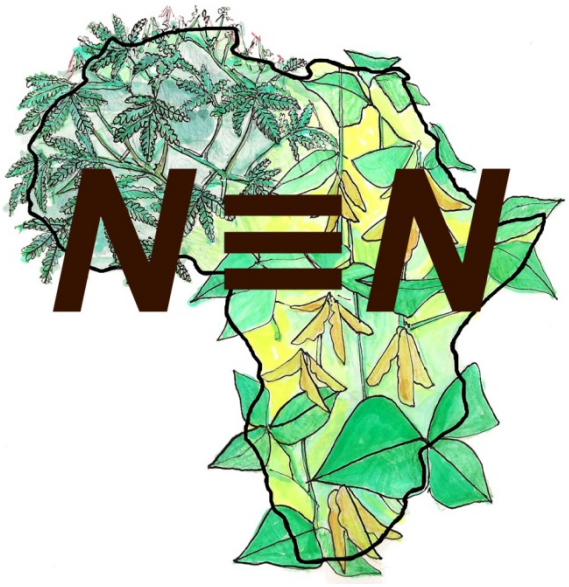

Linking communities to legume processing initiatives

Milestone reference 4.3.4

J. J. de Wolf

Submitted December 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
Internet: www.N2Africa.org

Authors of this report and contact details:

Name: J.J. de Wolf
Address: P.O. Box MP 228
Mount Pleasant, Harare
Zimbabwe
E-mail: J.dewolf@cgiar.org

Partner acronym: CIAT-TSBF

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:

de Wolf, J.J., 2013. Linking communities to legume processing initiatives. (Milestone reference number: 4.3.4), www.N2Africa.org, 19 pp.

Table of contents

Table of tables

1 Introduction

This reports presents information on achievements on milestone 4.3.4 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

Develop strategies for empowering women to benefit from the project products

Table 1 shows how the sub-activities follow one another to achieve "Engage with legume seed system, market, and nutrition initiatives operating in the impact zones" to reach the overall dissemination objective. The activities that preceded 4.3.4 are presented in reports number 28, 22 and 36.

Table 1: Sub-activities/milestones under activity 3

Activity 3	*Report No.*	*Engage with legume seed system, market, and nutrition initiatives operating in the impact zones*	*Timing*
4.3.1	C 028	Sufficient [several tons] legume seed is acquired through cooperation with TL-II and the private sector, for initial dissemination in the various impact zones	month 12, year 1
4.3.2	C 022	At least half of the farming communities engaged in the project are actively producing legume seed for local distribution	month 6, year 2
4.3.3	C 036	At least half of the farming communities engaged in the project are actively linked to legume market outlets	month 12, year 2
4.3.4		At least half of the farming communities engaged in the project are linked to legume processing initiatives	month 12, year 3

Hereafter, we present the activities and achievements per country on the linkages of farming communities that are engaged in the project to legume processing initiatives (Milestone 4.3.4).

2 Farming communities linked to processing initiatives

2.1 Introduction

Much of N2Africa's work towards developing legume market linkages for participating farming communities has been built upon existing initiatives. This makes sense as a major emphasis within the N2Africa project is placed on improving production and productivity of legume cultivation. This helps farmers to achieve better quality legumes and in larger volumes.

However, one of the larger challenges to those working in program outreach activities is linking "at least half of the farming communities" to legume processing initiatives. With an increase in the number of farmers participating in N2Africa over the years, the number of farming communities to be linking to legume processing initiative also rises.

Yet, expertise on linking farmers to markets has not been readily available amongst the direct project staff. In addition, there are large differences in the socio-economic as well as agro-ecological conditions in the different countries where N2Africa is implemented – this calls for diversity in approaches. We also see that in terms of timing, there are notable differences between countries; some countries started much earlier than other, possibly partly as result of changes in project staff that caused lack of coordination of several of the dissemination activities.

Many other NGOs, local and international, companies, etc. are already involved in linking smallholder farmers to formal markets. These organisations might be better informed on for example market requirements such as quantity and quality required, price information and perhaps packaging. In some cases, certain organisations might be in a position to assist with provision of inputs on credit.

