



**Background information on
agronomy, farming systems
and ongoing projects on grain
legumes in Tanzania**

Milestone reference number: S 1.2.2

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Submission date: July 2013

N2Africa

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



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

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Ronner, E. and Giller, K.E. 2012. Background information on agronomy, farming systems and ongoing projects on grain legumes in Tanzania, www.N2Africa.org, 33 pp.



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Acknowledgements

We would like to thank Dr. Jeffrey Lewis (Korongo Ltd.), Dr. Omari Mponda (Naliendele Agricultural Research Institute), Dr. Charlie Riches (McKnight Foundation), Mr. Beatus Malema (MAFSC, Crop Promotion Services), Dr. Hussein Mansoor (MAFSC, Crop Research) and Mr. Alford Siza Mpanda (Lindi & Mtwara Agribusiness Support (LIMAS)) for providing useful background information for this report.



1. Introduction

As part of a supplementary grant received from the Bill & Melinda Gates Foundation, N2Africa is exploring the opportunities for extension of the project to Ethiopia, Uganda and Tanzania. For each of these countries, relevant background information on the importance of grain legumes, past research on legume agronomy and farming systems, as well as ongoing projects around grain legumes is gathered. This will increase N2Africa's relevance by building on key issues raised from these previous experiences. The activity falls under Milestones S 1.2.1 – 1.2.3: Prepare review and background of previous relevant agronomic, farming systems and market research in each country. This report provides background information for Tanzania.

The report starts with general information on economy, poverty and malnutrition in Tanzania in Chapter 2, followed by statistics on production and import of grain legumes in Chapter 3. Chapter 4 presents a characterization of Tanzania's agriculture, including agro-ecology, farming systems and market access. More detailed information on relevant grain legumes in Tanzania (common bean, soyabean, groundnut and cowpea) and results of previous research on these crops is given in Chapter 5. Chapter 6 lists ongoing projects around grain legumes in Tanzania.

2. General characteristics

Tanzania's population is about 46 million and the total GDP is just over 20 billion USD (Table 1). This is lower than Kenya's GDP, despite Tanzania's larger population size. Gross net income per capita is also lower than in Kenya (but higher than in Uganda), and of the three countries presented Tanzania has the highest share of its population living below the poverty line.

Table 1: Selected development indicators

	Tanzania	Kenya	Uganda	Source
Population (thousands)	46 219	38 765	34 509	UNDP
Gross net income (US\$ per capita, PPP)	1360	1 580	1 190	Worldbank
Population below poverty line ¹ (%)	33	20	25	Worldbank
GDP (billion US\$)	21.4	34.5	16.0	Worldbank
Agriculture (%GDP)	29	21	25	Worldbank
Children under 5 (thousands)	7,566	6 540	6 182	UNICEF (2009)
Stunting prevalence (%)	44	35	39	UNICEF (2009)
Children stunted (thousands)	3,359	2 269	2 355	UNICEF (2009)
Underweight prevalence (%)	17	21	16	UNICEF (2009)
Wasting prevalence (%)	4	6	6	UNICEF (2009)
Children under 5 mortality rate (per 1000)	108	85	128	Worldbank
Women with low BMI (%)	10	12	12	UNICEF (2009)

Tanzania strongly relies on the agricultural sector. This sector represents 30% of the total GDP of the country and about 75% of the poor are dependent on agriculture (Mnenwa and Maliti, 2010; Rowhani et al., 2011). The sector is especially important among rural women: 90% of economically active women are engaged in agriculture (SAGCOT, 2011). Malnutrition and underweight are present in all three countries and percentages for stunting, underweight, wasting and women with low BMI are comparable. The mortality rate among children under the age of 5 is relatively high in Tanzania, but even higher in Uganda.

¹ Poverty line defined as people living on less than US\$ 1.25 PPP per day.



3. Production and import of grain legumes

Common beans are the most widely grown grain legumes in Tanzania, and the country ranks 7th in global bean production. Some 13% of the grain legume production in Tanzania is for export, with pigeonpea, exported largely to India, constituting a large part of the export volume. Common bean, groundnut and soyabean follow with smaller proportions (Table 2).

Table 2: Production, area cultivated, yield/ha and import of main grain legumes in Tanzania in 2009

	Production (Mt)	Area cultivated (ha)	Yield (t/ha)	Import (t) in 2007
Beans	949 000	1 267 000	0.7	2 000
Soyabean	4 000	11 000	0.4	4 000
Cowpea	70 000	158 000	0.4	nd
Groundnut	385 000	535 000	0.7	7 000
Chickpea	38 000	82 000	0.5	nd
Pigeonpea	38 000	52 000	0.7	nd
Total	1 484 000	2 105 000		
Ranking of producers in the world	Beans 7 th Cowpea 11 th Groundnut 13 th Chickpea 13 th			

nd: no data

Source: FAOSTAT, 2011

Tanzania is also a large producer of groundnut, cowpea, chickpea and pigeonpea. The area cultivated with each of the legumes is proportional to production, although the area under production has increased more rapidly than yield in the period 1985-2007 for all legumes. Areas cultivated with groundnut and common bean increased at 8.0 and 5.5% annually, and soyabean with an average of 1.4% per year. Cowpea showed a small decrease of 0.4% (ICRISAT, 2011).

