



**Special events on the role of legumes
in household nutrition and
value-added processing**

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N2Africa

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



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1 Introduction

This reports presents information on achievements on a milestone under the objective of large-scale dissemination efforts of legume technologies to farmers. This 4th objective of the N2Africa project is to “Deliver legume and inoculant technologies to farmers throughout sub-Saharan Africa”. A series of activities with milestones was developed to achieve this objective:

1. Create strategic alliances for facilitating dissemination of legume and inoculant technologies in the impact zones
2. Produce specific dissemination tools, including inoculant packets, adapted to the needs of farmer groups, agro-dealers, and development partners
3. Engage with legume seed system, market, and nutrition initiatives operating in the impact zones
4. Conduct collaborative legume and inoculant technology dissemination campaigns and create awareness in rural communities in all impact zones
5. Develop strategies for empowering women to benefit from the project products

Table 1 shows how the sub-activities follow one another under the 5th activity “Develop strategies for empowering women to benefit from the project products” to achieve the overall dissemination objective. This report presents the activities undertaken under milestone 4.5.3 “At least 2 special events on the role of legumes in household nutrition and value-added processing conducted per country”. N2Africa aims to increase productivity of legume production in order to enable farmers to increase their income through sale of legumes and improve nutritional status of smallholder farmers’ households through increase consumption of legumes within the household. Increasing awareness and knowledge on legume consumption empowers women and enhances possibilities for increase consumption of legumes.

Table 1: Sub-activities/milestones under activity 5

<i>Activity 5</i>	<i>Report No.</i>	<i>Develop strategies for empowering women to benefit from the project products</i>	<i>Timing</i>
4.5.1	C 023	Gender analysis in relation to specific legumes, labour, household and market preferences documented.	month 6, year 2
4.5.2	R 023	A report documenting the involvement of women in at least 50% of all farmer-related activities produced	month 9, years 2, 3&4
4.5.3	R 034	At least 2 special events on the role of legumes in household nutrition and value-added processing conducted per country	month 12, all years

Hereafter, the special events that have been organized in-country on the role of legumes in household nutrition and value-added processing (Milestone 4.5.3) are presented per country.



2 Events on the role of legumes in household nutrition & value-added processing¹

2.1 Introduction

Local processing and utilization of legume crops is important to promote the uptake of legume crops and technologies by small-scale farmers. This is especially important for soyabean, 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. We acknowledge that women tend to dominate activities related to local processing and use of grain legumes within the household, 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.

It was planned that at least two special events on the role of legumes in household nutrition and value-added processing should be conducted per country per year. However, nutrition and processing activities really began in Year 2 of the project, and these were reported on in report number 34. At that time, late 2011, few 'special events' had been initiated. The level and range of nutrition and processing events grew considerably in almost all countries in Year 3, together with project-related increases in production of grain legumes and number of farmers reached by N2Africa.

In order to have a more complete picture per country of the activities implemented to articulate the role of legumes in household nutrition and value-added processing, the activities reported earlier are included in the report back from the different N2Africa countries.

2.2 Ghana

In 2012 it was reported that in 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 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%, see Table 2). These trainings included information on malnutrition and its effects on society as well as how to prepare soyabean flour, soya milk, soya 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.

Table 2: Legume nutrition and processing training in Ghana, 2012

Date	Location	Partner	No. of men	No. of 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
		<i>Total</i>	<i>21</i>	<i>233</i>

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.

¹ Some information in this chapter is derived from a first draft report on milestone 4.5.3 prepared by Anne Turner before she departed from N2Africa.



In April 2013 it was reported that events on human nutrition were conducted in all ten communities in each of three mandate regions. The training attracted women groups from the focused community and beyond. The average attendance per location was 65 persons instead of the targeted 40 persons. Legume recipes demonstrated included soya khebab, soya milk, soya tubaani, soya koose, soya apapransah/sawalla, soya TZ, banku and soya sauce, and rice with soya stew. To facilitate the learning process a handbook on the legume recipes for Ghana has compiled for distribution to the participants.