2.2 Ghana

From Ghana there are no reports of farming communities that were engaged in the N2Africa project directly linked to processing initiatives. There are farming communities that have been linked to legume markets in general (milestone 4.3.3), but not specifically to processing initiatives. A total of 540 farmers have been linked to aggregators, agro-processors and individual buyers of legume through the Esoko marketing platform. These farmers obtain regular alerts on market prices of legumes and agro-inputs, weather information and information on potential buyer within their region. A total of 1000 farmers would be migrated onto this marketing platform by the end of the Project. A major challenge has been the collation of mobile phones numbers as most the farmers do not use mobile phones. In addition a forum for the actors in the marketing of grain legumes would be organized in August 2013 to sensitize farmers on good practices for premium prices.

2.3 Nigeria

For the campaign 2013, the N2Africa project has partnered with the Seed Project Co Ltd, from Kano, a major agro-dealer network already involved in seed and fertilizer distribution across the target zones. This partnership is to facilitate the distribution of rhizobia inoculants among smallholder farmers.

Basically, it was hypothesized that a strategic entry point for the development of a sustainable inoculant supply network in Northern Nigeria could be through 1) the N2Africa project supplying the Seed Project Co with inoculant free of charge, and further 2) the commitment of Seed Project Co to build on the recovery to implement appropriate storage facilities for sustainable supply of inoculant to the emerging network. Another favourable condition for contracting with the Seed Project Co is its claimed immediate access to cool room facilities for storage of the inoculants to be purchased for the year.

Inoculants was handed over to Seed Project Company Ltd for distribution in Kano and Kaduna states in 2013 while Niger state got their supply directly from the project from 2012 stock before the arrival of 2013 inoculants.

The Seed Project Company[1] was handed over 215 packages of 700 grams of inoculants. These remained under the custody of the IITA because of non- availability of storage facilities in the Company premises; the product was collected little by little. Each agro-dealer received two packages, 38 packages were delivered to Gold Agro, the major agro-dealer. However, there was no arrangement on how much the agro-dealers should pay for the product, although the recommended selling price to farmers was N6.50 per one gram (4 US$ cent per gram, or USD 4 per 100 gram of inoculants).

About half of the agro-dealers were met at their places of business; they collected the product and signed the company's record. For the agro-dealers that could not be reached, their colleagues collected the product on their behalf.

Some agro-dealers (in Ajingi, Bichi and Saminaka) refused to accept the product on the ground that farmers in their respective areas have already finished the planting of soyabeans, however, they promised to contact the company if demand for the product arises. Almost all the agro-dealers reported of low demand of the product. The main reason was the late delivery of the product, as the planting season of soyabeans had virtually come to an end.

The Company and the agro-dealers faced the following challenges in the distribution and selling of the product:

- Storage facilities for the product are lacking;
- The product was released to both the Company and agro-dealers at the time when most of the farmers of soyabeans had finished planting;
- Many farmers in the selected Local Government Areas did not go into soyabean farming. Their main reason was that they had large stocks of unsold soyabeans due to poor prices;
- Both the Company and agro-dealers made little effort towards marketing the product to farmers;
- Most of the agro-dealers' shops could not be located by the Company because of wrong or incomplete addresses provided to the Company;
- The majority of the agro-dealers that attended the training meeting were not the shop attendants; this created a communication gap between the farmers and the people handling the product, and between the shop attendants and the Company.

The Company set out the following strategies in distribution, marketing and selling of the product in the future:

- To appoint agro-dealers that deal in seeds, chemicals and fertilizer;
- The agro-dealers as well as the farmers are to be trained, at least twice before the farming season commences;
- Radio jingles in Hausa and Pidgin English to be produced, and aired in the two States;
- Pamphlets and banners on how to handle the product to be produced;
- Appropriate storage facilities for the product to be provided at the Company premises and for the two major agro-dealers;
- The Company to provide the agro-dealers with the product along with soyabean seed and relevant fertilizer;
- The agro-dealers are to be compensated on commission basis;
- The marketing and sales of the product should cover all the LGAs of the two States, rather than only the LGAs where the trials are conducted.

There are few opportunities for farmer communities to link with legume processing locally, as there are very few initiatives. The project has focussed on training of women from the various communities in the processing of legumes and this training has continued in 2013. Many

[1] The following section is based on a report from the Seed Project Company Ltd to the N2Africa project in Northern Nigeria (November 2013).

women have reported to make snacks and drinks form the cowpea, soyabean and groundnut, which are then sold locally at schools, at local events or from home and to cook various meals that are consumed domestically.