Yields for all selected grain legumes are poor and far below potential yields (e.g. between 1.5 to 3 t/ha for common bean (Hillocks et al., 2006)). Import of grain legumes is marginal and only data for groundnut, soyabean and beans are known. In general, 13% of the grain legume production in Tanzania is for export, with pigeonpea and chickpea constituting a large part of the export volume. Common bean, groundnut and soyabean follow with smaller proportions exported (ICRISAT, 2011). An estimated 80% of the bean export is destined to the Netherlands. This is largely seed of white-seeded French bean varieties produced by (Dutch) seed companies for the European market. Formal and informal trade of beans also takes place along the borders with Kenya, Uganda, Malawi and Zambia (Lewis et al., 2008).



4. Characteristics Tanzania

4.1 Rainfall and agro-ecology

Tanzania's agro-ecological zones range from warm to cool and from (semi-)arid to subhumid tropics. Annual rainfall in Tanzania averages between 200 and 1000 mm. Northern and eastern Tanzania have a long rainy season (Masika) from March to May and a short rainy season (Vuli) from October to December (Figure 1).



Figure 1: Rainfall regimes in Tanzania

Source: (USDA, 2003)

In the long rains, planting starts in February/ March, and harvest is in July/ August. During the short rainy season planting is around November and harvest in January/ February. Southern Tanzania has a unimodal rainfall regime, with rains from December to April. Planting takes place around November, and harvest is from June to July (USDA, 2003). The central part of Tanzania is arid, with annual rainfall of less than 400 mm, and forms the transition zone between the two rainfall regimes. The highest rainfall is found in the highlands and the north eastern and south western part of the country (Figure 2).



Figure 2: Precipitation Tanzania

Source: World Trade Press (2012b)

Soils around Arusha, Kilimanjaro and the south west highlands are volcanic and of high agricultural potential. Light sandy soils predominate along the coast, while the mid-west (Mwanza and Tabora) has poor soils of granite/gneiss origin. The arid, central plateau has red soils, and the far west (Kagera, Kigoma and Sumbawanga) is dominated by poor and acidic ironstone soils, which could be productive with e.g. mulch and manure. Black vertisols are widespread throughout the country (Sarwatt and Mollel, 2000). Areas of deep acid oxisols are found in the south west around Mbeya.

4.2 Farming systems

Maize production is the most important agricultural activity in Tanzania. Other cereals cultivated are rice, sorghum, millet and wheat (Rowhani et al., 2011). Mnenwa and Maliti (2010) describe ten farming systems in Tanzania:



- The banana/ coffee/ horticulture system is found around Kilimanjaro, Arusha, Kigoma, Kagere and Mbeya. These areas are characterized by fertile, volcanic soils, but land is scarce. Dominant crops: tree crops, banana, coffee, horticulture, maize.
- Maize/ legumes. This system is found in many regions in Tanzania, from north to south and from east to west. Maize is intercropped with beans, groundnut or other legumes. Arabica coffee is also grown in this system, and shifting cultivation is practiced.
- The cashew/ coconut/ cassava system is practiced along the Tanzanian coast, in areas with low rainfall and low soil fertility. Crops are grown in a shifting cultivation system.
- Rice/ sugar cane, cultivated in alluvial river valleys.
- The sorghum, pearl millet, livestock system is found in the area south of Lake Victoria, where high population pressure and declining soil fertility are problematic. Crops grown are sorghum, pearl millet, maize, cotton, oilseeds and rice.
- Tea, maize, pyrethrum are grown in the Iringa region on loamy and volcanic soils. Main crops are tea, maize, Irish potatoes, beans, wheat, pyrethrum, wattle trees and sunflower.
- Cotton, maize. This system is mainly found in Northern Tanzania, but also along the coast and in Mbeya. Cotton, sweet potatoes, maize, sorghum and groundnuts are grown in intensive farming, and integrated with livestock.
- Horticulture is practiced in Lushoto district and Tanga, Morogoro and Iringa region. A range of vegetables (e.g. cabbages, tomatoes, sweet pepper) and fruits is grown, together with maize, coffee, tea and beans. These regions are characterized by volcanic soils.
- Wet rice and irrigated agriculture is found in river valleys and alluvial plains across Tanzania, on alluvial soils suitable for rice cultivation (see also Sakane (2011)).
- (Agro-) pastoralism is dominant in the semi-arid areas of Tanzania. Livestock is sometimes combined with simple cropping systems, or shifting cultivation of sorghum and millet. Population densities are moderate, but resources are limited and rainfall is variable.

The cashew/ coconut/ cassava as well as the sorghum/ millet and the (agro-)pastoralist systems are dominated by poor farmers. The banana/ coffee, the horticulture, the wet rice and the tea/ maize/ pyrethrum systems consist of a higher number of richer farmers. In these systems, use of inputs is also higher, with e.g. more people making use of extension services and applying fertilizers (Mnenwa and Maliti, 2010). Due to Worldbank supported subsidies, fertilizer use has increased over the past years, and 40 to 50% of farmers in Tanzania reported to use chemical fertilizers (J. Lewis, personal communication). About one quarter of the farmers uses draft animals. The area under irrigation in Tanzania is estimated to be only 1% of the total cropped area, involving 250,000 to 300,000 farmers. The area increased from about 265,000 ha in 2006 to about 332,000 ha in 2010. The Tanzanian government (through its Agricultural Sector Development Plan) as well as international donors (e.g. Worldbank, IFAD) are investing heavily in irrigation (Therkildsen, 2011).