Ilse de Jager, nutritionist from Wageningen University, conducted a quasi-experimental study on nutrition in February to April 2013, investigating the potential impact of the N2Africa project on the nutrient adequacy of the diet and the nutritional status of children under 5 of participating households.² The N2Africa project seems to increase the nutrient adequacy of the diet of children older than 2 years but not that of the diet of younger children. More children older than 2 years of N2Africa participants consume legumes. As stunting is irreversible after the age of 2, it needs to be explored how N2Africa project may contribute to nutrient adequacy of the diet of children under 2. Children do not differ in nutritional status between the two groups (see Table 3).

Table 3: Individual Dietary Diversity Score (IDDS) and nutritional status indicators of children 6-59 months of age from N2Africa participants and from non-N2Africa participants, Ghana

Outcomes	Unit	Non-N2Africa villages (N=202)	N2Africa villages (N=129)
IDDS, out of 14 food groups (incl. fats and oils)	Mean (SD)	5.1 (1.8)	5.5 (1.9)*
for children under 2 years	Mean (SD)	4.1	4.2
for children 2 to 5 years	Mean (SD)	5.6 (1.3)	6.1 (1.2)*
Consumption of 'legumes, nuts and seeds' group	% (N)	77.2 (156)	86.8 (112)**
for children under 2 years	% (N)	63.2 (48)	70.0 (28)
for children 2 to 5 years	% (N)	85.7 (108)	94.4 (84)**
Stunting, n (%)	% (N)	29.2 (59)	35.7 (46)
Underweight, n (%)	% (N)	23.3 (47)	24.0 (31)
Wasting, n (%)	% (N)	10.9 (22)	6.2 (8)

* $P < 0.05$ (Mann-Whitney U test); ** $P < 0.05$ (Chi-square test)

Furthermore, focus group discussions were conducted to explore two pathways through which improved legume productivity may affect nutrition security of a household: via food availability and via income. The main summarised results are shown in the figures below. Female N2Africa participants and N2Africa participants who received training on soyabean preparation mostly indicated that the legume yield was used for home consumption. Male N2Africa participants mostly indicated that the legume yield was used for sales ('security crop'). It is unclear if (and how) improved sales lead to enhanced nutritional status. To

² This section was written by Ilse de Jager.



(directly) link improved productivity with nutrition via food availability: target female farmers, focus on crops mainly used for home consumption and provide training on preparation methods.



Figure 1: Pathway to affect nutrition security of a household through improved legume productivity: via food availability

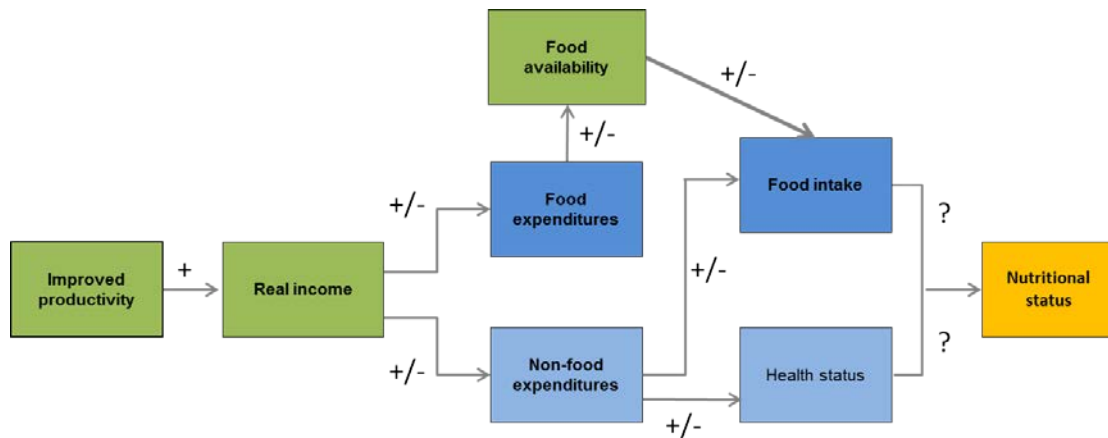


Figure 2: Pathway to affect nutrition security of a household through improved legume productivity: via income



2.3 Nigeria

Within the cultural context, it proved difficult to reach women via farming activities in northern Nigeria. Therefore in the 2011 season, N2Africa placed an emphasis on reaching them through training on legume nutrition and processing.

