SSP vs. no SSP
5. Soybean – mechanized plowing vs. manual plowing

From the results of the first year's trials, and discussions between N2Africa and Technoserve-Mozambique, the Technoserve packages numbers 2, 3 and 5 were revised as follows:

---

<sup>1</sup> N2Africa farmers did have access to Portuguese soybean extension materials produced by partner Technoserve, however.



1. Planting date: difference was extended from two weeks to ca. three to four weeks as little impact had been observed with two planting dates so close apart.
2. Spacing: a difference of only 10 cm resulted in no observable difference, therefore a larger spacing (75 cm x 10 cm) was selected to replace the 40 cm x 10 cm. The optimum spacing is believed to be 50 cm x 10 cm, however if crop growth is good (adequate well distributed rainfall, etc.), fully canopy coverage can be achieved with the wider spacing.
3. Mechanized ploughing is already known to be beneficial by all farmers, so this is to be dropped. Instead, the fifth plot will combine all the "optimum" treatments: SSP fertilizer, inoculants, 50 cm x 10 cm spacing and first planting date.

In addition to the Technoserve demonstration plots, N2Africa will be implementing its own soybean trials in the 2011/12 season which will be smaller in size and contain fewer treatments. These will be implemented by farmers who do not benefit from the support of Agri-Business Promoters (ABPs), which are located in the vicinity of most of the Technoserve demonstrations. Smaller sized demonstrations are easier for the farmers to manage, and in addition allow N2Africa to reach a larger number of farmers (given limits on amounts of inputs available for D&D plots). There will be three soybean packages, and the selection of which one will be applied will depend on the results of soil analyses which are to be taken from each site prior to the growing season:

1. For sites with low phosphorus and nitrogen levels, comparison will be of no soil amendments, plus SSP, plus inoculants and plus both SSP and inoculants will be made using a single soybean variety.
2. For sites where there is adequate phosphorus but low nitrogen, comparison will be made of two varieties, each with and without inoculants.
3. For sites where there is adequate nitrogen but low phosphorus, comparison will be made of two varieties, each with and without SSP fertilizer.

Groundnut trials will be added in the 2011/12 growing season with N2Africa Mozambique partner Ikuru. Factors to be tested are varieties (after consultation with ICRISAT-Malawi), planting dates and use of soil amendments (lime and P fertilizer). Varietal characteristics of greatest interest are (1) drought resistance, (2) resistance/tolerance to rosette virus and (3) larger size nuts. As per the soybean trials above, selection of which soil amendments are to be applied will depend on outcome of soil analyses. The two technology packages which will be used are as follows:

1. For sites with adequate phosphorus and non-acidic soils, comparisons will be made of two varieties (one early, one later maturing) each sown on two planting dates (spaced two to three weeks apart) and
2. For sites where soil acidity is high but phosphorus adequate, comparisons will be made of one variety sown with and without lime.
3. For sites where soils are both acidic and lacking adequate phosphorus, comparisons will be made of one variety sown with no soil amendments, with lime, and with lime plus SSP.

By the end of September 2011, the total number of dissemination tools in use in Mozambique is eleven, comprised entirely of technology packages.



## 2.6 Zimbabwe

Dissemination tools deployed in the first year of activities in Zimbabwe consisted of the BNF and Grain Legume Enterprise Guidelines for Lead Farmers, version for Southern Africa, and four technology packages. The latter were developed from a combination of different sources of information (CIAT, the national extension services Agritex, etc.) together with input from partners during the first planning meeting. The five technology packages were as follows:

1. Bean input and variety trial: seed of three bean varieties (Cardinal, Speckled Ice and Pan 159) grown with/without bean inoculants, with basal application of SSP fertilizer and lime.
2. Groundnut input trial: seed of Natal Common groundnut, and with/without gypsum, all with basal application of lime.<sup>2</sup>
3. Soybean input trial: seed of one variety of soybean grown with/without inoculant and with/with SSP fertilizer, basal application of lime to all subplots.
4. Cowpea input trial: cowpea seed (either variety CBC1 or CBC2), basal application of SSP and lime applied to all plots.

These technology packages are planned to be revised for the 2011/12 season, and most likely will add on/remove the following components:

1. Common Bean input trial: bean seed (single variety per trial, using as many different varieties as possible) grown no inputs, plus SSP fertilizer, plus inoculants and plus both SSP and inoculants.
2. Groundnut input trial: seed of one variety, grown with no inputs, plus gypsum, plus SSP and plus both gypsum and SSP.
3. Soybean input trial: seed of one variety grown with no inputs, plus inoculant, plus SSP and plus inoculants and SSP.
4. Cowpea management trial: cowpea grown with two management practices (harvesting of leaves during the season vs. no leaf harvest), with and without SSP.

In addition to the above main D&D trials, three to four lead farmers in each of the six districts where N2Africa is working in Zimbabwe will conduct a larger trial, based on one of two designs:

1. Soybean with and without inoculants, SSP and lime (eight treatments in total).
2. Common bean, with and without inoculants, SSP and lime (eight treatments in total).

