



**Special Events on the Role of  
Legumes in Household Nutrition  
and Value Added Processing**

Milestone 4.5.3

Anne D. Turner

Submission date: February 2013

**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 D. Turner  
Address: IITA-Malawi, PO Box 30258  
Lilongwe 3, Malawi  
E-mail: [a.turner@cgiar.org](mailto:a.turner@cgiar.org), [turner.annedaniel@gmail.com](mailto:turner.annedaniel@gmail.com)

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:

Anne D. Turner, 2013. Special Events on the Role of Legumes in Household Nutrition and Value-Added Processing, [www.N2Africa.org](http://www.N2Africa.org), 15 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>Introduction</b> .....	<b>4</b>
<b>2</b>	<b>Nutrition and Processing Events in Each N2Africa Country</b> .....	<b>5</b>
2.1	Democratic Republic of Congo (DRC).....	5
2.2	Ghana .....	6
2.3	Kenya.....	6
2.4	Malawi.....	7
2.5	Mozambique .....	8
2.6	Nigeria.....	9
2.7	Rwanda.....	9
2.8	Zimbabwe .....	9
<b>3</b>	<b>Conclusions</b> .....	<b>11</b>
	<b>Appendices</b> .....	<b>12</b>
	<b>List of project reports</b> .....	<b>12</b>

## Table of tables

Table 2.1	Events on the role of legumes in household nutrition and value added processing conducted November 2011-July 2012 in DRC.....	5
Table 2.2	Legume nutrition and processing training in Ghana held in Year 3 .....	6
Table 2.3	Training in legume nutrition and processing conducted in Malawi over November 2011 – October 2012.....	7
Table 2.4	Location and numbers of participants attending nutrition and processing training in Mozambique between November 2011 and April 2012. ....	8
Table 2.5	Training in soybean processing for improved household nutrition conducted in Mozambique July – August 2012. ....	9



## 1 Introduction

As outlined in the N2Africa Project proposal, local processing and utilization of legume crops is important to promoting uptake of legume crops and technologies by small-scale farmers. This is especially important for soybean which is a new or little known crop in some areas. Providing information on techniques for value-added processing of legumes, along with their importance in household nutrition should increase local demand for these crops, and provide benefits to rural livelihoods and well-being. At the time of the proposal development, it was acknowledged that women tend to dominate activities related to local processing and use of grain legumes, and project interventions concerned with training on nutrition as well as processing of all legume crops have consequently been tailored to reach women farmers and rural women's groups in particular.

Nutrition and processing activities under N2Africa really began in Year 2 of the project, and was reported in a combined milestone report covering Milestones 4.4.2, 4.4.3, 4.4.4, 4.5.3, 5.3.2 and 5.4.1 in December 2011. The number and range of nutrition and processing events grew considerably in almost all countries in Year 3, together with increased awareness of the nutritional value of legume products and the range of tasteful foods which can be prepared with same, together with project-related increases in production of grain legumes and number of farmers reached by N2Africa.



## 2 Nutrition and Processing Events in Each N2Africa Country

### 2.1 Democratic Republic of Congo (DRC)

Numerous events around nutrition and processing of soyabean were conducted by N2Africa and its partners in DRC from November 2011 – October 2012. Most involved training farmers in how to improve family nutrition with soyabean milk and cakes; additionally, partner DIOBASS incorporated demonstrations on making these products at one of their field days. Details on dates, locations and participants present at these events are given in Table 2.1 below.