Two trainings on legume processing technologies were held for 282 women from eight communities two Local Government Areas Bichi and Garko in Kano state during the 2011 season.³ Women were trained on nine soyabean and seventeen cowpea recipes which include beans cake (akara/kosai), moi-moi/alele, rich moi-moi, waken kulu (boiled beans), dafadukar wake (beans porridge), farin wake, pate-paten wake, dan wake, yaryuo, wainan wake, kunun wake, tuwon wake, wasa-wasan wake, bean soup, beans and rice white and jellof, kalallaba, surfafen wake, soya milk, soya cheese, soya stick meat, soya scramble, soya akara, soya moi-moi, soya vegetable soup, soya daddawa and soya akamu. Nine food exhibitions based on nutrition initiatives were also made within the 2011-2013 period. Women were trained to train other women in their communities.

2.4 DR Congo

Before the beginning of the 2011B season, the head of the national program on legumes at INERA/Mulungu gave a presentation with a special focus on bio-fortified varieties of beans rich in Zinc, Iron and other necessary micro-nutrients to improve human health. Several varieties were presented and participants were encouraged to disseminate these varieties in their families and promote their consumption, by pregnant women in particular.

Another training on household nutrition and soyabean processing was organized by N2Africa partner SARCAF for 17 women and three men, as a joint activity by CIALCA, N2Africa and IFAD Integrated Soil Fertility Management project. The participants learned how to conduct similar trainings at their respective action sites, including household level production of soyabean milk. In between Season B 2011 and Season A 2012, 530 N2Africa women farmers from two districts participated in the “International Day of Rural Women” where the theme was “Women’s right have access to good nutrition for themselves and their families”.

Numerous events around nutrition and processing of soyabean were conducted by N2Africa and its partners in DRC in the period November 2011 – October 2012. Most involved training farmers in how to improve family nutrition with soyabean milk, tofu 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 4 below.

As is seen in most N2Africa countries, women comprise the majority of participants in nutrition and processing training, with 61% of the DRC trainees over this reporting period being women. With a total of 435 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 as compared to the 17 farmers who received training in the first reporting period. The training was developed as a Training-of-Trainers and it was anticipated that the trained farmers would reach out to another 2,500 farmers before the end of season 2013B.⁴ (was originally reported under milestone 4.3.4)

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

³ In the previous milestone report it was reported that a one-day training on nutrition and processing of soyabean and cowpea was conducted by the N2Africa Farm Liaison Officer in September 2011. There were 75 participants, all women, and they learned how to prepare 12 different legume products. It is however not made clear whether this training is covered by the two trainings mentioned here.

⁴ The country report reports on milestone 4.3.4 of a total of 595 women (ToT) who were trained on household and cottage processing of soyabean into products such as soya milk, soya beverage and tofu. But the report does not provide more details on the training and participants.



A total of 595 women (ToT) were trained on household and cottage processing of soyabean into products such as soya milk, soya beverage and tofu.



Table 4: Events on the role of legumes in household nutrition and value added processing, November 2011 – July 2012, DR Congo

Date	Location	Partner	Event and Topics Covered	Number			Percentage	
				Men	Women	Total	Men	Women
1/12/2011	Mumosho	SARCAF	Training: Processing of soyabean to improve family nutrition	4	37	41	10%	90%
15/12/2011	Murhesa	PAD	“	7	11	18	39%	61%
13/6/2012	Birava	PAD	“	10	7	17	59%	41%
14/6/2012	Kalehe	PAD	“	13	5	18	72%	28%
15/6/2012	Murhesa	PAD	“	11	22	33	33%	67%
16/6/2012	Miti	SARCAF	“	3	27	30	10%	90%
19/6/2012	Walungu	PAD	“	19	15	34	56%	44%
20/6/2012	Mulamba	PAD	“	13	1	14	93%	7%
25/02/2012	Ikoma-Ibamba	SARCAF	“	14	70	84	17%	83%
12/3/2012	Kamisimbi	SARCAF	“	3	11	14	21%	79%
21/3/2012	Bugorhe	DIOBASS	Training: Making soyabean milk & cakes	25	37	62	40%	60%
11/5/2012	Mushinga	DIOBASS	Field day: Making soyabean milk & cakes	48	22	70	69%	31%
<i>Total</i>				<i>170</i>	<i>265</i>	<i>435</i>	<i>39%</i>	<i>61%</i>



