Opportunities for N2Africa in Tanzania

Workshop Report

E. Ronner, F.P. Baijukya
and K.E. Giller

Submission date: November 2012

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: E. Ronner Partner acronym: WUR
Address: P.O. Box 430
6700 AK Wageningen, The Netherlands
E-mail: esther.ronner@wur.nl

Name: F.P. Baijukya Partner acronym: TSBF-CIAT
Address: P.O. Box 823-00621
Nairobi, Kenya
E-mail: f.baijukya@cgiar.org

Name: K.E. Giller Partner acronym: WUR
Address: P.O. Box 430
6700 AK Wageningen, The Netherlands
E-mail: ken.giller@wur.nl

Ronner, E., Baijukya, F.P. and K. Giller, 2012. Opportunities for N2Africa in Tanzania, www.N2Africa.org, 54 pp.

Table of contents

Summary

A two-day workshop was held in Morogoro, Tanzania in November 2012, with the objectives of exploring the opportunities for extension of N2Africa to Tanzania, identifying suitable legume niches and developing a 'roadmap' for N2Africa activities in the country. The workshop was attended by 18 participants representing government organisations, universities, international organisations and the private sector. As this report testifies, the workshop was very productive. Given the limited time available the outcomes of the report should be seen as indicative of potential roles and priorities for N2Africa rather than definitive plans.

Key outcomes

1. The main legumes that N2Africa will work on in Tanzania are common bean, soybean and groundnut. The following niches were identified:
    a. Common bean: Northern Highlands (Lushoto, Hai, Kilimanjaro Rural) – focus on the introduction of climbing beans; and Southern Highlands (linked to activities and areas for soybean and groundnut).
    b. Soybean: Southern Highlands (Njombe, Namtumbo and Songea) linked to CRS 'Soya ni Pesa' project; expand to Mufindi and Iringa Rural (Ihemi cluster - SAGCOT), Sumbawanga and Nkasi (ARI Uyole).
    c. Groundnut: south (Mtwara, Ruvuma, Iringa, Dodoma)
2. N2Africa could provide technical/ agronomic assistance to projects focusing on cowpea and pigeonpea, as they are legumes of major importance in Tanzania.
3. Activities and key partners were identified for each of the selected legumes based on key entry points in the $(G_L \times G_R) \times E \times M$ equation.
4. A roadmap was developed, with key activities to be carried out in 2013 that should prepare Tanzania to be part of the proposed broader 'N2Africa Phase II' in 2014.
5. Seed multiplication for groundnut will have to be done in November 2012. Responsibility for follow-up: Esther Ronner.
6. New varieties of soybean, groundnut and common bean should be brought in now (link to Mozambique, Malawi, Kenya and Rwanda). The current situation and regulations should be checked. Responsibility for follow-up: Freddy Baijukya.
7. N2Africa will link directly to the CRS 'Soya ni Pesa' project to provide inoculants and technical assistance. The baseline survey, to be carried out by CRS, will be developed with input from N2Africa. Responsibility: Amsalu Gebreselassie.

Introduction

N2Africa is a large scale, science research project focused on putting nitrogen fixation to work for smallholder farmers growing legume crops in Africa. N2Africa is funded by The Bill & Melinda Gates Foundation and The Howard G. Buffet Foundation through a grant to Plant Production Systems, Wageningen University, in the Netherlands. It is led by Wageningen University together with CIAT-TSBF, IITA and has many partners in the Democratic Republic of Congo, Ghana, Kenya, Malawi, Mozambique, Nigeria, Rwanda and Zimbabwe. Currently, new partnerships are established in Ethiopia, Uganda, Tanzania, Liberia and Sierra Leone. More information on the N2Africa project can be found on our website: www.n2africa.org.

To explore the opportunities for expansion of N2Africa to Tanzania, a workshop was organized in Morogoro on 6 and 7 November 2012, by Wageningen University and IITA. The aim of the workshop was to develop the basis for a project proposal for N2Africa activities in Tanzania, together with potential key project partners. This report summarizes the proceedings of the workshop. An overview of the workshop programme is presented in Appendix A, and a list of participants and group photo in Appendix B.

Objectives of the workshop were to:

- Introduce N2Africa in Tanzania
- Explore the role of legumes in Tanzanian livelihoods and discuss ways in which N2Africa could enhance legume production in Tanzania
- Identify knowledge gaps in grain and forage legumes research in Tanzania
- Decide which legumes to work on in which locations, and identify partners in these locations
- Define activities and approach for N2Africa in Tanzania
- Prepare/ draft a project proposal for N2Africa in Tanzania
- Planning of limited number of seed multiplication activities in December 2012

Day 1: Tuesday 6 November

On the first day of the workshop, the main aim was to familiarize participants with the N2Africa project in its current form and the plans for expansion of the project to new countries. Participants also introduced their current work, in the light of potential synergies with N2Africa. In addition, a decision was made on which legumes N2Africa should work on in Tanzania.

Workshop opening

The workshop was opened by Dr. Fredrick Baijukya, CIAT, who welcomed all participants. An official welcoming speech on behalf of the Tanzanian Ministry of Agriculture, Food Security and Cooperatives was held by Dr. Beatus Malema (Crop Promotion Services).

Introductions: N2Africa and ongoing projects on grain legumes in Tanzania

Introduction N2Africa
Prof. Ken Giller – Wageningen University
See Appendix D, presentation 1

Past and ongoing research/initiatives on soybean
Dr. Beatus Malema – MAFSC, Crop Promotion Services
Two important initiatives have been held around soybean at Crop Promotion Services:

- Conduction of a survey, with as main question: what is the status of soybean production and processing in Tanzania? A stakeholder workshop was held as well, with farmers, researchers, processors, consumers, producers of animal feed, etc. Based on this survey and stakeholder workshop, a first book was produced: *Soya Bean Production and Utilization in Tanzania*.
- Organization of a second workshop, specifically for the poultry sector, to discuss the potential for use of soybean in poultry feed. This led to the development of the *Tanzania Soybean Development Strategy (TSDS) 2010 to 2020*, with a vision of what the Tanzanian soybean industry should look like.

Marketing of soybean is an important aspect of soybean production: inoculation improves yields, but where is the market to take up the additional harvest? Hence, investments in soybean processing are needed (for both food and animal feed). For instance, soybean-based foods or flour are used in hospitals, for young children.

Currently, Tanzania imports soybean, and prices for soybean produced in Tanzania are high. This is mainly due to the low production in Tanzania, which increases the costs for transport, marketing, etc.
It is the right time for N2Africa to come in and address soybean production in Tanzania. There is a need for inoculation and fertilizers. Perhaps there is a possibility of fertilizer subsidies? However, the private sector has to be involved, both for supply of inoculants as well as for output markets.

Past and ongoing research/initiatives on common bean
Mr. Jean Claude Rubyogo – CIAT/ PABRA
See Appendix D, presentation 2

Past and ongoing research/initiatives on groundnut
Ms. Happy Daudi – Naliendele Research Institute
See Appendix D, presentation 3

MAFSC – Department of research: Grain legumes strategy for Tanzania
Dr. Hussein Mansoor
See Appendix D, presentation 4

Nelson Mandela African Institute of Science and Technology
Prof. Patrick Ndakidemi
For work around inoculation and N-fixation, training is highly needed in Tanzania. At the Nelson Mandela University, some work around legumes is carried out at the moment. For instance, two students are working on vegetable soybean. There is also a project on testing the interaction between banana and beans (in Bukoba) – together with the promotion of the use of inoculants.
People are often not aware of the residual benefits of beans for maize or other cereals. Research is needed on the actual contribution of legumes in cereal systems. There is also need for the isolation of strains, their characterization and screening of their efficiency in terms of N_2-fixation. P-use efficiency should be tested as well, so that strains can be selected that use P efficiently. Moreover, a strain bank should be developed to keep an oversight of successful strains. Rhizobial inoculation could also help strengthen plant vigour, so that the risk of diseases diminishes.

NAFAKA programme
Mr. Martin Mason
The NAFAKA programme is funded by USAID and works around value chains. In the Morogoro region, the programme aims to increase productivity through marketing, mainly of rice and maize. Legumes play an important role in these systems as well. They are often grown as a secondary crop after the rice harvest, especially soybean and green gram. Legumes may not only increase household income, but also have nutritional and soil fertility benefits.
In other regions, the programme also works with pigeonpea, lablab and cowpea. They have both nutritional and commercial value. A challenge is the lack of seeds, as well as varieties adapted to the conditions in growing areas. Especially for cowpea and pigeonpea these adapted varieties are needed, but also for soybean when it is planted off-season.

McKnight Foundation
Dr. Charlie Riches
The McKnight funded CCRP is running for 20 years already. Since 2008, the Bill and Melinda Gates Foundation also support work in Malawi, Mozambique and Tanzania. Projects work around enhancing legume productivity, as well as increasing integration of legumes in production systems (which is close to the N2Africa strategy).
In both groundnut and cowpea, work has been done around breeding for resistance to multiple diseases. Lately, there is an increased focus on adaptation, spatial issues, heterogeneity – extension of the G x E x M equation. Other topics include pest management, post-harvest aspects and uses of groundnut. There is cross-country collaboration on these projects.
Through the CCRP, the biotech lab at SUA is supported. There are also links with the USAID-iAGRI programme for training. It would be advisable for N2Africa to link with priorities as well – they have already identified capacity building needs.
A concept note is currently under revision for another 5 year legume programme. An overview of current CCRP project is presented in Appendix C.

ARI-Uyole
Dr. Catherine Madata
Work done in the Ruvuma region shows there has been an increases in production and acreage of soybean and also for common bean. For both legumes, new varieties have been introduced. Bean breeding addressed specific market needs – e.g. large white, and large white dotted varieties.
Breeding was also done for climbing bean. Currently, multi-locational trials are carried out for a new variety, which is tolerant to viruses (although susceptible to diseases). In soybean, the biggest problem is rust, next to bacterial blight and viruses. In Uyole, rhizobial inoculants are available from a FAO project, but these have not been used. See also Appendix D, presentation 5 for more information.

Grain legume markets in Tanzania
Bernadette Majebelle
A market study that was carried out revealed that only soybean and common bean are consumed locally in Tanzania. Other legumes are mainly produced for markets in India. Farmers can often only choose to sell their legumes to a limited number of traders.

Groundnuts that are commonly available on markets in Tanzania come from Malawi (only groundnut with a pink color is produced in Tanzania) In Mtwara, Tanzanian groundnuts are sold for the highest price. Cowpeas mainly go to India. Chickpea is produced around Mwanza, also mainly for the Indian market. However, they are imported again after polishing (value addition)!
For all legumes it is crucial to consider which markets we are addressing: export or local?

Minjingu fertilizers
Projest Amos Ikerra
In Arusha, Minjingu Fertilizers produces the blend Minjingu Mazao, which contains P-fertilizer, with addition of zinc, boron, and nitrogen. Minjingu Fertilizers cooperates with SUA, AGRA and also with NAFAKA (supporting their trials). Currently, the government is linking farmers to Minjingu through fertilizer subsidies.

IITA
Fen Beed
One of the main questions is: where should the focus of N2Africa be? Where markets are? Or where legumes are already established? Legumes where there is great potential for change are cowpea, soybean and pigeonpea. They have potential where other legumes do not do well (especially in areas affected by drought) and they provide good ground cover for erosion protection.
It is also important to link to existing policies.
Legume intensification may increase the potential for diseases and we need to be aware of this. In selection of grain legumes, be clever in how they are promoted and already include plant pathology in the first phase so that diseases can be prevented. We should identify what key diseases are, and which opportunities exist. The use of pesticides should be well-managed to prevent environmental damage. With an increased awareness of the risks of diseases, we could pre-empt them.
There is an opportunity to inoculate legumes not only with rhizobia, but also with other organisms to increase plant vigour. This could be tested, and it would probably be possible to include this in inoculation without additional costs).
Aflatoxins are a big problem in groundnut, but food security needs to be addressed first, before the market is addressed! With the current high levels of aflatoxins, groundnuts will not be traded. Export markets should not hamper local markets, however, e.g. when poor quality groundnuts go to local markets while the best quality groundnuts are exported. We should look for methods that address both local markets as well as value chains.