2.4 DR Congo

In DR Congo, there have been continuous efforts to train and organize farmers in collective markets in areas with high production of soyabean and beans (this falls largely under milestone 4.3.3). In the third year of the project, nine (9) collection centres were established with farmer cooperatives in Ikomo, Miti, Mumosho, Bwirembe, Birava, Walungu, Mulamba, Bughorhe and Murhesa collecting a total of 26.5 tons of soyabean and 28.5 tons of beans. The centres collect grains and store them at harvest and sell it to retail buyers three months later at a price of USD 1.2 and USD 1.5 per kg of soyabean and beans respectively. In contract, the price offered at harvest time is USD 0.5 for soyabean and USD 1 for beans. The respective farmer cooperatives get initial capital from microfinance institutions MECREBU, COOPEC FOMILAC, COOCEK KIVU, and COOPEC Nyawera to facilitate the buying. To date all produced soyabeans and beans are easily absorbed by the local market and some finds its way to Rwanda.

A CBO was established to produce various soyabean derived food products, and started operations in Bukavu in January 2012. A Vitagoat was installed for the production of soyamilk and soy flour, from which yoghurt and doughnuts are produced. Production has continued increasing over time as more awareness of the products was being created. Awareness and appreciation of the various soyabean-derived products is still a constraint and an effort is made to further promote these products (see N2Africa project report 63). Furthermore efforts are underway to restore an old facility for the processing of soyabean oil.

2.5 Rwanda

The new SOYCO oil processing plant under construction in Kayonza district has started to buy farmers' soyabean harvests where all farmers producing soyabean in Rwanda are under one registry and have opportunity to sell their produces at this processing plant. Other old markets including COCOF, SOSOMA industries and CARITAS-Rwanda through its food security program continue to buy soyabean. With this completion there seem to be shortage of soyabean and locally produced soyabean is selling at approximately USD 700 per tonne, which is well above the word market price ranging between USD 450-600/t. The Postharvest handling and storage department has established the grain collection centres in Bugesera district. The centres are run by the farmer cooperatives and grains sold to customers from within and outside the district. This was reported under MS 4.3.3, but also fits 4.3.4.

2.6 Kenya

Towards the end of the first year and at the beginning of the second year, each of four network nodes organized a grain legume cooking contest and copies of a processing manual were distributed. A simple method of pressing soya milk was developed for that meeting that requires only about USD 60 investment.

The engagement of participating communities in soyabean processing focussed on a "low-technology" approach to soya milk production. This procedure was also published in a grain legume processing manual of which 800 copies were produce before the end of year 2 and 12 mince-and-press kits were distributed.

Mid-way through the project, there were challenges with the release of funds which caused a temporarily delay of activities in the area of legume processing. During that period, the main focus of legume processing remains soya milk production produced at the grassroots level following a simple five-step procedure using the affordable apparatus (of about USD 60). Briefly, soyabeans are washed and soaked, passed through a mincer and mixed with water, pressed between two heavy pots, liquid soya milk and press cake separated, soya milk boiled, packaged and consumed (see Table 2).

This process costs about $.082 for each kg of soyabeans, and results in two kg of moist press cake and six litres of soya milk worth a total of $3.77. This slightly diluted soya milk is suitable for making the sweet African tea preferred by many communities and is indistinguishable from that prepared using cow's milk. In West Africa, the same basic procedure is followed except that soaked soyabeans are pounded using a large traditional wooden mortar and pestle and "pressed" by wringing the cloth. This procedure is fast, women will typically meet to share the apparatus at a local centre and return home after 40 minutes or so carrying soya milk for their families. Alternatively, soya milk may be produced and sold as hot tea alongside other snacks from a kiosk at marketing centres and bus stations.

Table 2: A simple five-step procedure for local production of soya milk, Kenya

Step	*Process*	*Cost/Value*
Step 1: Soak	Wash and soak 1 kg of soyabean in 2 litres clean water for 4 to 6 hours	- $0.50
Step 2: Mince	Pass 3 kg soaked soyabean through mincer, add 5 litres clean water, mix	- $0.24
Step 3: Press	Transfer mince to clean cloth and press between two heavy pots, drain	- $0.08
Step 4: Boil	Filter soya milk, boil for 5 minutes, recover 2 kg press cake for grit or animal feed	+ $0.37
Step 5: Package	Cool and place 6 litres of soya milk in clean container or add tea and sugar and market (consume) as "African sweet tea".	+ $3.40

This soya milk is also lifesaving. For example, ten year-old Jared Andere is one of 15 orphans supervised by a small church in west Kenya. Jared was the most severely malnourished of these children and nearly died until receiving a 10-day treatment including soya milk provided by an N2Africa partner, Josephine Ongoma of Kleen Homes and Gardens. After this success, each of these 15 children received 300 ml of fresh soya milk daily from Josephine's group. Soon thereafter, the children's skin changed from scaly dry to soft and smooth; their hair changed from reddish and brittle to dark, shiny and strong; and their demeanour changed from weak and lethargic to playful, outspoken and energetic. Through the efforts of N2Africa, soya milk literally saved Jared's life and is improving the well-being of many other children.