4.3 Population density and market access

The highest population densities in Tanzania are found in Northern Tanzania, around Lake Victoria and Arusha (Figure 3). The region around Mbeya in the South West, along the border with Zambia, also has a relatively high population density, whereas the central part of the country is more sparsely populated.



Figure 3: Population density Tanzania

Source: World Trade Press (2012a)

Input markets of agricultural products are reasonably developed on the wholesale side, but local level stockists often have limited knowledge and are not well able to advise their clients (Lewis et al., 2008). Agro-chemical and fertilizer are mainly imported, although Minjingu Rock Phosphate has rapidly increased its production of rock phosphate. Seed companies are clustered in Northern Tanzania and Mbeya, whereas other parts of the country have limited access to improved seeds.

Farmers' organisations are often weak, and have poor links with local input suppliers, although initiatives are undertaken to strengthen their capacity and business-orientation. Market information has become more widely accessible through the widespread use of mobile phones. An IFAD funded project encouraged the use of mobile phones and internet in information sharing for instance (*ibid*).

An overview of the bean value chain is presented in Appendix 1.



5. Grain legume production in Tanzania

More than half of the Tanzanian farmers grows legumes (Stahley et al., 2012). Pulses occupy about 10% of the land under cultivation of annual crop in Tanzania, and oil crops another 10%, of which half consists of groundnut (NBS, 2012). Legume yields are generally poor. The main reasons include lack of seed and poor seed quality (only 10% of the area under pulses and 5% under oil crops is planted with improved seed (NBS, 2012)), susceptibility to pests and diseases (e.g. *Alectra vogelii*, a semi-parasitic weed) of local landraces, drought, low soil fertility with serious constraints of N, P and K, soil acidity and poor crop management (Hillocks et al., 2006; Ndakidemi et al., 2006). On average, Tanzanian farmers use only 9 kg/ha of fertilizer per hectare (SAGCOT, 2011). Due to high global fertilizer costs and handling costs in Tanzanian ports, farmers pay very high prices for fertilizers. In 2008, improved subsidy targeting, delivery systems with vouchers and improved operational procedures were on the government's agenda (Lewis et al., 2008). Soils are often acidic, and although there are sources of lime at Tanga and Makumbako, liming is not widely practiced (J. Lewis, personal communication). In addition, the level of mechanization is very low (Ministry of Agriculture Food Security and Cooperatives, 2010). Furthermore, farmers often get low prices for their produce: transactions costs are high due to the collection from a large number of smallholder farmers (and low level of organization among farmers), resulting in grain of mixed quality.

5.1 Common bean

Beans are the major grain legume cultivated in Tanzania, mostly intercropped with maize or with permanent crops such as banana or coffee (NBS, 2012). The main bean growing areas are in the north (around Arusha), the Great Lakes region and the Southern Highlands, where rainfall is reliable and temperatures are moderate. Bean leaves are consumed as well, and this also forms an important consideration for the selection of varieties cultivated (Hillocks et al., 2006). Beans are often cultivated by smallholder farmers for food consumption, without the use of fertilizers (Ndakidemi et al., 2006). A quarter to one third of the households sells beans. In Iringa, Kilimanjaro and Arusha regions, commercial bean production for export takes place, as the climate is suitable and there is access to an international airport (Hillocks et al., 2006; Lewis et al., 2008; Stahley et al., 2012). Sole crops of beans are common in this region. The most important bean marketing flows are presented in Figure 4.