IITA
Harun Murithi
IITA works on soybean rust, a foliar disease that is adversely spreading causing yield losses of about 10-90%. The fungus is highly variable with different races identified in different parts of the world. Our research is geared towards identifying the dominant races in Tanzania and other countries in East and southern Africa so that breeders can deploy or develop resistant germ plasm. Furthermore, we will test novel diagnostic methods that can help recognize the disease in the field before it establishes. We shall also map the risk of spread to new areas based on prevailing wind patterns and conducive environmental factors.

CRS
Amsalu Gebreselassie
CRS has received a USDA award for implementation of the 'Soya ni Pesa' project. The Soya Ni Pesa (Soybeans are Money) project is an initiative to strengthen the soybean value chain in Tanzania's Southern Agricultural Growth Corridor (SAGCOT), by working with smallholder farmers and integrating them with markets, targeting especially the poultry industry. Implemented by Catholic Relief Services in conjunction with local Tanzanian partner organizations, the project will deliver inputs and training in production techniques, market information and business development to enable farmers to boost yields, add value and increase incomes through soybean cultivation. 11,250 farmers will receive orientation on soybean cultivation techniques, farm management, savings and lending, and will be linked to financial services providers and markets.

Discussion/ comments

- To what extent does N2Africa address the topic of moisture stress, mid-season drought, etc.?
    - Look for adapted varieties. E.g. pigeon pea potential (drought resistant); conservation agriculture or deep tillage; soybean: residual moisture in rice systems
- SAGCOT Centre should be operational in one year. Currently working on contracts, work plans, etc.
- There are also other projects in Tanzania, from which representatives are not present during this workshop: e.g. AGRA soil health, TLII.
    - In the current N2Africa materials are already being shared between TLII and N2Africa.
- Identification of suitable varieties and release of those varieties: the process from research station to commercial sector is slow at the moment. This needs to be signaled.

Identification of legume niches in Tanzania

After the introductions on different initiatives on grain legumes in Tanzania, we identified the most important grain legumes for Tanzania. Participants agreed that the most important legumes in Tanzania are: soybean, common bean, groundnut, cowpea and pigeonpea. Breakout groups discussed a justification for each of the legumes which served as a basis for a selection of the legumes that N2Africa should best focus on in Tanzania. Criteria for the selection of legumes were identified in a plenary discussion:

- potential for change
- land coverage
- markets
- utilizations
- problems
- role in farming systems
- nutritional benefits
- gender role
- availability of partners
- other

The justification for work on each of the legumes is presented in Tables 1a and 1b.

Table 1a: Justification main legumes in Tanzania

Legume	Potential for change	Land coverage	Markets	Utilizations	Problems/constraints
Common bean	Pests, diseases - soil fertility problems, improved agronomy and varieties. Little opportunity for expansion of area apart from climbing beans. Increase knowledge on post-harvest handling. Estimated potential for change in productivity: 30% increase.	Everywhere. 950,000 t	Strong demand, guaranteed market (local, regional and export), although not well organized (informal trade) and prices decrease with increase in production. Many markets - different grain types; fresh and dried grain; leaves.	Staple food, home consumption. Dry bean, snap, vegetable, canning industry , livestock feed - crop residues	Availability of poles for climbing beans. Local seed systems, lack of improved varieties. Inadequate extension. Central government closing export. Diseases: bean stem maggot, bean fly. Insects: aphids. Poor soil fertility, limited availability of manure, drought. Post-harvest handling and storage.
Soybean	Huge national market for animal feed. Power Foods (soyameal/maize meal mix). Replacement for fishmeal for chickens. World Food Program for school feeding? Chicken feed. New extrusion plant in Mafinga (Iringa-Mbeya). Improved agronomy, use of inoculants, introduction new varieties. Estimated potential for change in productivity: 200% increase	Potential in all maize producing areas. Currently mainly in Southern Highlands. 3,100 t on 4000 ha.	Local and national (regional) market, also exported. Problems of local trading and scattered production. Many products to be marketed: grain, milk, cake, oil, feed, etc.	Small local consumption (soymilk), large scale industry (oil extraction, animal feed).	Availability of inoculants. Poor soil fertility. Diseases (soybean rust). Currently limited use due to lack of nutritional awareness and knowledge on technologies. Lack of improved varieties, seed availability. Inadequate marketing, lack of processing capacities.

Groundnut	Yields poor, new varieties - major disease constraints resolved. Raising awareness aflatoxins. Estimated potential for change in productivity: 50% increase	Mtwara, Dodoma, Singida, Tabora, Shinyanga, some parts of Mwanza. 300,000 t on 415,000 ha	Local demand and export, but need aflatoxin free. Poorly organized. Marketing of grain, oil, spread, feed.	Local consumption. Possible exports - new opportunities through GrowAfrica (Unilever and others).	Most diseases tackled though varieties not yet released - Aflatoxin major problem (new major investment). Poor soil fertility, drought. Post-harvest handling machines a problem.
Cowpea	Getting seed of new varieties out - rapid uptake. Good on acid soils. Does not need inoculation. Good potential for rotation in maize systems. Estimated potential for change in productivity: 50% increase.	Important in Singida, Mtwara, Tanga, Dodoma, Shinyanga, Iringa, Misungui, Coastal Strip. 90,000 t on 160,000 ha.	Strong market during Ramadan. Little demand rest of year. Lots of local consumption. Export to India.	Fresh and dry grain, leaves. Local added value.	Pest problems - Maruca etc. Pod suckers, Alectra. Weeds. Poor soil fertility. Storage pests. Seed availability a problem.
Pigeonpea	Good varieties, *Fusarium* resistant, deep rooting - good for drought areas. Does not need inoculation. Estimated potential for change in productivity: 20% increase	55,000 t on 70,000 ha. Localised in drier areas (Manyara, Singinda, Mtwara).	Huge export market (India) - problems of prices for farmers. Local market limited.	Not utilized much - even where grown for long time.	*Helicoverpa* huge problem, seed/ improved variety availability and issue - no formal supply. Diseases, weeds, pests.

Table 1b: Justification main legumes in Tanzania (continued)

Legume	Role in farming system	Nutritional benefits	Gender role	Availability of partners	Other
Common bean	Food crop/ food security. Opportunities for climbing beans, MACs. Soil fertility improvement through rotation and intercropping, used as animal feed. Mainly in maize and rice systems.	High benefits, micronutrient rich. Leaves eaten. Cheap source of protein (though contains antinutritional factors).	Womens' crop; men involved in marketing.	Many activities in breeding. Strong partners. E.g. CIAT/PABRA, IITA, McKnight, AGRA, ARIs, SUA, NMAIST, ASA, NGOs, traders, Farm Radio (for extension dissemination)	Already adapted and preferred
Soybean	Good rotation crop with maize. Rotation with barley in Iringa. Rotation with rice. Commercial farmers working with outgrowers. Suppresses *Striga*. Short duration varieties.	Very high benefits. Variety of products. Potential for local processing. Food for infants.	Men and women.	Dr Malema, CRS, SAGCOT, IITA, ARIs, NGOs, NMAIST traders	High interest & multiple uses. Local varieties available. Seed Co varieties being bulked.
Groundnut	Pendo (ex-ICRISAT variety) - very popular - replaced local varieties. Expansion under cashew nuts. Mainly in maize and cassava systems. Also grown as livestock feed and for soil fertility improvement.	High benefits. Weaning foods. Leaves consumed as well. Cholesterol free proteins	Cash crop, also home consumption - both men and women.	Naliendeli, Dr Mponda. SNV in Mtwara region. ICRISAT, IITA (aflatoxin), NMAIST, Traders	potential for high export income if aflatoxin managed
Cowpea	Intercropped with maize and sorghum. Grows well in hot drier, lower areas. Short duration varieties - hunger foods. Fits after rice on residual moisture. Suppresses Striga. Fire wood, animal feeds, soil cover.	Good - protein source. Cooks fast. Leaves eaten.	Womens' crop.	IITA, ICRISAT, ARI, NGOs, traders, NMAIST. No champion?	Opportunities for soil fertility improvements under arid conditions
Pigeonpea	Additive intercrops with maize and/or upland rice at low populations. Used to keep animals out of fields. Suppresses Striga. Fire wood, animal feeds, soil cover.	Good, but sometimes not preferred in diets.	Men and women.	Technoserve, IITA, ICRISAT, ARI, NGOs, traders, NMAIST. No champion?	Opportunities for soil fertility improvements under arid conditions

The outcomes of this justification led into a discussion suitable legume niches for N2Africa (legume niches refer to the fit for technologies, which can be identified by understanding systems at different temporal and spatial scales in terms of their agro-ecology and socio-economics (taken together as "socio-ecological niches"):

- Potential interventions N2Africa could use depend on the type of crop – they will be different for soybean and common bean for instance.
- N2Africa should not be stuck in geographical areas. The suitability for particular crops overlap; they fit in the same system. If this is the case, N2Africa will focus on two (or more) crops in the same region.
- Soybean really makes a difference, and is not likely to replace something else. Farmers just don't know how to grow it.
- USAID FtF/ AfricaRising is working with other crops as well (cowpea, pigeonpea). If N2Africa does not work directly with these crops, the project could provide technical knowledge to support this programme.

A final decision was made to focus on the following legume niches in Tanzania:

- Soybean: Southern Highlands
- Common bean: Southern Highlands + Northern Highlands through close collaboration with PABRA
- Groundnut: possibility in south? Ruvuma region (Namtumbo)
- Cowpea and pigeonpea – look for opportunities for integration in different geographical regions. Support AfricaRising in Northern Tanzania (pigeonpea, beans)

Direct link with CRS – Soya ni Pesa

For soybean, a direct link was already established with the CRS project Soya ni Pesa. This is a 10 million USD project, funded by USDA. The project has procured 6 tons of soybean seed from the Agricultural Seed Agency of Tanzania in Morogoro, which will be used for dissemination activities in late December 2012/ early January 2013.

The project has two main components:

1. Agricultural activities – improved use of technologies, improved farm management (both financial and management aspects). Activities include:
    - Demonstrate technologies
    - Demonstrate egg production
    - Soybean seed systems; link to agro-dealers; training on processing
    - Linking to market information, training farmer groups
    - Access to storage facilities.
2. Expanding trade of agricultural products (domestic and export)

Implementation will be done through local partners (churches, NGOs, NARS, IITA, etc.). The geographical focus is in four districts: Njombe, Ulanga, Songea and Namtumbo. In all these districts, soybean is already being produced.

Currently, a seed systems assessment is conducted, to learn more about availability of varieties, import regulations (varieties that have not been released yet cannot be imported). A baseline survey and value chain study will serve to refine activities. The project will target 18,000 households, of which 11,250 will probably be involved in soybean cultivation at the end of the four year project. Through 'saving and internal lending communities', farmer groups will receive training on soybean cultivation techniques, farm management, savings and lending. They will also be linked to financial services providers and markets. Complementary activities include poultry and egg production, to extend the linkages of the value chain.

Discussion/ comments

- Will the project hand out seeds or do farmers have to pay for them?
- Farmers will pay for the seeds at a reduced price. Farmers are willing to pay 500 to 1000 TSh for seeds (where 2000 TSh is the normal price).