By the end of year 3 of the project, the number of groups participating in N2Africa in west Kenya was 26, therefore 13 processing operations would have been established. The team responded by preparing the handbook "Grain Legume Processing Handbook: Value Addition to Bean, Cowpea, Groundnut and soyabean by Small-Scale African Farmers" (40 pp) and organized a course around the manual which was attended by 18 participants. The simple "mince and press" approach to make soya milk attracted considerable attention and we focused our first efforts around establishing soyabean "dairy" operations by assembling and distributing 12 kits consisting of a mincer, soaking basin, filters, press plates and pasteurizing pans. This approach met with moderate success, with women meeting in the late afternoon to take turns mincing their soyabeans for use in the evening meal at a rate of about two tons per month. One partner later established a shop that markets a full range of soyabean products including snacks, fruit soya milk yoghurt and blended flours. On paper at least we had achieved our 50% target but then an additional exciting opportunity arose.

Early in year 4, useful insights were also gained on household processing and consumption of soyabeans from the early impact assessment survey. Only 31% of households are routinely processing soyabean, and of those into cooked snacks (66%), flour (46%), roasted beverage (39%), soya milk (27%) and as porridge of stew (3%). soyabean nuts are the easiest to prepare as snacks, involving boiling, drying and frying. Making soyabean flour involves travel to a local miller, and then blending with other materials. While little training was offered on preparing soyabean as roast beverage, it is an attractive substitute to coffee

or tea. Soya milk making was emphasized by the program through training and field days and has taken root among 27% of households. Use of porridge is likely under-represented because it is quickly prepared from mixed flour and boiled water but it is clear that almost no farmers reported use soyabean as a substitute for other grain legumes as whole grain in stews. These data are, however, in contrast to the 84% of households that consume soyabeans between once and four times a week (Table 3), depending on the time of the year. Perhaps preparing stew is not considered processing by respondents. What is clear is that too few households save their soyabeans into the hunger season, as soyabeans are being eaten least when their proteins are needed most.

Table 3: Characteristics of soyabean farming households in west Kenya during the 2012-2013 short rains growing season based upon a survey conducted in February and March 2013. Data in parentheses indicate Coefficient of Variation [CV = (Standard Deviation/Mean) x 100]

Parameter	*Mean (CV)*	*Kenya-wide extrapolation*
households (n)	291	34,012 households engaged
women farmers (%)	57%	19,519 women farmers engaged
age (yr)	47 (±26%)	older household members responded to survey
household members (no.)	6.8 (±39%)	230,253 total family members impacted
soy processed by household (%)	31%	10,519 households process soyabean
- processed into flour (%)	46%	4,792 households mill soyabeans
- processed into beverage (%)	39%	4,091 roast and grind soyabean
- processed into snack (%)	66%	6,896 boil and fry nuts
- processed into soya milk (%)	27%	2,805 press soya milk
- processed into porridge or stew (%)	3%	351 prepare boiled soyabean to eat
- products per household (no.)	1.8	each processor prepares about 2 products
household consumes soyabean (%)	84%	28,519 households consume soyabeans
peak season meals (meals per week)	3.6 (±66%)	102,854 family meals contain soyabean/week
hunger season meals (meals per week)	1.0 (±118%)	29,687 family meals contain soyabean /week

In collaboration with Promasidor Ltd., N2Africa has established 16 soyabean marketing collection points. Promasidor reports that 604 tons of soyabean were purchased from N2Africa co-operators during the past two rounds of announced buying. UNIDO purchased 30 tons. KESOFA recently sold another 55 tons. Bagging and sales of the 2012-2013 short rains crop is underway. These soyabeans are worth about $420,000 (or KSh 35.7 million). N2Africa also printed and distributed another 4000 fifty-kg "branded" woven polythene sacks for grain processing, 2000 ten-kg woven sacks for seed collection and 8000 two-kg two-ply paper bags for seed distribution.