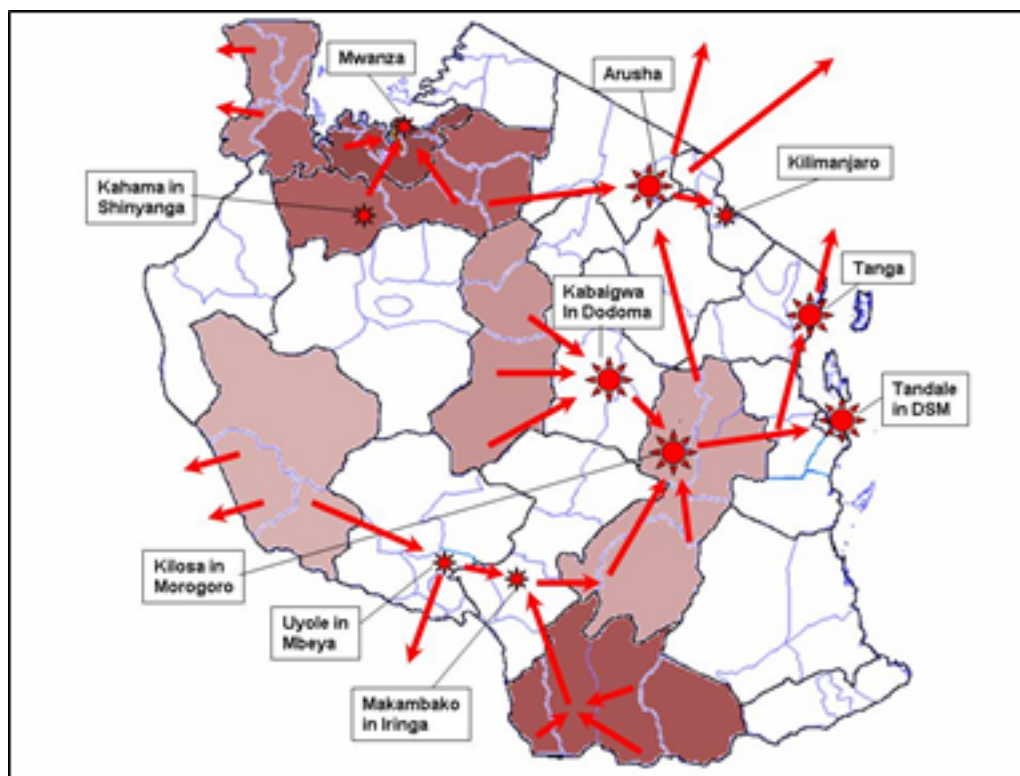


Figure 4: Bean marketing flows in Tanzania

Source: Lewis et al. (2008)

A constraint for cultivation of beans is the lack of seed. Pests and diseases are also a major problem. Major pests in Tanzania include the bean stem fly, the chrysomelid beetle, aphids (during dry spells) pod borers (*Maruca vitrata* and *Helicoverpa armigera*) and bean bruchids in stored beans (Hillocks et al., 2006). The most important bean diseases in Tanzania are angular leaf spot, halo blight, rust and Bean common mosaic virus (BCMV). A number of BCMV resistant climbing bean varieties has been introduced through a project on climbing beans under the CCRP of the McKnight Foundation (Makumba et al., 2012). In the past, the Bean Improvement for Low Fertility Soils in Africa (BILFA) focused on genetic improvement of beans for low soil N, low P and low pH conditions (Wortmann et al., no date). Through CIAT's Bean Programme disease resistant, higher yielding varieties were introduced as well (CIAT, 2010).

Amijee and Giller (1998) showed that root nodulation of common bean in the northern highlands of Tanzania was strongly determined by availability of P. On-farm trials with rhizobial inoculation and N and P fertilizer in Tanzania showed that yields of common bean increased with inoculation and application of 30 kg N/ha or 26 kg P/ha. The largest increase was obtained by a combination of inoculation and P-fertilizer, where grain yields doubled compared to the unfertilized, uninoculated control (Ndakidemi et al., 2006). An earlier study conducted in the Usambara Mountains in northern Tanzania also showed a strong response to 26 kg/ha of P fertilizer, increasing the percentage of N₂ fixed by biological N₂-fixation from 25-27% to 48-51% (Giller et al., 1998). Grain yields also increased significantly with application of P fertilizer. The combination of inoculation and P fertilizer marginally increased N₂-fixation compared to P fertilizer only. At one site, Kilacha, close to Mt Kilimanjaro the number of rhizobia in the soil was very small and inoculation increased nodule number strongly, though the increase in total N accumulation and grain yield was small. Although there was no significant response to inoculation in most individual experiments, there was a significant 18% increase in grain yields when 10 experiments were considered together (Amijee and Giller, 1998). Inoculation increased yields by between 7-60% in individual experiments.



The application of P in the West Usambara Mountains led to strong increases in shoot biomass but induced a strong inter-veinal chlorosis. A combination of soil analysis, plant analysis and multi-factorial nutrient addition experiments revealed that the leaf symptoms were due to K deficiency (Smithson et al., 1993). Addition of only 25 kg K/ha led to spectacular increases in yield – increasing yields from 0.6 t/ha to 1.3 t/ha in one smallholder farmer's field. There were no effects of trace elements (Zn and Cu) or lime.

Deficiency of molybdenum was shown to impair growth, N₂-fixation and yield of common bean in acid oxisols in Northern Zambia (Brodrick et al., 1992) – soils that stretch north into southern Tanzania. Seed analysis proved a powerful method for identifying deficiencies of micronutrients in common bean, and seed from beans grown on more fertile soils contained sufficient molybdenum to support the production of the next crop cycle (Brodrick et al., 1995).

A study from Stahley et al. (2012) indicated that intercropping of maize and beans resulted in lower yields than mono-cropping. It is unclear, however, if this is the result of lower plant densities or other management factors. Information on improved management practices could help increase yields. (Baijukya and De Steenhuijsen Piters, 1998) showed that removal of bean crop residues was a major source of nutrient losses in banana-based systems in Bukoba district, northwest Tanzania.

5.2 Groundnut

Shinyanga, Tabora, Dodoma, Mbeya and Mtwara are the major groundnut production regions (NBS, 2012). Groundnut is mainly cultivated during the long rains, and about half of the households sells their groundnut harvest in this period (Stahley et al., 2012). Groundnut is mostly grown in intercropping systems with maize. As with common bean, yields on these fields are found to be lower than when groundnut is grown as mono-crop.