- There are ongoing negotiations about the harmonization of varieties in East-African countries. Currently, there is need for only one season of testing before the variety can be introduced.
- How did CRS come to this project? – There is a shortage of soybean in the market and there is high potential for production of soybean. A catalyst for linking production and marketing is needed. With USDA, transfer of technologies from the USA is foreseen as well.

Day 2: Wednesday 7 November

The second day of the workshop started with a further introduction of the SAGCOT initiative and some experiences with partnerships in Tanzania. Next, activities and key partners were identified for each of the selected legumes (soybean, common bean and groundnut), based on key entry points in the (G_L x G_R) x E x M equation. Finally, a 'roadmap' was developed, with key activities to be carried out in 2013 that should prepare Tanzania to be part of the broader 'N2Africa phase II' in 2014.

Experiences with partnerships in Tanzania

Jeffrey Lewis gave some insight in partnerships and relations between different actors by presenting his experiences from the SAGCOT perspective.

Presentation on public private partnerships and SAGCOT
Mr. Jeffrey Lewis
See Appendix D, presentation 6

Discussion/ comments:

- Partnerships normally take a long time to establish, for building trust, etc. This is also the case for SAGCOT. They should start operating around mid-2013.
- The SAGCOT centre should enable partnerships, communication, etc. but will not carry out implementation activities themselves.
- Which soybean varieties are currently available and what are their yields? Jeffrey will try to find this out.
- Currently, SAGCOT is working on 5 year development plan, with more concrete actions than the Blueprint.
- SAGCOT will build-up their finances with donor/ government money, which is used to attract commercial finance/ investors.
- On what scale will SAGCOT operate? They will need small scale success stories, but within a vision of larger scale operations.

Activities for N2Africa in Tanzania and actors involved

Building on the selection of common bean, soybean and groundnut, as well as on the problems for each of the legumes that were identified on day 1 (cf. table 1), breakout groups identified which of these problems N2Africa could address. More specifically, entry points for N2Africa in the (G_L x G_R) x E x M equation were sought. The results for common bean and groundnut are listed below. Activities for soybean are presented in the next section, together with the action plan.

Common bean
Activities listed below apply for both bush bean and climbing bean (with exception of staking materials). For climbing bean, four varieties released are released at the moment (SARI and ARI Uyole), and more will be released by ARI Uyole soon.

Factors	Activities	Actors
G_L	1. Seed multiplication for targeted varieties, for multi-location trials and for decentralized seed production	N2Africa – ARIs and PABRA/ CIAT
	2. When N2Africa extends to new areas, farmers groups need to be selected to produce quality declared seeds (QDS)	N2Africa , ARI, ASA and TOSCI + Decentralized seed producers
G_R	1. Testing of response to inoculation climbing beans	N2Africa + ARIs +PABRA+ NMAST
$G_L x G_R$	1. Testing of Nitrogen Fixation capacity of CB genotypes and contribution BNF to system	N2Africa + ARIs +PABRA+ NMAST
E	1. Fast tracking (assessment of phenotypic and users' preferences) and multi-location trials of new varieties (pH, topo-sequence, soil type, rainfall, etc.	N2Africa , ARIs and PABRA/ CIAT
M	1. Research on limiting nutrients and fertilizer recommendations	N2 Africa and ARIs /PABRA -Students and Minjingu
	2. Evaluation of cropping patterns (intercropping and rotation) of e.g. maize + climbing/ bush bean	N2 Africa + ARIs +PABRA+ NMAST+ Extension +NGOs + producers organizations/groups
	3. Identify best practices available, to be used in extension	N2 Africa + ARIs +PABRA+ NMAST+ Extension +NGOs + producers organizations/groups
	4. Introduce and test fodder legumes/ other techniques for staking of climbing beans	N2 Africa + ARIs +PABRA+ NMAST+ Extension +NGOs + producers organizations/groups
	5. Test IPM options	Students: N2 Africa + ARIs +PABRA+ NMAST+ Extension +NGOs + producers organizations/groups
	6. Introduce and test labor saving technologies	N2 Africa and other actors and linking with private sector

Groundnut

G_L – Many varieties are already released and new varieties with resistance to multiple foliar diseases (groundnut rosette virus, early leaf spot, rust) are in the pipeline. N2Africa is needed to express the potential – phenotype.

G_R – rely on indigenous rhizobial populations. There is some need for characterization of the size (MPNs), diversity, and nitrogen fixation efficiency of indigenous populations (good MSc or PhD project).

E – Test ($G_L \times G_R$) × E × M across agro-ecologies (T, length of growing season) and question whether M needs adjusting to E for different ($G_L \times G_R$). This is a first level of targeting to socio-ecological niches. Need to select 3 locations?

M –

Soil fertility:

P is key. In groundnut specific need for Ca – use of gypsum top-dressing at pegging to avoid "pops". Compare Minjingu RP (which contains ?% calcium) with other sources of P (SSP, TSP).
Multi-locational trials to identify non-responsive soils (with soil analysis) and to identify frequency and extent of the need for K, Mg, S and other nutrients.

Water:
Box or tied ridging to avoid problems of terminal drought (also reduces aflatoxin). This links to hand-hoeing versus mechanical tillage (ox-drawn tines for ripping), depending on livestock availability.

Agronomy:
Farmers often use wide spacing – closer spacing will give benefits (for Spanish varieties; 50 cm rows, 10 cm within rows: Virginia varieties; 50 cm rows, 15 cm within rows).
It is necessary to understand sowing dates in relation to (changing) rainfall patterns and other crop priorities.

Systems integration
Intercropping:
Groundnut – cassava: options for adjustment of cassava spacing – Mtwara region
Groundnut-maize/ groundnut-sorghum: adjustment of spacing – other regions

Rotations:
Groundnut is often grown as sole crop, which offers opportunities for rotational benefits. Groundnut is often grown on more fertile soil close to homesteads. Haulms remain in the field.

Livestock
What are the opportunities for feeding groundnut residues? In some areas where there are large numbers of livestock, the cropping and livestock activities are separate and livestock is not allowed into cropping areas.

Post-harvest
Aflatoxin management; broader management issues of stripping, shelling, processing.
These activities have been funded by the McKnight Foundation and N2Africa will simply ensure that best practices are included in any knowledge transfer initiatives.

How to move forward?
- Seed systems
- Tanzanian Official Seed Certification Institute (TOSCI)
- Multiplication of foundation seed is done by ASA (Agricultural Seed Agency, Morogoro) – which often works with larger farmers who sell to ASA.
- Need to move to Quality Declared Seed (QDS) and involve District Councils – District Agricultural and Livestock Development Officers (DALDO).

Discussion/ comments:
Partnerships with output markets have to be in place to ensure that the increase in production is viable! Otherwise the intervention will fails. There has to be integration with projects that address output marketing.

Planning of activities in 2013

After presentation of the general activities and entry points for N2Africa, the groups continued with a 'roadmap' of steps to be taken in 2013, which should lead to full implementation of the project in Tanzania as part of N2Africa phase II.

Common bean
Areas selected:
- Focus on Northern Highlands: Lushoto, Hai, Kilimanjaro Rural – N2Africa will work in areas where climbing beans are not cultivated yet (opportunity for intensification of farming systems). These are also areas where other projects have not worked yet.
- Southern Highlands: activities common bean will be linked to work on soybean and groundnut. Suitable varieties (MACs?) need to be identified.

No.	Activity	Partners	Responsible person	Time line
1.	Fact finding & sensitization workshop	Local stakeholders, NMAIST	Patrick Ndakedemi	February
2.	Seed multiplication	SARI, private producers	Jean Claude Rubyogo	March
3.	Base line survey	Local Partners, WU, IITA	Fen – identify person within IITA	May
5.	Training of staff	NGOs, extension workers, CBOs	SARI, IITA	July
4.	Seed dissemination of new varieties	DALDO, CBOs, Worldvision.	PABRA,N2AFRICA, SARI, DALDO,	Sept.
6.	Agronomy trials	PABRA, N2AFRICA, SARI, DALDO, local NGOs (WUWE, ULT), NMAIST	Freddy develops protocol, SARI-Msaki implementation	Sept.
7.	Fast track/introduce CB varieties	PABRA, N2AFRICA, SARI, DALDO, WUWE, ULT	PABRA,SARI	Sept.

Soybean

Areas selected: Njombe, Namtumbo and Songea (CRS area), Mufindi and Iringa Rural (Ihemi cluster - SAGCOT), Sumbawanga and Nkasi (ARI Uyole).

	Activity	Areas (2013)	Implementers	2014/18	Partners
1.	Develop platform for soybean partnerships and clear coordination of activities	Njombe, N'tumbo and Songea	N2Africa, MAFC, IITA, LGAs, CRS	others	N2Africa, MAFC, ARI Uyole, SAGCOT, IITA, LGAs, ANSAF
2.	Baseline Survey: AEZ suitability (soil pH, temperature), nutritional benefits, value chain demand, key actors, institutional environment, etc.)	Njombe, N'tumbo and Songea	CRS (agreed methodology)	others	N2Africa, MAFC, ARI Uyole, SAGCOT, IITA, LGAs, ANSAF
3.	Validation of varieties in combination with R. inoculants for seed quantity, quality and intended use	Njombe, N'tumbo and Songea	CRS, N2Africa, MAFC, IITA	others	N2Africa, NARS (Uyole, Ilonga), TOSCI, ASA, commercial seed companies
4.	Optimization of agronomic techniques for selected varieties	Njombe, N'tumbo and Songea	CRS, N2Africa, MAFC, IITA, NARS (Uyole), LGAs	others	N2Africa, NARS (Uyole, Ilonga), CRS, SUA and NMU. LGAs, input suppliers
5.	Introduction, mass production for application of inoculants (in country production of R. inoculants)			All	N2Africa, Seed companies
6.	Varieties testing in Tanzania to maximize the possible choice across AEZ and fast tracking for release			All	MAFC, N2Africa, IITA and SEEDCO (introduction), ANSAF, ARI Uyole and Ilonga (testing), TOSCI (release), SAGCOT (facilitate)
7.	Seed multiplication and storage	Njombe, N'tumbo and Songea	CRS, ASA (ARI Uyole)	All	ASA (government Seed Agency), Seed Companies
8.	Establishment of participatory demonstration trials across AEZ			All	N2Africa, CRS, NAFAKA, NARS, ANSAF, TAP,

9.	Dissemination of extension services	Njombe, N'tumbo and Songea	CRS, ARI Uyole, LGAs, IITA, N2Africa,	All	FGs, MVIWATA, CRS, NAFAKA, LGAs, CBOs/FBOs, Seed companies
10.	Sustainability of nutrients, pests and disease management			All	N2A, IITA, IFDC, TSBF, CRS, ARI Uyole,LGAs
11.	Training and capacity building	Njombe, N'tumbo and Songea	CRS, LGAs, N2Africa	All	SUA, CRS, NARS, MAFC, LGAs, NMU,
12.	Monitoring & Evaluation	Njombe, N'tumbo and Songea	CRS, N2Africa	All	N2Africa, CRS, SAGCOT, IITA, MAFC,
Support activities to N2Africa					
13	Knowledge awareness and marketing information			All	Growers (FGs), FARMBASE, Power Food, MAFC, Private Sector (millers, exporters, traders, feed and food producers. Etc.), USAID-FtF, IITA
14	Integrating processors to drive support for production, post harvesting technology, storage, finance, marketing, and price			All	CRS (facilitation and coordination), Technoserve (Technical support), FARMBASE, Mt. Meru Millers, Kibaha Ed. Centre, MUVEK, Power Food, Sao Hill Agriculture (new)
15	Business training			All	CSDI, Technoserve, Commercial banks,

Discussion/ comments:

- What are current regulations on the import of inoculants? – There is a regulatory agency for fertilizers under the government (Tanzania Fertilizer Regulatory Authority), which should deal with this request. Their CEO is part of COMPRO. *(NB: Since the workshop a permit for import of inoculants for CRS and N2Africa has been arranged through Dr Hussein Mansoor)*.
- NAFAKA will be involved as well – they currently work with growing soybean on residual moisture. Official clearance from USAID is needed

Groundnut

Preparatory activities:
A) Seed multiplication. Foundation seed is available, and multiplication has to be done now, in November 2012.
Varieties: Pendo – 90 days, Mnanje – 110 days. What are the newest varieties?
Need 80 kg/ha of seed, production is 1.5 t/ha seed. What are the costs?