2.5 Rwanda

In September 2011, a three-day training session was organized for 26 women, two from each of the Rwanda N2Africa action sites. The training was facilitated by a nutritionist from Rwanda's Ministry of Commerce (MINICOM) and the president from N2Africa partner COCOF, which has a soyabean processing plant in Kamonyi District. The N2Africa Farm Liaison Officer for Rwanda also facilitated the training. The objectives of this event were to assist the rural population, especially soyabean farmers, by building their capacity in food preparation, to alleviate malnutrition among the community members, and also raise awareness of the range of processed soyabean products which can be made, thereby creating greater market opportunities for soyabean grain.

The training included hands-on processing of soyabean so that every participant would master the production of different products using simple methods and local materials/equipment. They were in turn capable of teaching other members of their community, especially women, to produce these products at household level.

The training event also aimed to create sustainable productive businesses in soyabean processing, which could contribute to poverty alleviation through creation of employment, increased income levels and to alleviate malnutrition in rural areas of Rwanda. N2Africa and its partners provided the support needed for the participants to conduct similar trainings at their respective action sites in October-November 2011.

In August 2012, The N2Africa Farm Liaison Officer for Rwanda visited each trainee at her action site, together with the nutritionist. The objective of these 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 soyabean 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 soyabean food products. Some of the trainees had developed small enterprises based upon soyabean tofu, and were being hired to help with food preparation for wedding ceremonies for example.

The transfer of knowledge into practice

- All trained farmers have trained other members from their cooperatives on soya milk processing;
- Trainings on soya milk and tofu making were conducted at health center and health community levels in Kayonza and Bugesera districts. More than 100 people were trained;
- During the "week for fighting against malnutrition", trained people from COCOF in Kamonyi district have organized a workshop on malnutrition alleviation by using soyabean products.

Soyabean products as food substitute

- After the training on soyabean processing some people with low revenue are consuming more soyabean products to substitute expensive animal food products;
- People who are allergic to animal food products prefer to use soyabean products.

Due to a shortage of soyabean grain in one action site in northern Rwanda, which is high in altitude and not suited to soyabean production, the trainees there encountered difficulties putting their new skills and knowledge to use.

Later on, in all open days organized at the district level, the trained women had a stand to exhibit soyabean products locally made (especially milk and tofu). These women have to date trained about 880 women and continue to do. Follow-up on use of gained knowledge by farmers is a strategy for the remaining period of the project.

More women continue to acquire knowledge on soyabean processing and value addition. In February 2013 a Training-of-Trainers was organized by CARITAS, where a total of 28 women



from Bugesera district were trained on soyabean processing bringing to the total of ToT to in 54. These farmers are in turn expected to train at least 20 farmers in each season (was reported under 4.3.4).

2.6 Kenya

In each of the four network nodes a grain legume cooking contest was organised late 2010, early 2011 (reported as being planned in December 2010). Copies of a legume processing manual were distributed to co-operators. For the get-togethers for the cooking contest a simple method for pressing soya milk was developed that required only about USD 60 investment (this also contributed to milestone 4.3.4).

A workshop was hosted by N2Africa partner Kleen Home and Gardens in May 2011 in western Kenya wherein 18 participants were trained, including one from Malawi. The topics covered included information on grain legumes in African rural households, preparation and nutritional value of grain legumes, post harvest handling, suggested recipes and how to organize cooking contests. Each of the four western Kenya network nodes organized legume cooking contests later in the season, and copies of the manual on Grain Legume Processing were distributed to co-operators.

In the period of the last months of 2011 and the earlier months of 2012, sixteen special events relating to women's empowerment were conducted, all in conjunction with farmer field days (30-month Kenya country report). 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. Some additional planned value-added processing activities at the grassroots-level were suspended due to delayed release of funds.

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

2.7 Malawi

A pilot training of 109 project farmers (73 women, 36 men) was conducted with assistance from N2Africa partner Department of Agricultural Extension Services in November 2010 on legume nutrition and processing. The course was conducted over a two-day period and involved hands-on production of a range of legume-based foods, an activity in which both men and women were engaged.