In Tabora, many farmers stopped growing groundnuts as cash crop due to low return per capital, low yield, lack of reliable market and lack of improved varieties (grown on only 20% of the groundnut fields) (Naliendele Agricultural Research Institute, 2008; Bucheyeki et al., 2010). Farmers recycle seeds for a long time, and introduction of new varieties is required (Bucheyeki et al., 2010). Under the Tropical Legumes II project, five new groundnut varieties have been released, which was the first release since 1998 (ICRISAT, 2011). Groundnut diseases include leaf spots, rust and the groundnut rosette virus (Mansoor, 2012). Furthermore, aflatoxin contamination forms a major problem, which also reduces the prices received for groundnut on the world market (ICRISAT, 2011). At Naliendele Agricultural Research Institute, under the McKnight Groundnut Breeding and Aflatoxin Project, breeding of new varieties with resistance to foliar diseases takes place, along with awareness raising and mitigation of aflatoxin contamination. Inadequate value addition and agro-processing activities further diminish farmers' benefits from groundnuts. This also has to do with the quality of the extension services for groundnuts and legumes in general (Mponda et al., 2012).

5.3 Soyabean

The area under soyabean has increased from less than 2000 ha in 2002/2003 to 7500 ha in 2007/2008 (NBS, 2012). Areas with the greatest potential for soyabean production in Tanzania include Ruvuma, Mbeya, Rukwa, Morogoro and Iringa, all in southwestern Tanzania. Soyabean was first introduced in the early 1900s and expanded between 1950 and 1970, with a soyabean breeding programme starting in 1955 in Lindi. The breeding programme resulted in recommendations for varieties Bossier and 3H/1 in 1978. New varieties released are Ex-Laela in 2002 and Uyole Soya 1 in 2004 (Ministry of Agriculture Food Security and Cooperatives, 2010). A breeding programme at Sokoine University was designed to enhance N₂-fixation in soyabean (Chowdhury and Doto, 1982), but it seems this work was discontinued. Soyabean was also introduced in Northern Tanzania (Arusha, Kilimanjaro), to diversify farming systems after a decrease in coffee prices (Ndakidemi et al., 2006). During the 1960-1980s, Tanzanian farmers were encouraged to produce soyabean for export markets. With the collapse of corporations buying the produce, however, soyabean production declined again as farmers could not sell their products and did not know how to use it (Ministry of



Agriculture Food Security and Cooperatives, 2010). In 2003-2004, the Crop Promotion Services Sector under the Ministry of Agriculture started promoting soyabean production again. However, soyabean production in Tanzania is still negligible compared to other countries. Research and extension services have been weak in supporting soyabean production, and as a result farmers have limited knowledge on soyabean cultivation and on its potential as food crop; and marketing, processing and utilization of the crop are still difficult (Chianu et al., no date). The soyabean value chain is weakly developed (SAGCOT, 2012b).

Tanzania Soyabean Development Strategy

As market outlooks for soyabean are still considered favourable, the Ministry of Agriculture has launched the Tanzania Soyabean Development Strategy 2010-2020, with the following components (Ministry of Agriculture Food Security and Cooperatives, 2010):

- Increase soyabean production and productivity
- Provide improved post-harvest technologies to soyabean processors for value addition
- Create awareness on potential of soyabean as cash crop
- Create enabling environment for producers and processors
- Ensure availability of good quality seed to farmers
- Facilitate and strengthen information sharing and coordinate soyabean activities
- Ensure soyabean marketing and provide market information to producers/ buyers
- Utilize experiences experts + other countries

The strategy demands cooperation between government organisations, Sokoine University of Agriculture and the private sector. The strategy also includes a proposal to form a National Soyabean Coordinating Unit, consisting of members of a number of different Ministries.

Processing facilities

In most soyabean growing areas there are already some small-scale soyabean food processors, but they operate individually. The only large-scale processor is found in Dar es Salaam. It has the capacity of milling up to 3,650 tonnes per year (10 tonnes per day), but the factory currently operates at only 50% of its capacity due to inadequate and irregular supply of soyabean (estimated to be five tonnes per day from May to October) (Malema, 2005). The factory applies contract farming with farmers in Ruvuma. Contract farming could increase the reliability of the output market. In addition, training on production and use of soyabean is necessary, as well as enhancement of seed availability and seed multiplication.

In the SAGCOT area, the Ihemi cluster (around Iringa) is considered as a potential area for soyabean cultivation. Climate in this area is suitable, and an increasing number of both small-scale and large-scale farmers in this area become interested in growing soyabean. In addition, there are promising plans by SAO Hill Agriculture to develop large-scale soyabean processing and animal feed production facilities in the cluster. Soyabean should be sourced from their own farm and some 5,000 outgrowers (SAGCOT, 2012b).

There is also increasing demand for soyabean in the poultry industry. Currently, sardines are the most important protein source in animal feed. They can easily be contaminated with salmonella, which poses a threat to the industry. In addition, prices of sardine have increased, which makes soyabean a safer alternative at lower cost. Moreover, as meat consumption is projected to increase, the demand for animal feed will further increase (Chianu et al., no date). The low quantities of soyabean produced and the high investments needed for processing facilities currently constrain the use of soyabean, in addition to uncertainty of soyabean supply and high farm gate prices (Malema, 2005; Chianu et al., no date).

Rhizobium inoculation

Strong response of soyabean to inoculation was observed at Morogoro (Chowdhury, 1997; Chowdhury et al., 1983). Tanzania had its own inoculant production facilities at Dar-es-Salaam,



established as part of a FAO supported project to select better strains of rhizobia in Tanzania. In addition, Sokoine University of Agriculture developed commercial inoculants ('Nitrosua') for use in soyabean and common bean, and also established extension activities to disseminate inoculants. It appears as if inoculant production and dissemination activities stopped when external funding dried up (Bala et al., 2011).