A recent report from Kleen Homes and Gardens, the partner organisation leading our legume processing effort in west Kenya, indicates that nine of 26 co-operators (35%) maintain continuous processing operations. Products include fresh soya milk, often further processed into yoghurt, roasted, powdered soy beverage, fried soyabean snacks and composite soy flour. These cottage operations utilize about 2284 kg of soyabeans per month worth $1,391 as non-processed grain. Products are valued at $3,371 per month resulting in a 2.4-fold value addition – assuming all produce is sold. These findings are derived from groups operating small shops and do not include value-added processing at the household level.

The United Nations Industrial Development Organization (UNIDO) soyabean processing project was funded by the Government of Japan to strengthen Kenya's response to famine and refugee situations. Three factories were established that produce soya milk, soya-flour

and protein fortified porridge. Originally the Kenya Red Cross was expected to direct its products to the needy in northern Kenya but repayment was unclear. On one hand, the Kenya Red Cross receives imported food from donors for free, but without payment the factories had no funds to purchase additional soyabeans from N2Africa farmers. Just as the first 30 tons of soya products were prepared, the Kenya Red Cross withdrew from the project when it was asked to pay for packaging and transportation costs. Other opportunities for these products quickly emerged; for example, soya milk was directed toward school feeding programs in Kisumu. One consequence of the original "bulk charitable distribution plan" was that the factory products were not initially labeled in compliance with the Kenya Bureau of Standards and could not be sold, nor were they attractively packaged. This shortcoming will be addressed in the next phase of UNIDO project activities starting in early 2014.

2.7 Malawi

From Malawi it was reported that farmers were being linked to the market for the 2011-12 season. About 45% of the farmers in the season will be linked to markets. Some of the prospective markets include ACE (Agriculture Commodity Exchange) facilitated markets. ACE is also constructing a warehouse at one of the N2Africa sites with World Vision in Dowa District for market linkages. At the time over 1000 (10% of all farmers under the N2Africa project at the time) were linked to ACE through the warehouse construction activities as well as through registration with ACE offices in Lilongwe via the IFAD-funded Integrated Soil Fertility Management (ISFM) Project as well as in other sites.

Rab Processors and NASFAM are some of the prospective contacted markets. NASFAM purchases soyabean and groundnuts. NASFAM market could service about 35% of the farmers under the N2Africa project. They do not have limits on the volumes that they are willing to purchase, however they do have stringent quality standards (e.g. moisture content, foreign matter and for groundnuts aflatoxin level). Rab Processors expressed a willingness to buy all of the four N2Africa legumes and in any quantities, but again, quality standards must be met, and unless the farmers are able to guarantee minimum volumes assembled at specified collection points, the farmers will be responsible for delivering their grain to the company's factory on the outskirts of Lilongwe.[2] (Reporting on MS 4.3.3 in 30-month country report)

One year later, N2Africa Malawi reports that they are continuing to link the farmers through its partners to two main market links; Agriculture Commodity Exchange (ACE) and Auction Holdings Commodities Exchange (AHCX). They are both electronic market links, which link farmers (producers) to buyers. They are also implementing the Warehouse Receipt System. They provide a platform for negotiations, which has been lacking on the farmers' side. The advantages of using the two market links are:

1. The farmers are able to negotiate the price of their commodity.
2. The farmers would be able to get a competitive price on offer at the exchange market
3. The farmers can sell their produce at their own convenient time depending on the prices being offered.
4. Farmers can access loans with banks that are also linked with the Commodities Exchange.
5. Farmers can also access farm inputs through the Warehouse Receipt System.

AHCX conducted awareness meetings with the farmers' marketing groups as shown in Table 4. In addition to the meetings by AHCX, some farmers – especially Marketing Committee members – were also taken on a visit to ACE (see Table 5).

[2] This was actually reported under milestone 4.3.3 in the 30-month country report, but fits under 4.3.4.