B) Baseline study – along a transect of production areas
Sample in Mtwara district – three villages will be selected according to variation in the farming system.
Villages: Masasi, Manyumbu, Lindi. Move to Iringa, Dodoma, Singida, Ruvuma.

The baseline should consist of a rapid appraisal of:
- Role of groundnut in farming systems
- Current management practices
- Seed sources
- Current yields
- Soil fertility problems
- Pest and diseases
- Markets and utilization
- District Agricultural Development Plans (DADEPs) – role of legumes
- Which NGOs, development organizations active.

Cost – US$1.5/km are rates for vehicle hire.

In the next main season – November 2013 – new activities for multi-locational trials will be started.

We will have to find major NGO partners and understand where they are working, so that we can forge alliances in multiple areas (and hence work with the same partner in more than one area). We need more than one partner to share the risk – e.g. Agha Khan Foundation, World Vision, Catholic Relief Services, AfriCARE. Partnerships along the value chain should be sought as well – e.g. OLAM (largest groundnut trader in Tanzania), Unilever etc.; and with farmer organizations/ CBOs (e.g. national level: Agricultural Council of Tanzania).

What are the costs for hiring local staff for dissemination and agronomy?

Multi-locational experiments
In three to four sites:
- Masasi (close to Naliendeli)
- Kongwa, Dodoma (close to Dodoma)
- Kiteto, Manyara – (close to Dodoma)
- Bukombe, Shinyanga

Discussion/ comments:
- We have the possibility of working in areas with different agro-ecologies, or along transects, to screen the adaptability of varieties to different circumstances.
- The rapid appraisal should specifically be used to identify gaps and needs
- In 2013 we will have to identify major NGOs, and try to find those NGOs that work in the areas we have identified for N2Africa (for all legumes). This will facilitate contracts, and avoids having many subcontracts with smaller NGOs.

General discussion/ comments on action plans

- Varieties should be targeted to different markets – we should work with a number of varieties. New varieties should be brought in NOW. We could link to Mozambique, Malawi, Kenya and Rwanda, but we need to find out what the current situation and regulations are.
  Responsibility: Freddy Baijukya, to follow up with Steve Boahen and Charlie Riches. Data is needed for the release process.
- With inoculants, we have to go for the best quality and not work with poor quality inoculants. If not, people will be disappointed and hesitant to use them again.
- Baseline: should this be a rapid appraisal or a detailed baseline? The baseline survey can be done in cooperation with CRS in the soybean areas and will be developed jointly.
  Responsibility: Amsalu Gebreselassie will contact Ken Giller for input.
- There is a need for local sensitization workshops with partners involved, to manage their expectations. These meetings could be combined with parts of the rapid appraisal/ baseline, although we need to talk to people in the field as well.
- There is potential for cooperation with partners working on pigeonpea and cowpea in the northern zone (Babati). Jean Claude Rubyogo will be the contact for this. The McKnight Foundation supports (at national level) Lilongwa, Iringa and Dodoma Rural, with a focus on training of farmers for seed multiplication. A second program is funded on nutrition and marketing. We should also link to and learn from experiences in West-Africa, where these crops are major.

Final comments and recommendations

- Links to output markets needs to be emphasized to make N2Africa interventions successful.
- We need to understand why other projects have not been successful, and learn from them.
- There is a need for policy support to be able to have an impact.
- There are clear opportunities for synergies with CCRP.
- We should not forget about other partners – maybe not all key partners were present at the workshop yet. In terms of markets: we should not *only* look at smallholder farmers; how can we link to other projects? And how could smallholders be integrated in other projects?
- It would be useful to develop a knowledge portal – This is already (partly) addressed through N2Africa website www.n2africa.org (videos, training material, reports, etc.).
- We should give opportunities to young scientists and specifically work with them.

General N2Africa roadmap:

Ken Giller, Bernard Vanlauwe and Freddy Baijukya will visit the Bill & Melinda Gates Foundation in Seatle in December, in preparation for N2Africa phase II. If the foundation supports plans to move forward, there will be a planning and proposal writing workshop for all N2Africa countries (Ghana, Nigeria, Tanzania, Uganda and Ethiopia) in 2013.

Appendix A: Workshop programme

Tuesday, November 6, 2012

TIME	ACTIVITY	LEAD PERSON	VENUE
8:30-8:45	Registration		Conference Hall
8:45-9:00	Workshop opening and introductions	Dr. Fredrick Baijukya – CIAT / representative MAFSC	Conference Hall
9:00-9:45	Introduction N2Africa project, workshop purpose/ objectives and ideas for Tanzania	Prof. Ken Giller – Wageningen University	Conference Hall
9:45-10:15	3 presentations on past and ongoing research/initiatives on groundnut, soybean and common bean	Beatus Malema (MAFSC), Happy Daudi (Naliendeli) and Jean Claude Rubyogo (CIAT)	Conference Hall
10:15-10:30	Short introductions (5 minutes max.) from all participants on their current project/initiatives related to legumes	Dr. Fredrick Baijukya	Conference Hall
10:30-11:00	*COFFEE BREAK*		
11:00-12:00	Short introductions current projects/initiatives on legumes (continued); leading into discussion on potential for change and intensification of legume niches	Dr. Fredrick Baijukya	Conference Hall
12:00-12:30	Justification legume niches and role of legumes in Tanzanian farming systems	Breakout groups	Breakout rooms
12:30-13:00	Report back in plenary session	Prof. Patrick Ndakidemi – Nelson Mandela University	Conference Hall
13:00-14:00	*LUNCH*		
14:00-14:15	Explanation assignment breakout groups	Esther Ronner – Wageningen University	Conference Hall
14:15-15:30	Develop a problem and objectives tree based on identified legume niches	Breakout groups	Breakout rooms
15:30-16:00	*COFFEE BREAK*		
16:00-17:00	Define activities, outputs, outcomes and training needs	Breakout groups	Breakout rooms
17:00-17:30	Report back in plenary session	Dr. Fen Beed – IITA	Conference Hall

Wednesday, November 7, 2012

TIME	ACTIVITY	LEAD PERSON	VENUE
9:00-9:30	Synthesis on objectives and activities for N2Africa Tanzania	Prof. Ken Giller	Conference Hall
9:30-10:30	Develop 'road map' for N2Africa Tanzania (dissemination & delivery, rhizobiology, agronomy, input & output markets)	Breakout groups	Breakout rooms
10:30-11:00	*COFFEE BREAK*		
11:00-11:30	Develop road map – continued	Breakout groups	Breakout rooms
11:30-13:00	Report back in plenary session	Prof. Ken Giller	Conference Hall
13:00-14:00	*LUNCH*		
14:00-15:30	Identification and planning of pilot activities 2012 required for start-up of N2Africa in 2013	Dr. Fen Beed	Conference Hall
15:30-16:00	*COFFEE BREAK*		
16:00-17:15	Concrete action plan and division of tasks	Dr. Fen Beed	Conference Hall
17:15-17:30	Thanks and closing		Conference Hall

Appendix B: List of participants and group photo

No	First name	Last name	Position	Organization	Town
1	Patrick	Ndakidemi	Professor	Nelson Mandela University	
2	Catherine	Madata	PARO	ARI-Uyole	
3	Hussein	Mansoor	Assistant Director Crop Research	MAFSC - Department of Research	
4	Projest Amos	Ikerra	Marketing manager	Minjingu Fertiliser Company	
5	Charlie	Riches	CCRP	McKnight Foundation	
6	Amsalu	Gebreselassie	Project Director	CRS	
7	Jeffrey	Lewis	Consultant	Korongo Ltd.	
8	Beatus	Malema	Assistant Director Crops	MAFSC - Crop Promotion Services	
9	Lembris	Laizer	Project Officer	CRS	
10	Harun	Murithi	APO	IITA	
11	Fen	Beed	Plant Pathologist	IITA	
12	Freddy	Baijukya	Project Leader	CIAT	
13	Happy	Daudi	Agricultural research Officer	Naliendele Research Institute	
14	Jean Claude	Rubyogo	Researcher – Seed systems, beans	CIAT	
15	Martin	Masan	Value chains legumes, USAID FtF funded	NAFAKA	
16	Bernadette	Majebelle	Baseline study grain legumes for USAID and BMGF	Consultant IITA	
17	Ken	Giller	Professor	Wageningen University	
18	Esther	Ronner	Research assistant N2Africa	Wageningen University	
19	Neema	Lazaro	Administration	IITA	
20	Maria	Chang'a	Accountant	IITA	

Left to right:

Lembris Laizer, Amos Projest, Patrick Ndakidemi, Freddy Baijukya, Harun Murithi, Amsalu Gebreselassi, Bernadette Majebelle, Catherine Madata, Fen Beed, Esther Ronner, Ken Giller, Happy Daudi, Hussein Mansoor, Jeffrey Lewis, Charlie Riches, Jean-Claude Rubyogo

Not on picture: Beatus Malema, Martin Mason

Appendix C: Synopsis Soya ni Pesa project CRS

SOYA NI PESA

USDA FOOD FOR PROGRESS

Project Synopsis

The Soya Ni Pesa (Soybeans are Money) project is an initiative to strengthen the soybean value chain in Tanzania's Southern Agricultural Growth Corridor (SAGCOT), by working with smallholder farmers and integrating them with markets, targeting especially the poultry industry. Implemented by Catholic Relief Services in conjunction with local Tanzanian partner organizations, the project will deliver inputs and training in production techniques, market information and business development to enable farmers to boost yields, add value and increase incomes through soybean cultivation. 11,250 farmers will receive orientation on soybean cultivation techniques, farm management, savings and lending, and will be linked to financial services providers and markets.

CRS Five Skills Approach

1. Group management skills
2. Internal savings and lending skills
3. Basic market skills
4. Innovation and experimentation skills
5. Sustainable production

The project is based on the promotion of fundamental skills sets that have been shown to be a common need among farmer groups in resource-poor settings. The Soya ni Pesa project will build these skills in a sequential, integrated manner that increases farmers' ability to engage with markets, harnesses group bargaining power, promotes innovation, and boosts resilience to market fluctuations and unpredictability. By stimulating production of a high-value crop, providing access to better market information, facilitating linkages with key stakeholders and buyers, and improving smallholder farmers' business skills, the project will lead to increased value-added agricultural production, more developed markets, increased incomes and greater food security for Tanzanians.

The project will take a phased approach to building seed systems, gradually increasing availability of quality seeds until reaching its target of 11,250 farmers by the end of the 4 year project. It will link soybean production with the expected growth of the poultry industry in Tanzania, by facilitating linkages between farmers and key poultry processors, who are expected to purchase approximately 11,000 MTs of soybean grain by year 4. It will include complementary activities to support egg production by women's groups, extending the linkages of the soybean value chain. The project will seek to integrate its activities with other agricultural development initiatives in the SAGCOT, including GOT, USAID, private sector, and other donor funded programs to ensure maximum impact and synergies.

The project will be implemented in Njombe, Songea, and Namtumbo districts.