Research on the need for inoculation of soyabean varieties in Tanzania showed that especially in Northern Tanzania inoculation is needed in e.g. the popular early maturing variety Bossier. In contrast, the long maturing variety Songea, grown in Ruvuma, nodulates well with indigenous rhizobia (Malema, 2005). Other on-farm trials with inoculation and N and P fertilizer in Tanzania also showed that soyabean yields increased by inoculation, but benefitted most from a combination of inoculation and 26 kg P/ha (Ndakidemi et al., 2006).

5.4 Cowpea

The main production areas for cowpea are Shinyanga, Mtwara, Tanga, Ruvuma, and Kigoma (ICRISAT, 2011). In Tanzania, cowpea production is mainly the responsibility of women (Hallensleben et al., 2009). Cowpea is mostly cultivated as food crop; about one quarter of the household sells cowpea, but in relatively small quantities (Stahley et al., 2012). Cowpea is not only valued because of the grain; its leaves are eaten as well. Multipurpose varieties are therefore cultivated, but often in mixture with early maturing varieties which allow for multiple harvesting and ensure food availability in the season before the main harvest (Hallensleben et al., 2009). Yields are low, however, due to the use of late maturing varieties, low plant densities and damage from insects. New early maturing, high yielding and insect pests and diseases tolerant varieties have been introduced, but these turned out to be especially susceptible to the parasitic weed *Alectra vogelii*. A project funded by the McKnight foundation ("Development and promotion of *Alectra* resistant cowpea cultivars for smallholder farmers in Tanzania and Malawi") developed *Alectra* resistant cowpea lines, and made them available for multiplication by farmer groups (Mbwaga et al., 2010).

6. Projects on grain legumes in Tanzania

This section summarizes some of the ongoing projects on and organizations working with grain legumes in Tanzania. During the stakeholder workshop held in Tanzania, more detailed information on relevant projects in the potential intervention areas was collected and presented as well. This information can be found in report number 48: *Opportunities for N2Africa in Tanzania* (http://www.n2africa.org/workshops_training).

6.1 National initiatives

Southern Agricultural Growth Corridor of Tanzania (SAGCOT)

An agricultural public-private partnership designed to rapidly develop the Corridor's agricultural productivity and profitability. SAGCOT's mandate is to mobilize private sector investment.

Objectives:

- Provide opportunities for smallholder producers to engage in profitable agriculture – strong links between smallholders and commercial agri-businesses, through outgrower schemes.
- Strengthening smallholder producer associations.
- Increase area under irrigation.

Soyabean is one of the major opportunities for cultivation in the Southern Agricultural Growth Corridor, and offers potential for import substitution as well as (regional) export markets. Commercial production of dry beans for export is another opportunity.



In addition to the SAGCOT Blueprint, the SAGCOT Greenprint focuses on Agricultural Green Growth, and identifies five priorities to create an enabling environment for upscaling of green investment opportunities (conservation agriculture or precision agriculture are e.g. considered such opportunities) (SAGCOT, 2012a):

1. agricultural extension
2. support for local organizations;
3. systematic land and water planning;
4. guidelines for investment in land and agriculture;
5. a pro-AGG investment generation program.

The needs and partners required are summarized in the table below:

Priority for Creating Fertile Ground	Current Limitation or Need	Key Groups to Engage in Creating Fertile Ground
Agricultural extension	Need for a much larger extension force, greater focus on field-based and participatory methods, and new training in agroecology and natural resource management	<ul style="list-style-type: none"> • Government extension personnel and decision-makers • Local and international NGOs • National and regional universities and training and resource centers
Support for local organizations	Tanzania has a strong tradition of local organizations and collective action, but these remain a largely untapped resource for catalyzing AGG. New forms of financial and technical support can unleash significant new investment and innovation from the smallholder sector.	<ul style="list-style-type: none"> • Farmers associations • Local NGOs • Savings and credit groups and other cooperatives • Local political leaders
Systematic land and water planning	Despite official commitments to integrated participatory planning, land and water planning processes are generally sparsely implemented, fragmentary, subject to confusion, and weakly linked to implementation.	<ul style="list-style-type: none"> • Tanzanian authorities that govern land • District land-use officers and other personnel • Local communities • Water basin authorities • Academic and civil society organizations with technical planning capabilities • Various coordinating entities
Investment guidelines	Lack of clarity on where and on what terms foreign investment is welcome in the Southern Corridor creates unnecessary costs and risks for investors, and uncertainty and risks for communities	<ul style="list-style-type: none"> • Tanzanian authorities that govern foreign investment and land allocation • International standard-setters • Other interested SAGCOT stakeholders
Investment Generation for AGG	The SAGCOT Investment Generation Programme should convey a single, compelling set of messages to investors that includes the importance and benefits of AGG for SAGCOT investors	<ul style="list-style-type: none"> • SAGCOT Centre, consultants, and GoT personnel involved in investor outreach • Prospective SAGCOT investors

Source: (SAGCOT, 2011)

Pan-African Bean Research Alliance (PABRA)

PABRA-ECABREN has done a lot of work in the past on common bean. In cooperation with CIAT's bean programme, pest and disease resistant germplasm has been developed, as well as varieties that are tolerant to abiotic stresses, have improved nutritional values and are acceptable to farmers. Tanzania is also one of the countries where climbing beans have been introduced. In addition, important work has been done to improve bean seed delivery systems (CIAT, 2010).