**Table 2.1 Events on the role of legumes in household nutrition and value added processing conducted November 2011-July 2012 in DRC.**

Date	Location	Partner	Topics Covered	No. Men	No. Women	Type of Event*
1/12/2011	Mumosho	SARCAF	Processing of soyabean to improve family nutrition	4	37	I
15/12/2011	Murhesa	PAD	Ditto	7	11	I
21/3/2012	Bugorhe	DIOBASS	Making soyabean milk and cakes	25	37	I
13/6/2012	Birava	PAD	Processing soyabean to improve family nutrition	10	7	I
14/6/2012	Kalehe	PAD	Ditto	13	5	I
15/6/2012	Murhesa	PAD	Ditto	11	22	I
16/6/2012	Miti	SARCAF	Ditto	3	27	I
19/6/2012	Walungu	PAD	Ditto	19	15	I
20/6/2012	Mulamba	PAD	Ditto	13	1	I
25/02/2012	Ikoma-Ibamba	SARCAF	Ditto	14	70	I
12/3/2012	Kamisimbi	SARCAF	Ditto	3	11	I
11/5/2012	Mushinga	DIOBASS	Making soyabean milk and cakes	48	22	II
<b>TOTAL</b>				<b>170</b>	<b>265</b>	

\*I = Training, II = Field Day

As is seen in most N2Africa countries, women comprise the majority of participants in nutrition and processing training, with 67% of the DRC trainees over this reporting period being women. With a total of 365 farmers trained in total, this is a large increase over number of people in DRC involved in N2Africa activities being trained in legume nutrition and processing (only 17 received training in the last reporting period).

In addition to training and field days, information on nutrition and processing of legumes was broadcast by Radio Mandeleo in the DRC on 24 October 2011, 15 November 2011 and 13 June 2012.



## 2.2 Ghana

The role of legumes in household nutrition and processed soyabean and cowpea products was covered both by training and in some field days in Ghana. Three training events which were dedicated to nutrition and processing were held in January 2012, with women participants far outnumbering men (233 women out of a total of 254 trainees, or 92%). These trainings included information on malnutrition and its effects on society as well as how to prepare soyabean flour, soy milk, soy brochette and how to fortify local dishes with soyabean and cowpea flour. Handling and proper storage of processed legume products was also covered in the training. Details on trainings on legume nutrition and processing in Ghana over the period November 2011 – October 2012 are given in Table 2.2 below.

**Table 2.2 Legume nutrition and processing training in Ghana held in Year 3**

Date	Location	Partner	No. Men	No. Women
18/1/2012	Chereponi District	ACDEP/EPDRA	11	65
24/1/2012	Karaga	URBANET/MoFA	5	90
26/1/2012	Savelugu	URBANET/MoFA	5	78
<b>TOTAL</b>			<b>21</b>	<b>233</b>

Information on nutrition and processing of soyabean and cowpea was incorporated in more general training (covering a wide range of topics) conducted at five different locations in July and August 2012. Legume nutrition and processing was also included in many of the field days held in Ghana over the 2012 growing season.

Since no events on nutrition and processing of legumes were held in Ghana over the previous reporting period, the activities described above reflect a growing increase in attention given to and interest in this subject area in Year 3 of N2Africa in the country. Should additional events be conducted in Year 4, this will enhance the percentage of women involved in project activities in Ghana.

## 2.3 Kenya

Over the November 2011 – April 2012, 16 special events relating to women's empowerment were conducted during the past six months, all in conjunction with farmer field days. These events included skits and poems performed by women (6%), legume variety appreciation (13%), local cooking contests (25%) and exhibition of value addition (56%). In addition, an extension publication describing grain legume processing written in Kiswahili was printed and 2000 copies distributed in west Kenya ("Kijitabu cha Usindikaji wa Nafuka Jamii Kundi", P.L. Woomer and W. Mulei, , 2011, A5 size, 20 pp). This publication included post-harvest handling, value addition, nutritional information, recipes and a glossary.<sup>1</sup>

By August 2012, during a presentation given by Josephine Ongoma on "Soybeans for Food, Health and Wealth", nine out of the 26 Kenyan N2Africa co-operators were reported to actively involved in value-addition processing of soyabean, with eight of these having received soymilk press kits in May 2012. A range of products, from soymilk (also used to make soy yogurt), other soy beverages, soy crunchies and crackers and soy flour (plain and composite). The presentation further stated that in addition to production of value-added soy products for sale from group kiosks/shops, household-level value-added processing was on-going following continued events designed to empower women.

<sup>1</sup> This information was taken from the 30 Month Progress Report for Kenya.