Appendix D: Presentations

Ken Giller

Jean Claude Rubyogo

Happy Daudi

Hussein Mansoor

Catherine Matada

Jeffrey Lewis

N2Africa

www.N2Africa.org


Introduction to N2Africa

- 'Putting nitrogen fixation to work for smallholder farmers growing legume crops in Africa'
- Funds: Bill & Melinda Gates Foundation and Howard G. Buffet Foundation
- Research project led by Wageningen University; main partners IITA and CIAT-TSBF; many national partners
- Total funding US$22M - >90% to partners
- Originally eight countries in 2009
- Extension to Ethiopia, Tanzania, Uganda, Liberia and Sierra Leone

Main goal: increasing inputs from N_2-fixation

- Increase the area of land cropped with legumes (targeting of technologies)
- Increase legume productivity (agronomy, P-fertilizer)
- Select better legume varieties
- Select better rhizobium strains and inoculate
- Link to markets and create new enterprises to increase demand for legumes




N2Africa – target regions and legumes

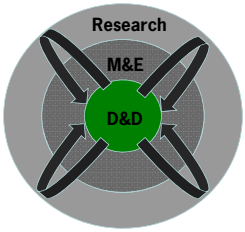
West Africa
- Cowpea, groundnut, soybean

East & Central Africa
- Common bean, groundnut, soybean

Southern Africa
- Common bean, groundnut, soybean

Throughout all regions
- Forage legumes

N2Africa is a development to research project



- Dissemination and development are the core
- Monitoring & evaluation provides the learning
- Research analyses and feeds back

N2Africa's approach

- Targeting of technologies:
  - From fields to farms and farming systems
  - From silver bullets to 'best fits'
- In each N2Africa country :
  - Demonstration trials with best-bet technologies
  - Dissemination: package of legume seeds, inoculants and BNF-technologies for farmers to test

Genotype × Environment × Management

$$(G_L \times G_R) \times E \times M$$

Where:
G_L = legume genotype
G_R = rhizobial strain
E = environment
- climate (temperature x rainfall x daylength etc) – to encompass length of growing season etc.
- soils (nutrient limitations, acidity and toxicities)

M = management
- agronomy – inoculation, seeding rates, plant density (row spacing etc.), weeding, P fertilizer
- (diseases and pests are also a function of G x E x M...)

Putting nitrogen fixation to work for smallholder farmers in Africa

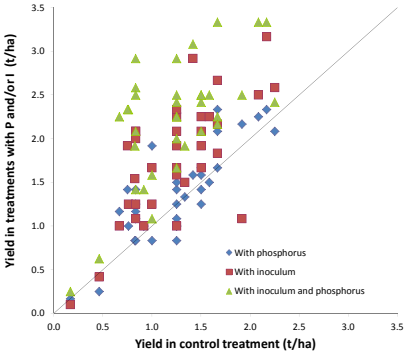
The need for good agronomy

Groundnut on a smallholder farmer's field in Malawi

Wide row-spacing means the crop uses less than half of the available radiation

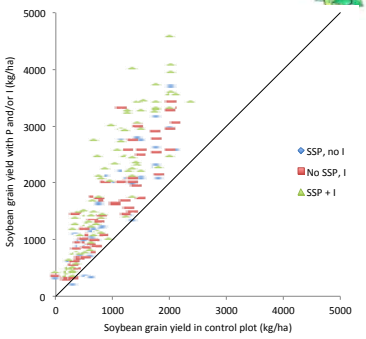
WAGENINGEN UNIVERSITY PLANT SCIENCES

Response to P and inoculation with soybean in DRC



N2Africa demonstration trial results in Mushomo, Sud Kivu, DRC 2010

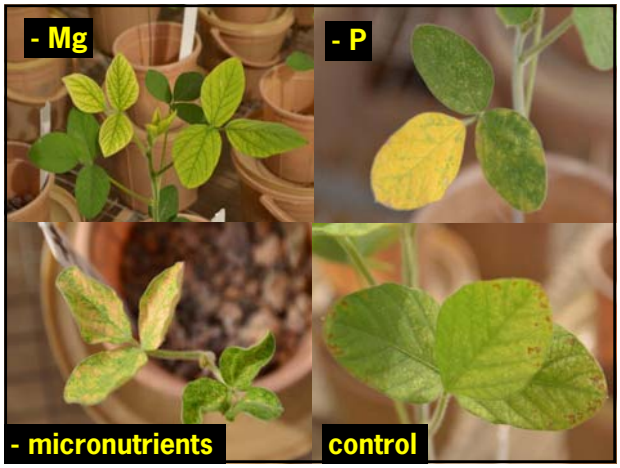
Soybean response to P and inoculation in Nigeria



N2Africa demonstration trial results in Ghana and Nigeria 2010

Problem: non- or poorly responsive soils

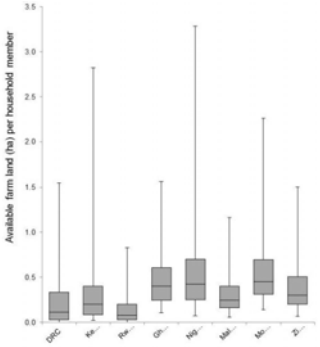
Double pot experiments - Nigeria



Successes after two years

- ($G_L \times G_R$) × E × M is key to significant yield increase and benefits on farms across all regions
- Often doubling or more of yields with groundnut, cowpea and common bean with small amounts of P
- With soybean clear interactions between small amounts of P fertilizer and inoculation (I) to demonstrate strong $P \times I$ interactions in the field – neither P or I alone is enough with soybean

Guided by farming systems analysis

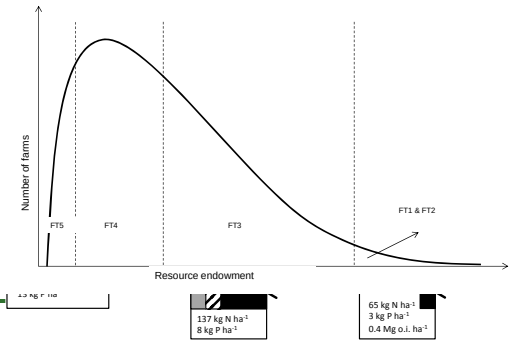


Putting nitrogen fixation to work for smallholder farmers in Africa

Zooming in, where will value chains work?

Putting nitrogen fixation to work for smallholder farmers in Africa

Farm types to explore options, example from Malawi



Climbing beans in DRC

Long rains season 2010 in Sud Kivu, DRC

Conclusions

1. Good ($G_L \times G_R$) key, but $E \times$ ***M*** overriding
2. Success depends on good technology *and* market linkages
3. Deploying science outputs at scale gives major learning on priorities and targeting
4. Need attention to non-responsive soils
5. Need better *ex ante* methods for advising policy and development agencies
6. Legume nitrogen fixation has a great role to play in African agriculture

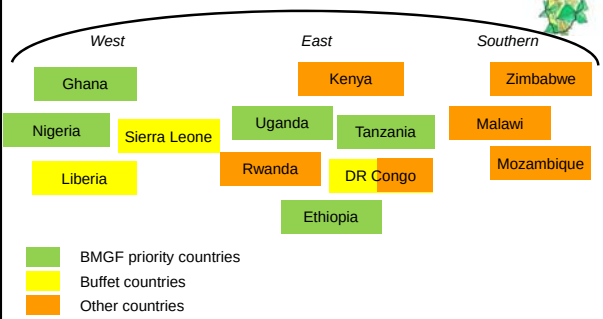
N2Africa
What's new for Phase 2?

Putting nitrogen fixation to work for smallholder farmers in Africa

Moving forward and starting afresh

- Federal structure
  - All expertise within countries
  - Common framework and tools
  - Coordination and support team
- Countries not on the BMGF priority list
  - Invested in building capacity (both human and physical)
  - Moderate funding from new BMGF grant
  - Actively seeking funding
- Much stronger role of NARES
- Increased attention to forages

Partner countries for N2Africa

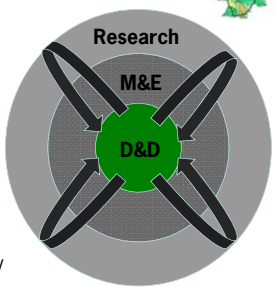


N2Africa in Ethiopia, Uganda and Tanzania

- Background reports written on past research and current activities (Esther Ronner)
- Exploratory visits
- Workshops held
  - with ILRI in Ethiopia, IITA in Uganda and Tanzania
- Plans developed – initial discussions with partners
- Co-funding through Dutch Embassies
- Initial seed multiplication, inoculation trials on chickpea
- Pilot grants for 2013?

Development to research and adaptation

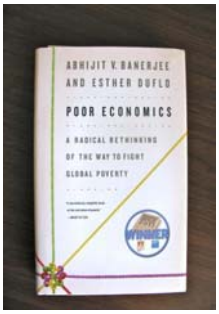
- Development through D&D at scale is the core
- M&E is provides the learning
- Research analyses and feeds back
- Farmers adapt and adopt



D&D = Dissemination and delivery
M&E = Monitoring and Evaluation

N2Africa as a large experiment

- Baseline information
- Use a randomised control trial approach
- Monitoring and Evaluation is key
- Analysis within and across countries
- Expanding to Ethiopia, Tanzania and Uganda



Increasing reach through partnerships

- Dissemination and input/output markets through partnerships
- No free seed!
  - Focus on sales of through small packs with inoculant
- New blends for non-responsive soils (Yara, MEA)

N2Africa as an experiment

- Use a randomised control trial (RCT) approach
  - Selection of locations
  - Selection of villages within locations
  - Farms within villages
  - …
- Lead with “D&D trial” approach
  - follow with agronomic experiments in feedback loops
  - Distributed mother & baby approach
- Strategic analysis of $(G_L \times G_R) \times E \times M$ across E
- Increased focus on local farmers’ adaptation

Putting nitrogen fixation to work for smallholder farmers in Africa

For updates see

www.N2Africa.org

Lots of video resource materials

N_2Africa Podcaster - Monthly Newsletter

Putting nitrogen fixation to work for smallholder farmers in Africa

Overview of Bean Research in Tanzania

Jean Claude Rubyogo

N2 Africa Workshop
Morogoro Tanzania
November 6-7th, 2011





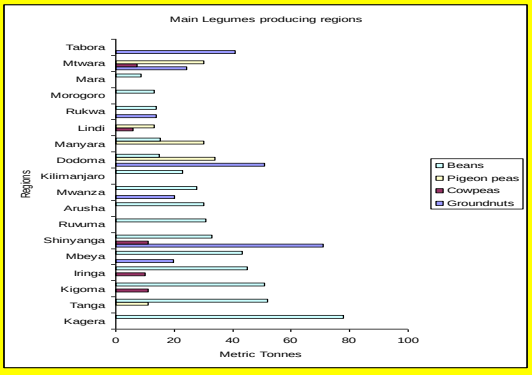


Importance of beans

- Per capita bean consumption is 19.3kg, contributing 16.9% protein and 7.3% calorie in human nutrition.
- It is a rich source of vitamin B, calcium, iron, zinc copper & magnesium and contains 18-30% protein.
- In Tanzania, beans account for 71% of leguminous protein in diets and 75% of areas under legumes .
- However average farm yield is lower about Kg 750/ha

Cont; Introduction

- To a larger extent, the crop is grown by smallholder farmers under quite diverse farming systems and agro-climatic conditions; both for household food requirements and income generation.



Major common bean production regions in Tanzania

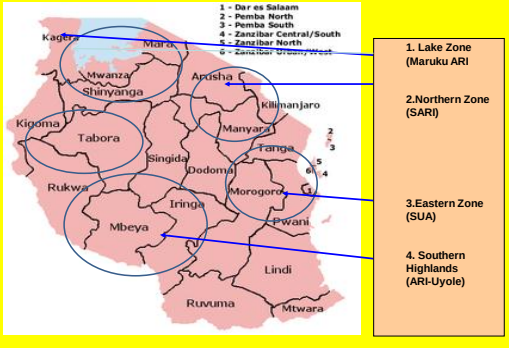
The highest concentrations are located in the:

- Northern zone (Kilimanjaro, Arusha, Manyara, Tanga regions)

-Southern Highlands zone (Mbeya, Ruvuma, Iringa, Rukwa regions)

-Lake zone (Kagera region).