AGRA - Soil Health Program: (<http://www.agra-alliance.org/grants/soil-health-program/shp-tanzania/>)

Sokoine University of Agriculture

Aims to increase the availability of fertilizer from locally available phosphate rock, thus raising the productivity and incomes of smallholder farmers in Tanzania

Amount: US\$424,416

Projected Duration: 1 Aug 2009 - 31 July 2012

Citizens Network for Foreign Affairs, Inc. (CNFA)

Further develops the existing input distribution system into an efficient, commercially-viable infrastructure for increased productivity and incomes of smallholder farmers.

Amount: US\$1,498,772

Projected Duration: 1 June 2009 - 31 May 2011

Ministry of Agriculture, Food Security and Cooperatives

To improve soil fertility and increase food security and incomes of smallholder farmers in central and northern zones of Tanzania through the enhanced integration of pigeonpea into the maize-based production system

Amount: US\$794,700

Projected Duration: 1 Mar 2010 - 28th Feb 2013

Ministry of Agriculture, Food Security and Cooperatives

To improve the incomes of small holder households in the southern highlands of Tanzania through increased maize-legume productivity and Striga weed control.

Amount: US\$405,715

Projected Duration: 1 Jan 2010 - 31st Dec 2012

Ministry of Agriculture, Food Security and Cooperatives

For use by its Maruku Agricultural Research and Development Institute to improve soil health, food security and incomes of small holder farmers through integration of legumes in maize-based cropping systems in four districts in Tanzania.

Amount: US\$894,988

Projected Duration: 1 Apr 2010 - 31st Mar 2013

Ministry of Agriculture, Food Security and Cooperatives

To improve soil health, food security and incomes of small holder farmers by strengthening institutions and capacity for fertilizer quality control in Tanzania

Amount: US\$396,875

Projected Duration: 1 Aug 2010 - 31st July 2013

Sokoine University of Agriculture

To create an entry point towards more sustainable agricultural production in the East and Southern African countries through the development and strengthening of regional human resources and institutional capacity to undertake impact-oriented research in soil and water management. Focused on PhD training.

Amount: US\$1,867,497

Projected Duration: 1 May 2010 - 30 Apr 2015

National Agricultural Research Centres

The research system in Tanzania is organized in seven agro-ecological zones of the country. Each zone is mandated to conduct research on specific crops. Legumes research is conducted at several research centres in the country:

Southern Zone - ARI Naliendele - Groundnuts (coordinator: Omari Mponda), pigeonpea, cowpea, bambara groundnuts

Southern HZ - ARI Uyole – Common bean, soyabean

Eastern Zone - ARI Ilonga - Pigeonpea, cowpea, soyabean

Northern zone - ARI Selian - Pigeonpea, common bean

Lake Zone - ARI Ukiriguru - Chickpea, cowpea



All the institutes fall under the Division of Research and Development within the Ministry of Agriculture, Food Security and Cooperatives.

Oilseeds research programme (ORP) Tanzania – Naliendele Agricultural Research Institute

Objectives:

- To identify and develop high yield varieties adapted to the main growing areas of southern Tanzania. They should have desirable attributes such as tolerance to insect pests and diseases of major economic importance.
- To develop the best cultural practices for different varieties of oilseeds.
- To identify the major insect pests and diseases of economic importance and develop suitable control measures.
- To investigate the role of oilseeds in farmers' traditional systems and develop recommendations to improve productivity of these systems.

Research priorities are breeding, fertilizer and plant population trials, screening against foliar diseases and aflatoxin management, value chain analysis and seed multiplication models

Naliendele is also supported by McKnight Foundation CCRP on groundnuts and Bambara groundnuts.

Website: http://www.agriculture.go.tz/naliendele/d_oil_seeds.html

6.2 International initiatives

Collaborative Crop Research Program

The McKnight Foundation Collaborative Crop Research Program (CCRP) is a competitive grants program that seeks to increase food security for resource-poor people in developing countries. The strategy is to support carefully selected agricultural research and development efforts led by developing country partners. The supports research and partnerships that lead to increased crop productivity, improved livelihoods, and better nutrition. The CCRP supports a variety of approaches to these issues, such as crop physiology and breeding, seed systems, analysis and utilization of crop biodiversity, integrated pest management, and commercialization. Under the CCRP in Southern Africa a number of projects on grain legumes are carried out in Tanzania. A summary of these projects is given in Appendix 2.

Lindi & Mtwara Agribusiness Support (LIMAS)

Funding: Government of Finland and Tanzania

Duration: 2011-2014

Objectives: Focus on value chain of different types of crops including pigeonpea and groundnut (and focus on increasing productivity through Conservation Agriculture)

- Increase the value of sales of farm products by creating functional market linkages and long-term partnerships between farmers and buyers (support of out-grower schemes)
- Increase the volume of marketable crops and animal products
- Increase the value of sales of processed products
- Improve average yields in farming and productivity in forestry

Website: <http://www.limas.or.tz/limas/>

Aga Khan Foundation

Focus on increasing productivity of different crops including those legumes through conservation farming practices (Alford Siza, personal communication).