Hereafter, a series of similar trainings were conducted for 32 Extension Officers in three districts of Malawi from March up to May 2011 (Table 5). Due to the much higher proportion of male extension staff in general, only seven of the trainees were women.



Table 5: Attendance of the Training-of-Trainers on nutrition by extension officers, Malawi, March-May 2011

<i>District</i>	<i>Number</i>			<i>Percentage</i>	
	<i>Female</i>	<i>Male</i>	<i>Total</i>	<i>% women</i>	<i>% men</i>
Dedza	2	7	9	22 %	78 %
Salima	3	5	8	38 %	63 %
Dowa	2	13	15	13 %	87 %
<i>Total</i>	7	25	32	22 %	78 %

The training sessions covered the following:

- Nutrition aspects of soyabeans, cowpeas and legumes in general
 - o What do we get from legumes?
 - o Why is soyabean supreme to other legumes
 - o The protein inhibitor in soyabean
- Hygiene when preparing food
- Equipment and ingredients required when processing different legume foods

The foods that were prepared include: steamed cowpea snacks (olele), cowpea fritters (akara), soyabean milk, soyabean tofu, soyabean snacks and balls, soyabean pops.

The following challenges were identified:

- DAES who were entrusted with the funds for the activity were slow in conducting the training activity;
- Funds were limiting on this activity to reach out to all the farmers especially on equipment and raw materials;
- There were differences between N2Africa guidelines and what was commonly known or were common practices within a country.

In addition, a number of different types of events took place in Malawi around legume nutrition and value-added processing over the 2011-12 season. D&D partners Concern Universal in Ntcheu, DAES in Dedza and Salima all started on nutrition and legume processing training. These trainings dealt with protein content of legumes, importance of protein for pregnant/lactating women and children under the age of 5, importance of heating soyabean to inactivate trypsin inhibitors, as well as processing legumes into a variety of products. The participating farmers were able to make a range of legume products, from glazed groundnuts to soyabean milk, snacks, cakes and porridge. In Salima, the training was included in a field day, and an exhibition of the legume products was put on display.

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 6). 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 in the 2011-12 season are given in Table 6.



Table 6: Events on legume and processing conducted in Malawi, 2012

	<i>Location</i>	<i>Partner</i>	<i>Numbers</i>			<i>Percentage</i>	
			<i>Men</i>	<i>Women</i>	<i>Total</i>	<i>female</i>	<i>male</i>
Field days							
9 March	Salima	Dept. of Agricultural Extension Services	39	102	141	72.3	27.7
13 March	Dedza	Dept. of Agricultural Extension Services	65	43	108	39.8	60.2
21 March	Dedza	Dept. of Agricultural Extension Services	48	44	92	47.8	52.2
22 March	Dedza	Dept. of Agricultural Extension Services	137	93	230	40.4	59.6
		<i>Total</i>	<i>289</i>	<i>282</i>	<i>571</i>	<i>49.4</i>	<i>50.6</i>
Trainings							
15 March	Ntcheu	Concern Universal	22	8	30	26.7	73.3
21 June	Mchinji, Mngwangwa EPA	NASFAM	25	46	71	64.8	35.2
2-3 July	Mchinji, Mkanda EPA	NASFAM	6	11	17	64.7	35.3
4-5 July	Mchinji, Mlonyeni EPA	World Vision	18	11	29	37.9	62.1
		<i>Total</i>	<i>71</i>	<i>76</i>	<i>147</i>	<i>51.7</i>	<i>48.3</i>



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 to be conducted for larger numbers. It has been challenging to get participants to supply the ingredients for the hands-on processing themselves as has been done in other countries.

With the lifting of the export ban on soyabean in 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 legume nutrition and value-added processing training.

During the 2012-13 season, there was an open day that covered the nutrition and grain legume household processing. Nutrition and grain legume household processing activities are mainly graced by more women than men because traditionally, cooking activities are aligned to women. On this open day, on 29th August 2013, a total of 468 people participated (189 men, 162 women, 36 boys and 41 girls). In addition to farmers, stakeholders also participated such as Concern Universal, the Local Authority, teachers, community-based organization leaders, youth club leaders and Village Headmen. Many foods were prepared like cakes, local bread, main meals (nsima and relish), snacks, beverage and milk, porridge and many more, from soyabean, bean, maize, groundnut and cowpea crops. During the open day, a lot of people who had not yet participated in N2Africa activities had a chance of learning more about nutrition and food utilization practices.