Table 4: Number of Lead Farmers attending marketing awareness meetings, Malawi, 2013

Date (all 2013)	District	Partner	Site	Lead Farmers		
				Total	Male	Female
15th April	Dedza	DAES	Linthipe EPA	20	18	2
16th April	Dedza	WV	Tchesa ADP	18	13	5
17th April	Ntcheu	DAES	Bilira EPA	11	7	4
18th April	Salima	DAES	Chinguluwe EPA	10	5	5
19th April	Salima	DAES	Makande EPA	6	2	4
8th May	Kasungu	CRS	Nkhamenya	56	21	35
			Total	121	66	55

Table 5: Number of Marketing Committee Members who visited ACE, Malawi, 2013

Date	*District*	*Partner*	*Site*	*Total*	*Male*	*Female*
6/5/2013	Dedza	DAES	Linthipe EPA	20	16	4
6/5/2013	Dedza	WV	Tchesa ADP	10	8	2
7/5/2013	Ntcheu	DAES	Bilira EPA	9	7	2
7/5/2013	Salima	DAES	Chinguluwe EPA	10	6	4
7/5/2013	Salima	DAES	Makande EPA	6	3	3
			Total	55	40	15

Farmers are thus bulking their soyabean, bean and groundnut produce to sell through ACE and/or AHCX. On both commodity exchanges, the farmers will be getting the market information (quantity and quality of commodity required, prices offered and other information) via their personal cellular phones, through a price board at each Warehouse, and through Radio and TV announcements. This market information will enhance decisions by the farmer groups on when and how to market their bulked produce. At the time of reporting (April 2013), both local and international market prices for soyabeans were low, and this made farmers not to sell their produce that was bulked and stored at the AHCX warehouses as well as in farmers' warehouses and storerooms.

After linking farmers to legume market outlets, N2Africa in collaboration with partners, is also facilitating the following marketing activities:

- Training of the marketing committees
- Market research and negotiations
- Meeting quality requirements for the intended market
- Bulking of produce
- Selling of produce

While attempts have been made to interest the poultry feed industry, which is in great need of soyabean, in considering sourcing their grain from our farmers, no progress has been achieved. We are hopeful that the marketing and agri-business training activities being led by the IFAD-funded project, will result in our farmers being better placed to achieved the specifications (quality, quantity, packaging and timeliness of delivery) set by the poultry feed industry, as well as other processors (e.g. Rab Industries for peanut butter).

2.8 Mozambique

The legume seed market, in particular, soyabean and groundnuts is dominated by IKURU and NGOs like Technoserve and CLUSA who routinely purchase seeds for re-sale at the

beginning of the growing season. They have out-grower schemes which facilitate seed production and purchasing. Other newly formed seed companies including MozSeeds and Lozane Farms, they also purchase seeds for seed production. There are also linkages between soyabean grain producers and processors including Albilio Atunes, Novos Horizontes and Getty Lda who purchase directly from farmers and process into poultry feed.[3]

It is reported that more than 90% of the farmers in the N2Africa project communities are linked to soyabean processors (mainly poultry feed) either directly or through a farmers association. The farmers send their grains to collection points where they are purchased and transported in bulk to processing centres. In addition, using Training of Trainers approach, farmers are being introduced to home processing and utilization of soyabean.

2.9 Zimbabwe

Farmers in the different districts have been linking to markets for their different products in the 2011-12 season (see 30-month country report on milestone 4.3.3). Of importance are Mudzi and Guruve where farmers have put large acreages to groundnuts and common beans respectively. In Mudzi, the Grain Marketing Board (GMB) and Agricom were buying legume grain from farmers and the companies had set camps in the respective wards where the N2Africa project is being implemented; they were purchasing both shelled and unshelled groundnuts from the farmers. That year the prices of the commodity had increased from that of last year. One tonne of unshelled groundnuts cost between USD 400 to 500 while shelled groundnuts were selling at USD 750. The prices were expected to increase further as at the time of reporting the crop had only recently been harvested and generally prices go up as time goes on.

In Guruve most farmers, after realizing the profitability of common beans, have put more of the crop in their fields. Farmers had grown more common bean than the main staple crop, maize. Common bean was being sold at the farm gate price of USD 1200 per tonne. Most agro-dealers were buying the crop from farmers and reselling the crop in the capital, Harare where the prices were even more lucrative. Common bean offers a good alternative of the traditional cash crops tobacco and cotton.

In Goromonzi district Windmill was offering new marketing opportunities to farmers. Windmill is a fertilizer company that has diversified into manufacturing animal feeds and veterinary medicines. The company subcontracted to produce crops like maize, soyabeans and others. Farmers were provided with all inputs needed and after harvest they would sell their produce to the company. The farmers were required to pay back the value of the inputs with an interest of 15% per annum.