## 2.4 Malawi

A number of different types of events took place in Malawi around legume nutrition and value-added processing over this reporting period. D&D partners in three districts (Ntcheu, Dedza and Salima) conducted nutrition and legume processing training early in the 2011/12 season. Other in-depth training, covering a two-day period, was conducted by N2Africa and the IFAD-project staff in three Extension Production Areas (EPAs) after the harvest in June-July 2012 (see Table 4 below). In July 2012, N2Africa show-cased a variety of legume food products at the launch of a USAID-funded project, attended by the President of Malawi, Her Excellency Joyce Banda. The President expressed amazement over the range of products which can be prepared from soyabean, and said she hoped Malawians would be able to boost productivity levels of this crop. Details on nutrition and processing events in Malawi over the reporting period are given in Table 2.3 below.

**Table 2.3 Training in legume nutrition and processing conducted in Malawi over November 2011 – October 2012.**

Date	Location	Partner	No. Men	No. Women	Type*
9/3/2012	Salima	Department of Agricultural Extension Services	39	102	FD
13/3/2012	Dedza	Department of Agricultural Extension Services	65	43	FD
21/3/2012	Dedza	Department of Agricultural Extension Services	48	44	FD
22/3/2012	Dedza	Department of Agricultural Extension Services	137	93	FD
<b>TOTAL FD</b>			<b>289</b>	<b>282</b>	
15/3/2012	Ntcheu	Concern Universal	22	8	Tr
21/6/2012	Mchinji, Mngwangwa EPA	NASFAM	25	46	Tr
2-3/7/2012	Mchinji, Mkanda EPA	NASFAM	6	11	Tr
4-5/7/2012	Mchinji Mlonyeni EPA	World Vision	18	11	Tr
<b>TOTAL Tr</b>			<b>71</b>	<b>76</b>	

\*FD = Field Day, Tr = Training

A majority of the trainees attending nutrition and processing training in Malawi was female, however the percentage (52%) was lower than in most other project countries. In the case of the Ntcheu training, a much larger proportion of the Lead Farmers selected in the district were men (and the training was targeting Lead Farmers). In Mlonyeni, a funeral was being held at the same time as the training, and women are traditionally expected to participate more in such events than men. The number of Malawians trained in legume nutrition and processing in Year 3 was only slightly higher than that reported for Year 2 (141); funds available for this activity were not sufficient for larger numbers, primarily because the participants did not supply the ingredients for the hands-on processing themselves. Should any nutrition and processing training be conducted in the future, participants should be encouraged to provide at least some of the processing ingredients so as to reach more people, and add more sustainability to the activity, as happened in Rwanda (see below).

With the lifting of the export ban on soyabean (May 2012), a growing market for the crop in the southern African region and declining market for Malawi's traditional export, tobacco, soyabean is increasingly seen as a cash crop. As such, there may be less adoption of



household level consumption of processed soyabean products, despite the awareness being raised on the nutritional benefits of these foodstuffs. Groundnut is similarly gaining importance as a cash crop, however it has been a more traditional ingredient in Malawian meals, so will most likely continue to be consumed by households which produce the crop. Hopefully we will see increases in consumption of the other two legumes promoted by N2Africa in Malawi, namely cowpea (also grown for its nutritious leaves which are used in “relish” during the lean months prior to harvest of the main crops) and common bean, resulting from our legume nutrition and value-added processing training.

## 2.5 Mozambique

In collaboration with the other projects in Mozambique, (Platform Mozambique and TLII), CLUSA and community groups, N2Africa project conducted training and demonstrations in soyabean home processing and utilization in Zambezia province. The training and demonstrations were conducted through the Training-of-Trainers (ToTs) approach whereby selected individuals from community groups were trained and thereafter returned to the communities to train their group members. The focus of the training was on bio-fortification of commonly eaten carbohydrate foods to enhance protein and energy quality of the diets. The recipes introduced included soy milk, soy fortified thin and thick porridge, soy-vegetable soup, soy-wheat flour bread, and soy-wheat flour cake. Between November 2011 and April 2012, 979 people (770 females and 209 males) were trained, as shown in Table 2.4 below.