Picture 1: A woman explaining how they prepare soyabean milk during the open day, August 2013, Malawi



2.8 Mozambique

In June 2011, N2Africa hired a consultant to conduct a series of Training-of-Trainers in six sites where the project is working in northern Mozambique on use of soyabean in processed food products. A total number of 47 women and nine men underwent the training, after which they conducted training of farmers, with a focus on women, in their respective sites. Some of the trainees are attached to health centres, which enable them to provide pre- and ante-natal training of mothers on nutrition and the importance of heating soyabean in processing in order to remove the compounds which inhibit digestion of the grain. By the end of September 2011, a total of 1498 female and 109 male farmers had been trained on how to produce soyabean products for home consumption. It was planned to train selected women groups on production of soyabean products for commercialization later that year.

In collaboration with the other projects in Mozambique (Platform Mozambique and TLII), CLUSA and community groups, the N2Africa project conducted training and demonstrations in soyabean home processing and utilization in Zambezia province in the 2011-12 season. The training and demonstrations were conducted through the Training-of-Trainers (ToTs) approach whereby selected individuals from community groups were trained and thereafter go back 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 soya milk, soya fortified thin and thick porridge, soy-vegetable soup, soy-wheat flour bread, and soy-wheat flour cake. See Table 7 for participation in the communities in Gurue district.

Table 7: Overview of people trained in soyabean home processing, Gurue district, Mozambique, 2011-12 season

	Female	Male	Total	% female	% male
Lioma	209	123	332	63.0	37.0
Ruace	239	26	265	90.2	9.8
Tetete	322	60	382	84.3	15.7
Total	770	209	979	78.7	21.3

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 (see Table 8). The focus of the training was on improvement of the nutritional quality of commonly consumed foods using soyabean. The participants were first taught how to prepare flour from soyabean, and then encouraged to innovate using the soya flour as they use groundnut powder in foods. They were also encouraged to use soya milk the same way they use coconut milk – a familiar ingredient – in various dishes. In the end, participants were taught how to prepare a total of 11 home-processed food products: soya flour, soya milk, soya fortified porridge, tomato-soyabean relish, soy-vegetable soup, cassava-soya meal, sweet potato and soya baby food, banana and soya baby food, moringa soya relish, soya wheat cake, and soya wheat bread.



Table 8: Training in soyabean processing for improved household nutrition, Mozambique, July-August 2012

Location	Number			Percentage	
	Men	Women	Total	Men	Women
Murrimo	107	193	300	35.7	64.3
Tetete	250	463	713	35.1	64.9
Tetete	250	454	704	35.5	64.5
Murrimo	58	116	174	33.3	66.7
<i>Total</i>	665	1226	1891	35.2	64.8

Women trainees outnumbered men in the nutrition and processing training, with 79% (Table 7) and 65% (Table 8) 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 country 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 activities in the first season (2010-11) when only 15% of all training participants were women.

Training and demonstrations of soyabean-based recipes were again conducted between April and June 2013 at Ruace and Lioma Health Centres in Gurue district. The target groups for these training sessions were children under 2 years, expecting and lactating women. These target groups were selected considering their elevated nutrient requirements. However, men were also invited to participate, as acceptability of the soyabean-based recipes by men would be crucial for home adoption. The overall aim was to improve the nutrient density of well-adapted food. Recipes demonstrated included soyabean flour, maize-soya flour thin porridge, maize-soya flour thick porridge, soyabean stew, soya milk, sweet potato-soya milk puree and pumpkin-soya milk puree. A total of 1392 women and 452 men participated in the training during this period. Twenty-four per cent of the participants were males indicating that the male participants increased compared with 6.8% in previous training.

2.9 Zimbabwe

In the season 2010-11 only one partner conducted a training on food processing and preparation with a participation of 369 farmers. A district level food and products fair was held in Goromonzi in mid-June 2011 to promote information exchange on processed legume product. In July 2011, two partners participated in the ZAVSAP Processed Products Fair held in Harare.