Furthermore, the collaboration between N2Africa and the IFAD-funded project in Zimbabwe was enhancing opportunities for farmers to engage in marketing of their legume crops. In pursuit of sustainably linking smallholder farmers in the project sites to remunerative legume markets, the project has trained Lead Farmers on collective marketing in the districts of Goromonzi, Guruve, Hwedza and Mudzi (IFAD collaborative effort, see Table 6 for participation). The objectives of the training were to equip farmers with the necessary skills to understand markets, conduct market research, make intelligent assessments of where to sell, who to sell to along the market value chain and when to sell their produce profitably. The training also prepared farmers with the basic skills they need in order to be able to negotiate with buyers at various stages of the market chain and ways of preparing their produce so that they can sell directly to processors as opposed to other middlemen. Furthermore, the training enlightened farmers to engage in market-driven production as this minimizes chances of being stranded with their produce or product dumping to opportunistic buyers. As opposed to taking the lead in directly linking farmers to markets, the current approach prepares farmers to be able to take the lead in linking with markets with assistance from project staff. As the training was provided to Lead Farmers of the N2Africa project, it is assumed that the

[3] This was actually reported under milestone 4.3.3 in the 30-month country report, but fits under 4.3.4.

knowledge gained will be cascaded to other farmers. With the help of resident extension officers, farmers in project sites are presently conducting market research.

Table 6: Number of people trained in 'Linking farmers to markets', 2011-12 season, Zimbabwe

District	Number of farmers trained			No. of extension workers trained	Total trainees
	Female*	Male	Total		
Goromonzi	23	17	40	3	43
Guruve	7	31	38	2	40
Hwedza	29	34	63	7	70
Mudzi	8	32	51**	5	56
	67	114	192	17	209

* *These numbers of female farmers represent the following percentages: Goromonzi 57.5%, Guruve 18.4%, Hwedza 46 % and Mudzi 20%*

** *Of 11 participants the gender is not confirmed*

Despite the 2012-13 season being a bad season judging by the poor rainfall distribution across most of the project sites, farmers in Guruve managed to get surpluses of common beans, cowpeas and soyabeans while those in Mudzi got groundnuts. Since April 2013, market information had been supplied to Agritex Mudzi and LGDA. The farmers in Mudzi district intended to sell a total of at least 30 tonnes of shelled groundnuts after the 2012-13 season. They had planned to sell 10 tonnes of shelled groundnuts to Fructas in June at a price of $1.20 per kg and 20 tonnes later, which is a good price in the current market in Zimbabwe.

LGDA first sent common beans samples to Fructas where after they made a sale. Market information was also availed to farmers in Mbire district through LGDA. These farmers intended to sell 12 tonnes of cowpeas. The farmers were in negotiations with a prospective cowpeas buyer. The link to the cowpeas buyer was facilitated by Fructas. Price enquiries for soyabeans by farmers in Hwedza district were received. Arrangements have been made to share price bulletins (by email) with one of the extension officers based in Hwedza at the AGRITEX district offices. Potential for marketing in Murehwa and Makoni is being explored.

Farmers in Mudzi District managed to organize themselves into groups and sold their groundnuts to Fresca Fruta. After the managing director of the company read about the project activities on the N2Africa website, he contacted the N2Africa team in Zimbabwe who then linked him to Mudzi farmers through Agritex. The farmers ferried their crop to Harare where they sold the 2.5 tonnes to the company at USD 1300 per tonne.

The process of linking farmers to markets involves the following stages:

1. Identifying market information sources for instance Zimbabwe Farmers Union, Agricultural Market Authorities among others;
2. Conveying the market information to farmers;
3. Initiating discussion amongst farmers on who to sell to, based on the market information;
4. Facilitating farmers to select a sales committee;
5. Facilitating farmers to negotiate with the buyers;
6. Facilitating farmers to select a quality control committee;
7. Facilitating farmers to select a collection point;
8. Organizing farmers to bulk their produce;
9. Facilitating farmers to share proceeds and reflecting on sales.

Farming communities engaged in the project are linked to legume processing initiatives. Three of the partners implementing the N2Africa project form part of the Zimbabwe Adding Value to Sustainable Agriculture Produce (ZAVSAP) which is a network that works with farmers to process crops and to achieve value addition for their harvested produce. In earlier years, ZAVSAP had their annual fair around July or August in which these organisations participated (CADS, LGDA, CTDO). For 2013 a bigger food fair is planned for December.

At district level, farmers sometimes conduct food fairs where they showcase different value-added products that can be obtained from legumes. These products can be used at household level while others are sold.