Agricultural Reseach Institutes/instutions working on beans



National Bean Breeding

- Breeding (crosses/hybridization), Seed multiplication, nursery evaluations are done by Breeders at:
  - ➢Selian A.R.I (medium altitude zone)
  - ➢Uyole A.R.I (High altitude zone)
  - ➢Sokoine University (Low altitude zone)

Project Objective

- **To address nutrition and health, food security, market challenges and environmental stresses in order to contribute to improved livelihoods and create incomes of resource poor small holder families in Tanzania**

Specific Objective

- **Identify and develop opportunities, strategies and technologies to improve bean productivity and product quality in ways that contribute to more resilient and sustainable land use by resource poor farmers**

Major Themes

1. Approaches that contribute to more **resilient and sustainable agro-eco**systems
2. Improve **nutrition security** and **health** of vulnerable communities
3. Linking farmers to **equitable and sustainable markets**
4. **Reaching end users**
5. **Capacity building** and **knowledge management** for policy and advocacy

Current and future risks to bean production associated with major biotic stresses

Screening for disease and pest resistance/tolerance	**Bean Stem Maggot (BSM), Aphids**
	**BCMV, rust, CBB, Anthracnose and Angular Leaf Spot (ALS)**

Current and future risks to bean production associated with major abiotic stresses

Screening for tolerance to poor soils and drought	

Expanding the climbing technologies (varieties and staking techniques

Why Climbing beans?

- Rwanda has little arable land (0.1 ha / capita)
- Climbing beans **"extend"** land

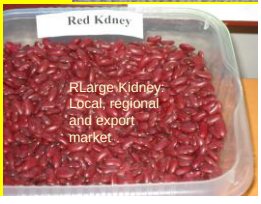
Land area ratio: 1 : 3

Market access for beans: Research and facilitation

Some marketable bean types

- Breeding for specific market

Navy beans: Export market (EU, Asia)



RLarge Kidney: Local, regional and export market

Breeding for Higher Iron and Zinc Content

Bean Genotypes with

- Initially above 70 ppm for Fe and 30 ppm for Zn
- Now some genotypes have above 90 ppm for Iron and 45 ppm for Zinc (being tested)

BEAN TYPES & MARKET PREFERENCES OF RELEASED VARIETIES

Type	Variety Name	Seed colour	Seed size
Bush	Lyamungu 85	red mottled	Large
Bush	Lyamungu 90	red mottled	Large
Bush	Selian 94	Pink Mottled	Medium
Bush	JESCA	purple speckled	Large
Bush	Selian 97	red	Large
Climber	Selian 05,	Khaki	Small
Climber	Selian 06	Purple	Medium
Climber	Cheupe	White	Medium
Bush	Kabanima	Calima	Large
Climber	Uyole 84	Cream,	small
Bush	Uyole 94	red striped on cream background	Large
Bush	Uyole 96	Dark Red	Large
Bush	Uyole 98	Orange	medium

Cont; BEAN TYPES & MARKET PREFERENCES OF RELEASED VARIETIES

Type	Variety Name	Seed colour	Seed size
Bush	Uyole 03	cream coloured mottled	Large
Bush	Uyole 04	cream	
Bush	BILFA	Cream	
Bush	Kablanketi		
Bush	Wanja	Khaki	
Bush	Njano	Orange	medium
Bush	Rojo,	Red	
Bush	Ushindi		
Bush	Pesa		
Bush	SUA 90		

Seed systms

Partnership relatively better developed at ARI Uyole and SARI –Northern Zone

- Farmers self help -groups
- Individual entrepreneurs
- NGOs/Church based
- ASA
- Use of small packs to disseminate faster

Integrated Soil Fertility Management (ISFM-) in Southern Highlands

ISFM (evaluation of levels of FYM + inorganic fertilizer or tolerant genotypes in acidic soil + inorganic fertilizer levels and Minjingu Rock phosphate):

5 ton FYM + 15 kgN + 30P205 (promising in various in agro-ecosystems) .

Other areas of interest

System integration

Cereal + beans systems

- Intercropping maize + beans (less aggressive climbing beans)
- Rice + beans (rotation- use of residual moisture for both early maturing dry beans and snap – *French* beans)
- Use of crop residues for livestock
- Labor saving tools

Donors partnership/Focus

Donors /Supporters	Focus
Government of Tanzania	Bean Sector Development
CIAT-PABRA-CIDA/SDC	Entire value chain
CIAT-TLII -BMGF	Breeding for drought and Seed systems
CIAT-McKnight Foundation	Climbing beans, Seed systems and Bruchids
Africa Rising	Systems Intensification (Northern Zone)
CRSP/DGP	Breeding SUA
AGRA	Breeding+ Soil health/N2 Fixation (SHT)

Groundnut varieties improvement for yield and adaptation, human health and nutrition
OILSEEDS DEPARTMENT

N2AFRICA WORKSHOP
6 and 7 November, 2012
Morogoro, Tanzania

Team members and Collaborators

- NARS Team members
- Dr. O. Mponda – ZRC, Head Oilseeds and Principal ORP Breeder
- Dr. E. Kafiriti- ZDRD, Principal ORP Agronomist
- Juma Mfaume Groundnut Breeder
- Happy Daudi - Sesame Breeder (On MSc studies)
- Joseph Nzunda- Agronomist
- Charles Mkandawile – PAFO – Breeding
- Joane Kasuga - ARO – Pathology
- R.O. Kapinga – PAFO , O/I Nachinngwea – Breeding
- Jackline Shayo – MSc student - SUA
- Collaborators
- ARI Hombolo, Makutopora, Ukiriguru, Ilonga
- Dr. E. Monyo- ICRISAT Malawi
- Dr. Nick Nathaniels - Dutch Management
- District Councils – Southern Zone, CZ, LZ
- NGOs – ROSDO-Masasi, Dutch Connection,
- Media – TBC, ITV, EATV, Mtukwao Radio, Radio Info-Mtwara

The major legumes projects taking place are

- 1. Tropical legumes 1 - concentrating on molecular breeding -drought and disease phenotyping
- 2. Tropical Legumes 2 - Concentrating on conventional breeding and seed systems -
- 3. McKnight Groundnut Breeding and aflatoxin Project - At Naiendele mainly developing new varities with resistance to foliar diseases and alatoxin awareness/mitigation
- 4. Bambara groundnut project at Naliendele - developing new varieties and agronomic practices and issues of value chain upgrading recipe development to increase utilisation

Groundnut breeding Objectives

- High yielding farmer and market-acceptable groundnut varieties with resistance to foliar/viral diseases and aflatoxin contamination developed
- Nutritional status, dietary diversity, human health and mycotoxin contamination problem spatially characterized
- Adoption rates of improved farmer and market-acceptable varieties and production technologies enhanced
- Capacity of partners for management of mycotoxins in food, variety development and enabling policy environment enhanced.
-

Project Key achievements/findings

- Reported under 4 Key themes:
  - Variety Development
  - Aflatoxin Research
  - Technology Exchange
  - Capacity Building

Variety Development:

- 12 local varieties were collected from groundnut producing areas
- 38 crosses introgressing new sources of, rust and GRD, drought resistance were produced during 2010/11 season also seed size, oil content
- F1 from these crosses are being advanced
- 300 genotypes Reference set evaluated for rust and GRD
- 132 varieties evaluated for yield and adaptability and farmer market traits
-

Identified promising varieties

High yielding and rust disease resistant -ICGV SM 0557, ICGV SM 06711 and CG-7, ICGV-SM 08573, ICGV-SM 08588, ICGV 08582,ICGV SM 06771 and ICGV-SM 94114, ICGV-SM 90092, ICGV-SM 06711, ICGV-SM 05616, 86-87/175 (b) and ICGV-SM 06711

- High yielding and rosette resistant
- **ICGV-SM 03516, ICGV-SM 01514** and **ICGV-SM 03517** , **ICGV-SM 96566, ICGV-SM 05558**
- **ICGV-SM 07520, ICGV-SM 07518, ICGV-SM 99568**

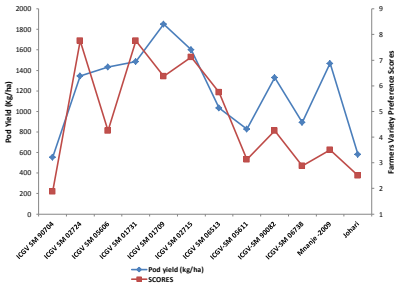
3 best Farmer and Market Preferred vars

	NALUWALE	NANYMBU	NAHWARA	NANGMBA	CHIKOWETI	LUATALA	Reasons
Preferred Varieties	ICGV-SM-99568 ICGV-SM-03513ICGV-SM-03521	ICGV SM-07533 -Valencia ICGV SM 99568 ICGV-SM-03521	ICGV-SM-99568 ICGV-SM-03513 ICGV-SM-03521	MANGAKA-2009 ICGV-SM-99568 ICGV-SM-03521	PENDO ICGV-SM-03521 ICGV-SM-99568	iCGV-SM-99568 ICGV-SM-03513ICGV-SM-03521	High yields, Big pod size Tolerant to disease Market preferred-Pendo

Participatory variety selection - Virginia

VARIETY	NANYUMBU	NAHAWARA	NANGOMBA	NAMOMBWE	NALUWALE	CHIKOWETI	LUANDA	Mean
ICGV SM 90704	480	700	300	600	700	800	300	554
ICGV SM 02724	800	2500	1120	1300	1400	1000	1300	1346
ICGV SM 05606	600	1400	1060	2200	1500	2000	1280	1434
ICGV SM 01731	560	1900	1020	2100	1500	2000	1320	1486
ICGV SM 01709	400	2900	1200	2600	1500	2400	1960	1851
ICGV SM 02715	600	2400	840	2400	1200	2500	1280	1603
ICGV SM 06513	200	2000	480	1300	900	2000	360	1034
ICGV-SM 05611	280	1000	440	1600	400	1600	480	829
ICGV-SM 90082	200	3700	800	1600	900	1400	720	1331
ICGV-SM 06738	240	1700	240	800	400	1600	1280	894
Mnanje -2009	680	2900	1080	1500	1400	2200	520	1469
Johari	600	600	240	500	400	1200	540	583
MEAN								1201
CV %								36.4
LSD								467
P=0.05								**

Pod yield vs Preference ratings

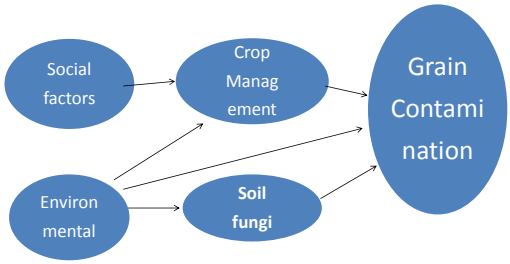


Technology dissemination

- 50 farmer research groups (FRG) 750hh established and they supply to their community 185t annually, - of which 40t variety *Pendo* (ICGMS 33) was sold to ASA.
- 5,080 kg of breeder seed for Pendo, Mnanje, Mangaka etc produced.
- 2 seed fairs organized in Nanyumbu and Tunduru
- 1 Farmer field days 5-7 May 2011 Nahawara, Nanyumbu
- Participated in Agricultural shows 8-8, World Food Day
- Radio 30 and 15 TV Programmes technology promotion

Aflatoxin studies

Model for understanding Risk of Contamination



Occurance and Distribution of Aflatoxin in Tanzania - Crops and number of samples collected

District	Number of gnut samples	Number of maize samples	Num of cassava samples	Total
Bahi	68	44	0	112
Bukombe	81	68	2	151
Nanyumbu	87	46	5	138
Total	236	158	7	401

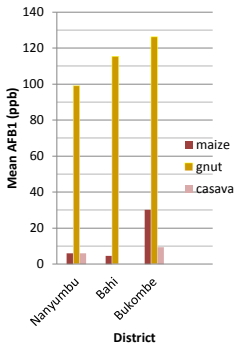
Mean AFB1 distribution by districts

Groundnuts seems to be the most contaminated in all districts

Contamination range for gnuts was from a min 0 - 2591ppb with a mean of 113 ppb

Maize also ranged from 0 - 466 and a mean of 118ppb

This reveals that households are exposed to levels above established safety limit of 20ppb



Distribution of aflatoxin contamination in farm samples

	% contamination by crop		
Contamination (ppb)	groundnut	maize	cassava
0-4	33.05	60	33.33
4.1 – 10	33.90	20	50
10.1 – 20	14.83	0	16.67
20.1 – 100	5.08	0	0
100	13.14	20	0

Approx 18% of all households consuming groundnuts in the target hh are exposed to levels beyond established safety

Approx 20% of maize consumed is similarly exposed.