**Table 2.4 Location and numbers of participants attending nutrition and processing training in Mozambique between November 2011 and April 2012.**

<b>Location (within Gurure District)</b>	<b>No. Men</b>	<b>No. Women</b>
Lioma	123	209
Ruace	26	239
Tetete	60	322
<b>TOTAL</b>	<b>209</b>	<b>770</b>

Over the period of July – September 2012, an additional total of 1891 farmers were trained on home utilization of soyabean for improved nutrition (protein and calories) by N2Africa in Mozambique. The focus of the training was to improve the nutritional quality of commonly consumed foods using soyabean. The participants were first taught how to prepare flour from soybean, and then encouraged to innovate using the soy flour as they use groundnut powder in foods. They were also encouraged to use soy milk the same way they use coconut milk – a familiar ingredient – in various dishes. In the end, participants were learned how to prepare a total of 11 home-processed food products: soy flour, soy milk, soy fortified porridge, tomato-soybean relish, soy-vegetable soup, cassava-soy meal, sweet potato and soy baby food, banana and soy baby food, moringa soy relish, soy wheat cake, and soy wheat bread. Locations-months of training and numbers of participants attending each of these trainings are given in Table 2.5 below.





**Table 2.5 Training in soybean processing for improved household nutrition conducted in Mozambique July – August 2012.**

Month (2012)	Location	No. Men	No. Women
July	Murrimo	107	193
July	Tetete	250	463
August	Tetete	250	454
August	Murrimo	58	116
<b>Total</b>		<b>665</b>	<b>1226</b>

Women trainees outnumbered men in the nutrition and processing training, with 79% (Table 4) and 65% (Table 2.5) of all participants being female. Involvement of a higher proportion of women in the D&D trials through both IITA and partner IKURU (see 30 Month Report) together with a high percentage of women participants at nutrition and processing training helped N2Africa to achieve a higher level of involvement of women in the 2011/12 season, compared to the first season of activities (2010/11 where only 15% of all training participants were women).

## 2.6 Nigeria

Reaching women via farming activities in northern Nigeria is difficult, given cultural taboos, so N2Africa placed an emphasis on reaching them through training on legume nutrition and processing in the 2011 season. A total number of 282 women from eight communities underwent this training by the end of 2011. This activity was led by the Farm Liaison Officer for Nigeria, and given that she went on maternity leave towards the end of the 2012 season, nutrition and processing activities were postponed until her return to work.

## 2.7 Rwanda

Initially 26 women were trained in nutrition and processing of soybean by partner COCOF and a nutritionist from Rwanda's Ministry of Commerce (MINICOM) in September 2011. In turn, they were expected to return to their action sites (13 in total) and train at least 100 community members in nutrition and processing of soybean. Subsequently, the Farm Liaison Officer for Rwanda visited each trainee at her action site, together with the nutritionist. The objective of the visits was to see whether or not the trainees were applying what they had learned, and if they needed any additional support. The feedback given during these visits was very encouraging; some of the trainees were organizing demonstrations on soybean processing at the sector level, inviting representatives from the villages in the sector to see and taste the products. At other action sites, the trainees had become consultants of sorts, training women who visited health clinics with malnourished children how to prepare nutritious soybean food products. Some of the trainees had developed small enterprises based upon soybean tofu, and were being hired to help with food preparation for wedding ceremonies. Only at one action site, in northern Rwanda, were the trainees encountering difficulties putting their new skills and knowledge to use, and this was due to a shortage of soybean grain in the area, which is high in altitude and not suited to soybean production.