The BNF and Grain Legume Enterprise Lead Farmer Guidelines were translated into Shona, and will be printed and distributed during the 2011/12 season. This brings the total number of dissemination tools used in Zimbabwe by the end of September 2011 to twelve: two written/illustrated extension manuals, and ten technology packages.

---

<sup>2</sup> As a result of miscommunication, rhizobial inoculants for groundnut and cowpea were accidentally distributed to farmers. Naturally, these were discontinued due to the lack of experimental evidence to indicate a likelihood of a response, and the lack of observations of a response in growth and yield during the first season.



## 2.7 Ghana

Dissemination tools utilized in the first year of activities in Ghana included the BNF and Grain Legume Enterprise Lead Farmer Guidelines and four technology packages (one groundnut variety trial and two soybean trials) developed from results from previous research by various institutions (SARI, ICRISAT and IITA) along with input from partners at the first planning meeting. Following the 2011 planning meeting and other sources of feedback (e.g. agronomy trials), these were refined and simplified so as to be more easily implemented and understood by participating farmers. The technology packages deployed in 2011 were as follows:

1. Soybean input trial: soybean seed (variety Jenguma), TSP fertilizer, inoculants, pre-emergence herbicide and insecticide.
2. Cowpea variety trial: cowpea seed (originally varieties Songotura and Apaagbala, with the latter replaced by IT90K-277-2 and Padituya in places due to lack of sufficient seed of Apaagbala), TSP fertilizer, pre-emergence herbicide and insecticide.
3. Groundnut variety trial: groundnut seed (varieties Chinese, Samnut 22 and Samnut 23), TSP and KCl fertilizers and pre-emergence herbicides.

An additional new dissemination tool developed for Ghana in 2011 was the provision of inoculants in 100 g sachets (previously had been 400 g) for easier and safer handling.

The total number of dissemination tools developed for Ghana by the end of September 2011 was therefore seven: one extension manual, one inoculant tool and five technology packages.

## 2.8 Nigeria

Dissemination tools deployed in Nigeria in the first year of N2Africa activities were comprised of the BNF and Grain Legume Enterprise Guidelines for Lead Farmers and eight technology packages. These were modified based on the results of the first season together with availability of new crop varieties, and were comprised of the following:

1. Soybean variety and inoculants trial: one improved (one of which was introduced this season, namely TGX 1955-3F<sup>3</sup>) and one traditional variety of soybean, each grown with and without inoculants.
2. Soybean phosphorus fertilizer and inoculant trial: one variety of soybean grown without any soil amendment, with phosphorus fertilizer, with inoculants and with phosphorus fertilizer plus inoculants.
3. Cowpea variety and phosphorus trial: one improved (one of which was introduced this season, namely IT99K-205-8<sup>4</sup>) and one traditional variety of cowpea, each grown with and without phosphorus fertilizer.
4. Groundnut variety trial: two improved groundnut varieties compared with farmer's variety.

---

<sup>3</sup> Promiscuous breeding line of medium maturity and high yielding; being evaluated by TLII and soon to be released in Nigeria.

<sup>4</sup> White seeded, extra early maturity, drought tolerant, striga resistant and moderately resistant to common diseases in northern Nigeria.



- 
5. Groundnut variety and phosphorus fertilizer trial: one improved (one of which was introduced this season, namely RMP 91<sup>5</sup>) and one traditional variety of groundnut, each grown with and without phosphorus fertilizer.
  6. Groundnut cropping system trial: An improved groundnut variety grown as intercrop with a cereal (maize or sorghum) using (a) a ratio of two rows of cereal to four rows of groundnut and (b) four rows of cereal with four rows of groundnut compared with a monocrop of a traditional groundnut variety.
  7. Cowpea variety trial in relay with maize: one traditional and two improved varieties of cowpea planted into existing maize field at time when maize is at silking stage.
  8. Cowpea cereal strip/relay cropping trial: one variety of cowpea, comparing farmer's "traditional" cropping practice with (a) strip planting two rows of cereal (maize, millet or sorghum) with four rows and cowpea and (b) relay cropping (planting cowpea in between hills of cereal two weeks after planting of cereal).

The total number of dissemination tools deployed in Nigeria by the end of September 2011 is therefore nine: one extension manual and eight technology packages.

---

<sup>5</sup> High yielding (both haulms and pods) and rosette resistant.



---

## 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 soybeans, 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

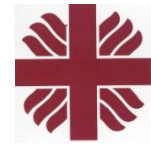


- 
32. N2Africa Baseline report
  33. N2Africa Annual country reports 2011
  34. Facilitating large-scale dissemination of Biological Nitrogen Fixation
  35. Dissemination tools produced





## Partners involved in the N2Africa project



Caritas Rwanda



Diobass



Eglise Presbyterienne Rwanda



Resource Projects-Kenya



Université Catholique de Bukavu



University of Zimbabwe



World Vision