Implications of Project findings

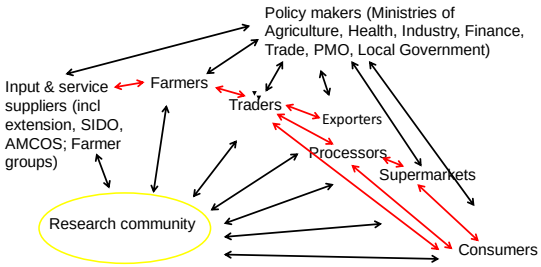
- AFB_1 contamination levels in food have been found to be a significant problem and is likely to indicate AFB_1 exposure to the public.
- Intervention work should target management strategies for reducing AFB_1 load in food
  - Low-cost measures like proper drying and storage on raised pallets, if done consistently, reduces AFB_1 in food – this is amenable to quick implementation as breeding progresses
- As genetic resistance is not absolute, improved varieties MUST be adopted alongside integrated aflatoxin management options to protect consumers.

Aflatoxin mitigation

- Farmers and traders need to be aware of what they are dealing with, in terms of the risk of aflatoxin to themselves, their families and customers as well as being involved in finding solutions.

Using a Value Chain Approach to Investigate Groundnut Marketing with Particular Emphasis on Aflatoxin Awareness and Control

Stakeholders in a Value Chain



Adapted from Homann-Kee Tui (2010) Training/Planning Workshop Report on Establishing Small Stock Innovation Platforms, Gaborone

Groundnut Export Value Chain

- Groundnuts exported mainly as shelled nuts.
- In 2008, Tanzania officially exported nearly 15,000 tonnes of shelled groundnuts.
- Tanzania was world's 9th largest exporter.
- **But** unit value was lowest of world's top 20 exporters.

Top 20 Groundnut Exporters, 2008

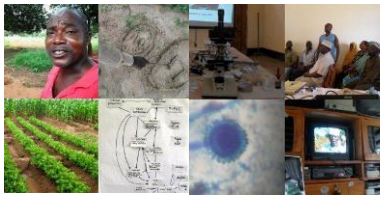
Rank	Country	Quantity (tonnes)	Value (1,000 US$)	Unit value (US$/tonne)
1	India	293,128	274,154	935
2	China	167,054	232,183	1,390
3	USA	216,936	198,593	915
4	Argentina	148,962	180,890	1,214
5	Netherlands	80,287	137,390	1,711
6	Nicaragua	77,973	90,058	1,155
7	Brazil	44,361	50,586	1,140
8	UAE	15,938	15,799	991
9	South Africa	10,202	15,027	1,473
10	Vietnam	14,300	13,700	958
11	Paraguay	9,230	9,778	1,059
12	Belgium	6,282	9,395	1,496
13	Gambia	18,000	8,200	456
14	Singapore	6,093	7,336	1,204
15	Australia	3,984	7,254	1,821
16	Bolivia	4,056	6,658	1,642
17	UR of Tanzania	14,817	6,280	424
18	Egypt	5,684	6,138	1,047
19	Spain	3,275	5,874	1,794
20	Uzbekistan	6,461	5,545	858

Source: FAOSTAT

Controlling Aflatoxin: Findings

- Exporters are only value chain actors aware of aflatoxin
- Producers may receive a lower price due to reputation of Tanzanian groundnuts being infected
- Higher costs incurred due to transport of mouldy kernels to Dar for sorting; chickens at risk
- Farmers store pods polypropylene sacks, which could increase aflatoxin level
- Many Dar-based agencies have expertise to advise on managing aflatoxin; unaware of NARI's work
- Tanzania has representative on new USDA Aflatoxin initiative to control aflatoxin in Africa.

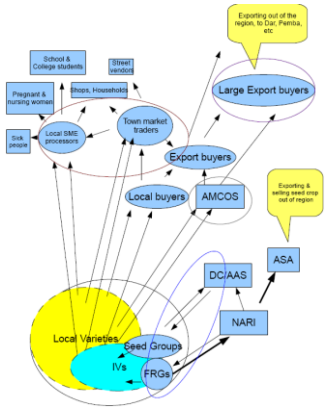
Innovative communication media and methods for more effective aflatoxin mitigation, variety uptake and use interventions in groundnut in Malawi and Tanzania 2010-11



Exploratory study
Mtwara, Tanzania

Objectives

To gain insight into how groundnut stakeholders interact now and identify opportunities for communication pilot media and processes for development and testing



successes

- Increased understanding of objectives of and connections between different groundnut value chain stakeholders that can help direct ICMM interventions for greater relevance and impact
- Initial positive experience of more participatory and innovative methods to develop informative face-to-face and radio-based communication intiatives
- Closer relationship with local media/radio organisations that will facilitate collaboration on production, testing and monitoring of responses to communication events.
- Increased appreciation of video as an complementary way to share responses of beneficiaries to project activities at project meetings.
- Experience with bringing together diverse stakeholders to debate and commit to action to advance the aflatoxin mitigation and promote improved groundnut varieties.

Capacity Building

- Athanas Minja training to MSc level at SUA on Groundnut pathology – McKnight Foundation CCRP
- Juma Mfaume trained to MSc level at SUA – Trained by TL II groundnut Breeding
- Happy Daudi – training to MSc level on Breeding by COSTECH
- Radio Debate on Aflatoxin awareness and mitigation and Improved varieties for better uptake
- Irrigation system under construction
- Aflatoxin disease survey
- Adoption survey –team training
- Agroclimatic Analysis
- Value chain analysis

Phase I varieties - Tanzania

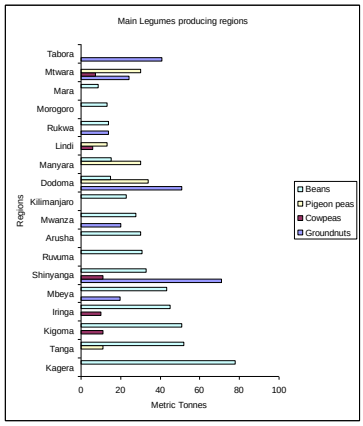
Presentation 4

Dr. Hussein Mansoor - MAFSC

Grain Legumes Strategy for Tanzania

Important grain legumes

- Beans
- Groundnuts
- Pigeonpeas
- Cowpeas
- Chickpeas
- Bambara groundnuts
- Greengram
- Soybeans



Legume production and demand statistics

Parameters	Crop				
	Beans	Chickpea	Cowpea	Groundnut	Pigeonpea
Average area (ha)	720,000	70,000	150,000	409,320	164,000
Average production (MT)	467,000	31,000	63,000	293,870	100,000
Average yield (current, kg/ha)	670	447	333	718	610
Average yield (2015, kg/ha)	1000	800	800	820	850
National demand (MT)	472,906	120,000	63,000	93,766	150,000
Expected growth of production / annum (%)	9	5-10	4.2	6.45	2.5
Proportion of production sold (%)	60	70	10	70	60

Legumes productivity and constraints

Crop	Constraints
Groundnuts	Diseases: Leaf spots-ELS, LLS, Rust, Rosette Aflatoxin, drought, seed, market, value addition
Pigeon peas	Disease: Fusarium wilt; insect-pest, seed, market, value addition
Cowpeas	Disease/insects, drought, market, value addition
Soybean	Disease/insect-pest, seed, market, value addition
Chickpea	Disease: Fusarium wilt, Dry root rot, Ascochyta blight, , seed, market, value addition
Beans	Diseases, insect-pests, Seeds, chemicals, poor soil fertility

Dominant varieties

Beans	**Chickpea**	**Cowpea**	**Groundnut**	**Pigeonpea**
Lyamungu 85 & 90 (red mottled), Uyole 96 (DRK), Uyole 98 (orange), Kablanketi (local landrace) and several yellow varieties.	Farmers local variety (*Dengumawe*), and newly introduced lines (ICCVs 97105, 00108, 00305, and 92318)	Fahari (TVx 1948-01F), Vuli 1, & Vuli 2 (IT82D-889), Tumaini, IT85F-2020 and IT18	Pendo, Nyota, Johari Red Mwitunde Natal common, Dodoma bold and Farmer's local varieties New varieties becoming popular: Mangaka 2009, Mnanje 2009	ICEAP 00040, ICEAP 00053 and late maturing local land races

Socio-economic constraints

- Poor access to input and output markets;
- Limited access to seed of improved varieties and other agricultural inputs,
- Limited access to extension information and a general lack of market information.
- Export markets especially for groundnuts have been greatly constrained by stringent aflatoxin standards set by importing countries.
- High transaction costs due to collection from a large no of smallholder farmers resulting in grain of mixed quality leading to low prices

Organization constraints

- Poor product grading and standardization;
- inadequate market infrastructure;
- Unstructured markets of inputs and outputs; and
- poor land tenure system that is not supportive of farmers use of land to borrow finances for development.

Strategic partners

Partner	Role
DRD – Department of Research and Development Ministry of Agric and Food Security	Variety development, evaluation and release. Production of breeder and foundation seed
ICRISAT, IITA, CIAT, Purdue University	Provide improved legume germplasm/breeding populations. Capacity building through training. Research on effective methods for technology dissemination. Provide testing bags control of bruchids/weevils –Traders, farmers
Farmer Cooperatives Mangaka Primary society/AMCOS Farmer research groups	Seed production and dissemination
NGOs (Dioceses, CARE, World Vision, CRS, Africare, WVI), KMAS, Dutch Connection, ROSDO, District Councils	Facilitate introduction new varieties, development legumes market value chain, resource contribution, Informal seed production and dissemination of proven technologies
SMEs – groundnut processors • Mikindani Womens Group • Bantu Food Processing and Olinore • Makukwa Enterprises	Processing and commercialization of seed and products
Farmers	End-users of technologies in terms of high yielding varieties, management practices
TOSCI – Tanzania Official Seed Certification Institute	Variety release, seed certification services and quality control
ASA – Agricultural Seed Agency	Seed systems support, helping Collaborating NGOs and CBOs with Quality seed production/ monitoring
Department of Agricultural Extension Services	Provision of guidance in crop production technologies and associated packages
OLAM Tanzania Ltd Export Trading Cereals and Mixed Produce Board	Capacity to distribute seeds and contract farmers, Aflatoxin awareness, Marketing, Grades and standards, contract growing
Media TBC, ITV, Star TV Local radio FM	Capacity to create awareness and publicize improved seeds and technologies, grades and standards

Capacity building needs (staff, infrastructure):

- Infrastructure for seed increase & storage, technology dissemination,
- Trainings on production technology, seed production and seed storage
- MSc and PhD level training of scientists and technicians involved in legumes improvement,
- Loan accessibility capacity building for progressive farmers FRG, PMG, SME, output/input marketing companies and
- MoA staff involved in technology dissemination
- Business planning and marketing training MoA staff and legumes entrepreneurs
- Legume product grading and standardization for cooperative officers, extension officers, farmers, processors, vendors
- Contracting/Price negotiation skills and establishment of price negotiation fora
- Policy briefs training for researchers and extension

Processing & storage requirements / Market opportunities

- Development of bulk production clusters to attract private investment in setting up of processing factories
- There is a need to improve seed storage infrastructure due to the extensive damage caused by seed weevils (bruchid).
- Large-scale cleaning and grading facilities to improve the grain quality,
- Eefficient storage system to avoid distress sales.
- Establishment of warehouse facilities to attract credit based on assured repaying capacity
- Linking producing communities with markets in distant locations is desirable.