## 2.8 Zimbabwe

While no special events dedicated to nutrition and processing of legumes this year in Zimbabwe, value added legume products were featured at "dry shows"<sup>2</sup> This year, as

<sup>2</sup> These events are comprised of farmer groups organizing a display of various agricultural products they have produced. They are not conducted in the field, but at community centers, churches, leaders' homes, etc. The dry shows are held after all crops have been harvested, and are open to all community members.



occurred last season, D&D partners (three in number) participated in a “ZAVSAP” fair, which features processed agricultural products, by exhibiting value-added legume foods participating farmers have learned to make. The large majority of the visitors were farmers, and to a lesser extent people from NGOs, journalists, etc. The fair is an excellent opportunity for a wider audience to learn about the nutritional value of and range of products which can be made from grain legumes.



### 3 Conclusions

With a large increase in the number and diversity of special events on nutrition and processing of grain legumes occurred in nearly all N2Africa countries since the last reporting period, we will probably find a significant increase in production and consumption, as well as sale, of these products during the Early Impact Assessment. Both numbers of farmers reached through these events, and increases in supplies of grain legumes available, the project has made considerable progress towards this milestone. There are some concerns, however, in countries such as Malawi where the prices grain legumes now fetch, and an increasing inflation rate (together with continued devaluation of the local currency), farmers producing the legumes are showing greater interest in selling all their harvest rather than consuming at the household level. Nigeria, on the other hand, which had an excellent training program in 2011 was not able to conduct any events this season, due to the Farm Liaison Officer's going on maternity leave. There were sizeable increases in the numbers of these events in DRC, Kenya and Mozambique, as well as numbers of participants, the majority of which are usually women.

In the remaining months of N2Africa, we should look at ways of making nutrition and processing events more sustainable, e.g. by encouraging participants to provide the ingredients themselves, conducting more events at venues where mothers are likely to be present (e.g. pre- and ante-natal clinics, as has been done in Mozambique, schools, community meetings, etc.) – but also target men so that they understand the importance of the nutritional value of legumes and the need to retain some for household consumption rather than selling all of their harvest.

The level of interest in processed legume products appears to be high in most countries, so we should build on this momentum. The fact that women trained in processing in Rwanda were so interested and motivated by this activity that they have undertaken providing similar training to women in their communities, of their own volition and not depending on any money or inputs from N2Africa. This is an important lesson that N2Africa can try and repeat in other countries.



## Appendices

Appendix I: Poster from N2Africa Kenya on producing soya milk.

# Mince & Press Soymilk

**Preparation:** Soybeans are washed and soaked briefly, passed through a mincer and mixed with water, pressed between two heavy pots, liquid soymilk and press cake separated, soymilk boiled, packaged and consumed. This process costs about KSh 70 for each kg of soybeans, and results in 2 kg of moist press cake and 6 liters of soymilk worth a total of KSh 320 by this simple five step procedure.

Step 1: Soak	Wash and soak 1 kg of soybean in 2 liters of warm water for 4 hrs	- KSh 42
Step 2: Mince	Pass 3 kg soaked soybean through mincer, add 7 liters hot water, mix for 5 minutes	- KSh 21
Step 3: Press	Transfer mince to a clean cloth and press between two heavy pots, drain	- KSh 7
Step 4: Boil	Filter soymilk, boil for 5 min, recover 2 kg press cake for grit or animal feed	+ KSh 34
Step 5: Package	Cool and place 6 lts of soymilk in a clean container or add tea and sugar and market (consume) as "African sweet tea"	+ KSh 286





**press cake**

**soymilk**



### Making soymilk using a simple grind-and-press approach



1 kg dry soybeans = 3 kg soaked soybeans



3 kg mince + 5 litres water



2 kg wet press cake



6 litres soymilk

grind and press



**Apparatus may be assembled for only KSh 4400 per unit**

soymilk may be produced and sold as hot tea alongside other snacks!

For more information contact Dr. Paul Woomer by emailing [plwoomer@gmail.com](mailto:plwoomer@gmail.com)



## 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
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



## Partners involved in the N2Africa project



Bayero University Kano (BUK)



Caritas Rwanda



Diobass



Eglise Presbyterienne Rwanda



Resource Projects-Kenya



Sasakawa Global; 2000



Université Catholique de Bukavu



University of Zimbabwe