Farmers are undergoing some training on legume processing initiatives. The basic type of trainings done is the processing of the grain. Farmers are encouraged to shell and grade their groundnuts that are earmarked for marketing. The crop for household consumption is to remain unshelled since shelled groundnuts quickly lose their quality. Farmers are processing groundnuts into peanut butter, apart from the use on bread and with sweet potatoes, it is also used in cooking of vegetables, dried meat and maize porridge. Cowpeas are being pounded into flour and the product is being used for making porridge for children and 'rupiza', a relish that goes with sadza, the staple maize porridge in Zimbabwe. One of the N2Africa partners, Cluster Agriculture Development Program (CADS) has employed a fulltime field officer who is responsible for nutrition and value addition in which numerous farmer groups are being trained.

As part of some of the complementary activities to the N2Africa project, the IFAD project coordinator has approved funds for training of farmers on value addition and processing in Hwedza, Guruve and Mudzi through the help of a hired nutritionist. The training will target the N2africa Lead Farmers and aims to capacitate farmers in processing and value addition activities both for household and market.

Although some of the activities planned with the IFAD-funded project in Zimbabwe did not happen, several activities did take place and increased consumption of processed foods of legumes will improve household nutrition and dietary diversity. The marketing of the processed foods will also boost household incomes as is already happening in Goromonzi district where farmer groups have opened a shop to sell their processed foods.

3 Conclusion

The primary focus of the N2Africa project has been promotion of legume crops, increasing their productivity and the research thereof. Less attention was paid to what to do with increased produce from legume in terms of improving household nutrition and sale of legumes until later in the project. It is challenging to link the large numbers of farmers reached by N2Africa effectively to markets, be these legume market outlets (grain or seed), legume processing initiatives or other. This requires specific expertise and acknowledgment of the noteworthy differences between countries and crops.

Differences in marketing potential are seen both across legume crops and geographical regions. Cowpea is readily sold as a cash crop in West African countries versus Southern Africa where cowpea is grown primarily for household consumption (leaves as well as grain). High market demand exists for soyabean across all N2Africa countries, as well as for groundnut where it is being grown (West and Southern Africa). Common beans have a high market demand in Rwanda and DRC, and a medium demand in Zimbabwe and Malawi. Seed of climbing bean varieties is in high demand in Rwanda and Western Kenya, and considerable progress has been achieved in training farmers in Western Kenya in soyabean seed multiplication and marketing which could facilitate the establishment of a sustainable linkage to soyabean seed buyers.

While legumes are a beneficial cropping option for farmers with diverse wealth status, it is known that different products have different potential for benefitting poor farmers through linkages to formal markets, and that farmers with higher levels of assets (including access to road, motorized transport education and/or size of landholding) are more likely to benefit from participation in formal markets (Seville *et al.* 2011). Learning how to reach diverse farmers and make them benefit from formal market chains was beyond the scope of a project like N2Africa because of its duration, but will be explored in the next project phase.

Farmers need a particular skill set to be able to effectively market their legume crop. At the same time, it is clear that there is also need for capacity building on the side of, for example, buyers of legume produce. Often we find that there is market demand for legumes while farmers have stock for which they cannot find buyers.

It appears that N2Africa farmers are benefitting from both formal and informal market linkages. In Nigeria, Ghana and Mozambique, farmers often preferred to sell to traders rather than formal markets due to higher prices they could get (in the case of Mozambique, after a period of storage when prices had risen). Farmers in Western Kenya are benefitting from linkages with the soyabean processing company Promasidor, which purchased fertilizer and inoculants, which were given to farmers on a credit basis. The provision of information on quality, grading, and packaging to Kenya's soyabean farmers by N2Africa together with the facilitation of collection and transport of the produce may help to build this initiative into a sustainable market linkage.

In three countries, N2Africa has collaborated with the IFAD-funded ISFM project. Training has been provided on "farming as a business" (record keeping, break-even analysis, marketing skills) as well as linking farmers to Market Information Services (MIS) such as Esoko and this may have provided at least some of the N2Africa legume farmers with the skills they need to profitably participate in sustainable market linkages.

Undoubtedly, there is great potential in linking legume farmers to markets; there are sufficient beneficial markets for the different legume crops in each of the N2Africa countries and farmers are generally very keen to sell at least part of their produce to make some money. However, it requires expertise and investment to make this happen in a sustainable manner.

Appendix I: Poster Mince & Press Soya milk, Kenya

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	Process	Cost/value
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

Making soymilk using a simple grind-and-press approach

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

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

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