Mechanization as it relates to timely planting/harvesting and processing

- Deep ploughing during summer helps for soil inversion and destroys hibernating insects.
- Strippers, Shellers, and Dehullers are needed to process the grain for local and regional markets and value addition.
- For some legumes such as soybean and groundnut, availability of oil pressers would be desirable to start small-scale businesses by household, particularly women.

Environmental / sustainability issues:

- Legumes improves soil fertility and thereby less dependence on in-organic fertilizers.
- Resistant varieties to biotic and abiotic stresses will enhance optimal use of natural resources and avoid indiscriminate use of pesticides

M&E

- Baseline study for which project progress can be gauged;
- Monitoring visits during the cropping season;
- Farmer-scientist interactions during project monitoring;
- Annual in-country review and planning meetings;
- Regional planning and reporting workshops;
- Adoption and diffusion studies.

Perspectives for phase 2

- Tanzania has an especially wide range in agro-ecologies under legumes production.
- Six of the eight major agro-ecologies found in Tanzania
- Naliendele (Mtwara), UKiriguru (Mwanza), Ilonga (Kilosa), and Selian (Arusha) Agricultural Research Institutes are the key Legumes Research Coordinating Centres and has well motivated scientists,
- Irrigation system under support of TL1-TLII and the government is being improved for water supply.
- Released 9 varieties during phase I and now need bulking and fast tracking its availability to farmers
- Superior legumes germplasm identified in phase I need to be further evaluated for release.

Presentation 5 – Dr. Catherine S. Madata, ARI-Uyole

BEANS and SOYABEAN

Improvement in Southern Highlands of Tanzania

(A) COMMON BEANS-(Problems: disease, insects, markets and strong farmers, traders and consumer preferences)

Improvement of three classes for specific markets.

(a) Kablanket (Soya)

This class is very important in local and urban markets in Tanzania five (5) parents used in combination of three (3) parents per population.

Progress (2011/2012 Season)

- Currently at F5 Generation
- Early generation yield trials conducted at Uyole and Mitahulo in 2012
- Preliminary yield trials for selected lines at 7 nsites
- 2 best lines have been included in on -farm trials in Mbeya, Rukwa , Iringa and Ruvuma regions.

(b) Large white (LW) are common in rukwa region and Mbozi; have good market in Zambia

Four (4) parents used in combination of 3 parents per population

Progress (2011/2012 Season)

- Currently at F5 generation
- Early generation yield trial conducted at Uyole, Mhimba , Milundikwa and Mitahula
- On farm trials in Mbozi, Rungwe , Nkansi and Sumbawanga

2012/13 SEASON

- Advanced yield at Trials at 7 sites
- Best lines included in on - farm trials and Mbeya , Iringa , Rukwa and Ruvuma regions

(B) SOYABEANS

Problems Rust, Bacterial Blight viruses, Insect Pests, Target disease is rust

Multiple cross made in combination of 2-3 parents per population

Progress 2011/12 Season

- 7-10 trials planted at six sub-stations
- 15 trials planted at Uyole
- On- farm trials planted at

2012/2013 Season

- Trials at 7 sites
- On - Farm trials in Mbeya , Iringa , Njombe , Rukwa and Ruvuma regions

(C) Promotional and Seed increase

2 varieties each for beans and 0.5 kg Soyabeans planted at every on farm trial sites

(D) Seed related activities

(E) Plans for Dus and NPT

Stakeholders: Extension , NGOs, CARITAS/CRS farmersResearch and Others, Government of Tanzania (General)

Funding: McKnight (Beans), AGRA (Soya)

AGRICULTURAL PARTNERSHIPS IN TANZANIA

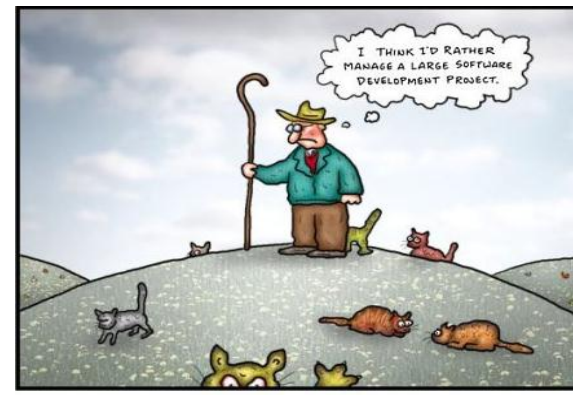
"Business as Unusual"

WHY BUSINESS AS UNUSUAL?

- **Because, despite great potential, good policies and massive investment, existing systems have not worked as well as they could**
- **Insufficient trust, goodwill and communication to pull the different actors together**
- **Everyone works in their own 'box"**

PUBLIC-PRIVATE PARTNERSHIPS

- **Require shared objectives**
- **Need each partner to forego specific short-term interests for the long-term benefits**
- **Risk creating a Personal and Political Preferences type of PP**
- **Require the coordination skills for herding cats**



The daydreams of cat herders

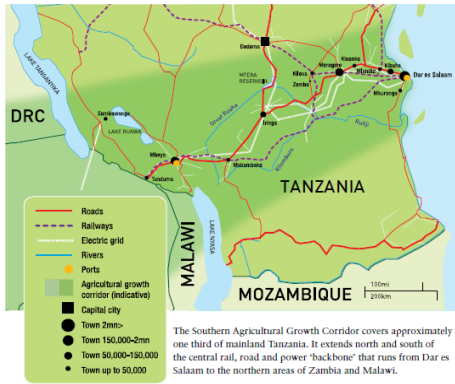
SOFT ACTIONS

- **Helping partners feel comfortable outside their usual comfort zones**
- **Providing an open, reliable, 'sector neutral' framework within which to work**
- **Recognizing different incentives for different actors to take part**
- **Show benefits of cooperation, collaboration and coordination**
- **Just because it can't be counted does not mean it does not count**

AGRICULTURAL PARTNERSHIPS IN TANZANIA

- **ASDP has Private Sector Development component – has not been effectively implemented**
- **Agricultural private sector poorly organised**
- **TANZANIA AGRICULTURAL PARTNERSHIP developed under ACT**
- **COMMODITY INVESTMENT PLANS as part of DADPs**
- **SAGCOT**

THE SAGCOT AREA

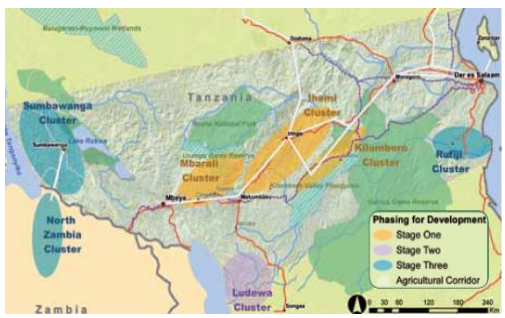


The Southern Agricultural Growth Corridor covers approximately one third of mainland Tanzania. It extends north and south of the central rail, road and power 'backbone' that runs from Dar es Salaam to the northern areas of Zambia and Malawi.

THE SAGCOT STRATEGY

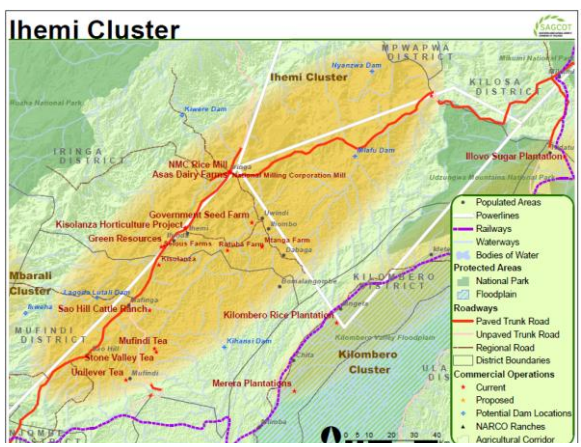
- **Focus on high potential opportunities linked to the infrastructure 'spine'**
- **A critical mass of commercial small-scale and large-scale agriculture**
- **Improvements throughout selected value chains**
- **Facilitate a range of different appropriate financial mechanisms**

SAGCOT CLUSTER AREAS



THE SAGCOT TARGETS FOR 2030

- **680,000 MT of field crops - maize, soya and wheat**
- **630,000 MT of rice**
- **4.4 million MT of sugar cane**
- **3,500 MT of red meat**
- **32,000 MT of high value fruit and vegetables**



POSSIBLE N2 SOYA PARTNERS

Public Sector	Private Sector, NGOs, Farmers' Organisations and Partnerships	Commercial Operators
• **Ministry of Agriculture, Food Security and Cooperatives** • **Ministry of Trade and Industry** • **RUBADA** • **SIDO** • **Sokoine University of Agriculture, Nelson Mandela** • **International Research Organisations** - **CGIAR, IIATA, ILRI, IFDC..**	• **SAGCOT** • **Catholic Relief Services** • **Technoserve** • **RUDI** • **MVIWATA** • **ANSAF** • **Tanzania Agricultural Partnership** • **Agricultural Council of Tanzania** • **Tanzania Chamber of Commerce Industry and Agriculture**	• **Small-scale farmers** - Farmers' Groups, Outgrowers, Contract Farmers • **Large-scale farms** -Selous Farming, SAO Hill Agriculture, Kisolanza, KPL, Rutuba.. .. • **Traders and Millers** -Power Foods, Mt Meru, ETL, METL.... • **Input Companies** -SEEDCO, Syngetna, Pannar, YARA, MEA. Minjingu...

SAGCOT LESSONS SO FAR

- **Organisations find Business as Unusual very difficult**
- **Donors can't take short cuts**
- **Partner 'loyality' is uncertain**
- **Progress with concept even if the institution and financial arrangements are not ready**
- **Start with vision, but get progress in the field**
- **It is essential to Manage Expectations**

THANK YOU

List of project reports

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

34. Facilitating large-scale dissemination of Biological Nitrogen Fixation
35. Dissemination tools produced
36. Linking legume farmers to markets
37. The role of AGRA and other partners in the project defined and co-funding/financing options for scale-up of inoculum (banks, AGRA, industry) identified
38. Progress Towards Achieving the Vision of Success of N2Africa
39. Quantifying the impact of the N2Africa project on Biological Nitrogen Fixation
40. Training agro-dealers in accessing, managing and distributing information on inoculant use
41. Opportunities for N2Africa in Ethiopia
42. N2Africa Project Progress Report Month 30
43. Review & Planning meeting Zimbabwe
44. Howard G. Buffett Foundation – N2Africa June 2012 Interim Report
45. Number of Extension Events Organized per Season per Country
46. N2Africa narrative reports Month 30
47. Background information on agronomy, farming systems and ongoing projects on grain legumes in Uganda
48. Opportunities for N2Africa in Tanzania

Partners involved in the N2Africa project

Caritas Rwanda

Diobass

Eglise Presbyterienne Rwanda

Nairobi University

Resource Projects-Kenya

Université Catholique de Bukavu

University of Zimbabwe