In the 2011-12 season, value addition trainings are being done in Goromonzi, Murewa, Chegutu and Mudzi districts for all Lead Farmers in the N2Africa project. Soyabeans are being processed into flour, fritters, soya cakes. Groundnuts are being shelled and processed into peanut butter in all the districts. Cowpeas are being pounded into flour and used to make porridge and other products for household feeding. The annual ZAVSAP food fair in which three of N2Africa's D&D partners participate, also presented numerous foods processed from legumes and other agricultural produce.

Other farmers in the N2Africa action sites in Zimbabwe have been trained on post-harvest handling and storage. The N2Africa Farm Liaison Officer and IFAD-funded Marketing officer trained farmers in Guruve, Hwedza and Makoni. Farmer training on post-harvest handling in Mudzi, Goromonzi, Mutoko and Mhondoro was done by Agritex Mudzi, CADS and Community Technology Development Organisation (CTDO) respectively. Unfortunately the agreed training on Value Addition and Nutrition in Mudzi, Hwedza and Guruve in the 2011-12 season, was cancelled by the IFAD project. As such, the value addition and processing trainings were not done. In Goromonzi district, CADS, the N2Africa partner has the expertise



in value addition and processing. They have established groups that are being trained on value addition and processing. They also facilitate a national event on value addition and processing.

Farmers also conduct dry shows and food fairs in the months of June-August. During these shows farmers showcase value added products from their legume crops and it is a learning platform for the farmers. At such dry shows and food fairs, farmers will also compete among themselves. Dry shows and food shows encourage the farmers to do value addition to their produce.



3 Conclusion

The interest amongst – particularly female – farmers for nutritional training and household processing of legumes is high. While there have been noteworthy initiatives, training on household nutrition within N2Africa has been different from the way farmers have been trained on legume production aspects. As usually women are targeted for nutrition and household processing, these trainings have not been done along the lines of Lead Farmers who would then shared the gained skills and knowledge with their group members. However it is still likely that trainees have shared new knowledge and skills with other farmers, yet this has generally not been followed up.

Also trainings on household nutrition, teaching processing techniques and new recipes to women tends to be more intensive as it requires some hands-on exercises to practice new recipes. This often means trainings of longer duration of at least on full day and sometimes even two days, it requires ingredients to be used and time for cooking.

Sometimes such trainings have been done by partner organisations or through other projects such as IFAD-funded project in Zimbabwe, Malawi and DR Congo. As a result, these trainings have not always been captured in the same way as for example ToTs on legume production have been recorded with the standardized M&E form.

All in all over time the number and diversity of special events on nutrition and processing of grain legumes has increased a lot. It is such events and their aftermath that will positively affect the N2Africa objective to achieve improved nutrition at household level and even increased income from the sale of processed legume products. Progress towards this milestone is also influenced by increases in supplies of grain legumes available. Yet there may have been some concerns as well; in countries such as Malawi where the prices grain legumes fetched increased, and a relatively high inflation rate combined with a devaluation of the local currency, farmers producing the legumes were showing greater interest in selling all their harvest rather than consuming at the household level.

It is recommended that nutrition and processing events may be conducted 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.

As this milestone falls under the activity to engage sufficient women in N2Africa it might also be relevant to emphasize post-harvest handling of legumes as this may enhance the quality of the end-product – even if it is well-sorted grain of consistent good quality, as such a product will fetch better prices when selling. As phase II of N2Africa moves more towards empowering women, such activities need more attention right from the start of phase II to ensure empowerment of women in different aspects of legume production.

The level of interest in processed legume products appears to be high in most countries, so it should be possible to build on this momentum.



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



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65. Special events on the role of legumes in household nutrition and value-added processing
- December 2013



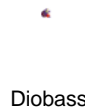
Partners involved in the N2Africa project



Bayero University Kano (BUK)



Caritas Rwanda



Diobass



Eglise Presbyterienne Rwanda



Resource Projects-Kenya



Sasakawa Global; 2000



Université Catholique de Bukavu



University of Nairobi
MIRCEN



University of Zimbabwe