Website: http://www.akdn.org/rural_development/tanzania.asp
Tropical Legumes II (TLII)

Support from ICRISAT, IITA and Generation Challenge Programme GCP from CIMMYT, to enhance legume productivity of six legumes (groundnut, common beans, cowpea, pigeonpea, chickpea and soyabean) in SSA and South Asia. For groundnut in Tanzania: phenotyping trials for rust and rosette disease (<http://www.slideshare.net/GCPProgramme/tli-2012-groundnut-breeding-tanzania>)

Focus on breeding and seed system aspects, so opportunity for N2Africa is to address soil fertility, especially for soyabean (Omari Mponda, personal communication).

Sustainable Intensification of Maize-Legume Systems for Food Security in Eastern and Southern Africa (SIMLESA)

Coordination: CIMMYT

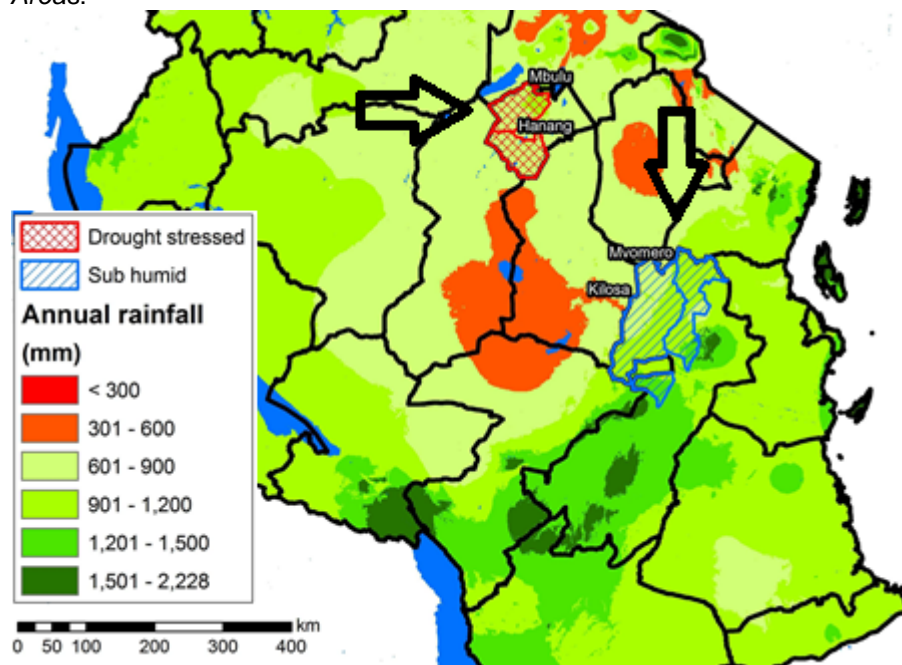
Duration: 2010-2013

Local partners: Department of Research and Development (DRD) (Fidelis Myaka) - Ministry of Agriculture and Food Security (ARS); Selian Agricultural Research Institute (SARI) (Lucas Mugendi)

Objectives:

- to characterize maize-legume production and input and output value chain systems and impact pathways, and identify broad systemic constraints and options for field testing;
- to test and develop productive, resilient and sustainable smallholder maize-legume cropping systems and innovation systems for local scaling out;
- to increase the range of maize and legume varieties available for smallholders through accelerated breeding, regional testing and release, and availability of performance data; to support the development of regional and local innovations systems;
- capacity building to increase the efficiency of agricultural research today and in the future

Areas:



Website: <http://simlesa.cimmyt.org/>



P4P (Purchase for Progress – connecting farmers to markets)

Funding: BMGF, Howard G. Buffett Foundation and others

Duration: 2008-2013

Objectives: Connecting smallholder farmers to markets through market and agricultural development.

Pilot in Tanzania with three components:

- Innovative Procurement Modalities
 - Pro-smallholder competitive tendering
 - Direct contracting
 - Forward contracting
- Supply-side Partners
 - Providing technical expertise in agriculture & market development
 - Building capacity
 - Empowering Women
- Learning and Sharing

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Appendix 1: Common bean value chain in Tanzania

Stage in Value chain	Inputs	Production	Collection/Storage	Wholesale	Retail
Relevant Participant	Input traders (fertilizer, seed chemical and machinery agents)	Integrated small-scale farmers Large scale farmers	Primary local traders Warehousing/storage Transporters	Wholesaler Inter-regional traders	Market retailer, Own HH consumers, Exporters Transporters
Estimated numbers of private sector players	Fertilizer companies: 9 (plus 1 local), Seed companies: about 11, Chemical companies: 20 Machinery companies: 14	Traditional bean farmers: approx: 1.3 million+ Large scale (>20 ha) farmers: < 500	Local traders: numerous Warehouse programmes: 15+, Transporters:	Wholesalers: Numerous Regional traders: Numerous	Retailers 4 supermarkets, numerous retail outlets Exporters: large scale 12-15 Transporters:
Private sector dynamics along value chain	<ul style="list-style-type: none"> ➤ Three value chain channels: <ul style="list-style-type: none"> ○ Integrated small-scale farmer channel: This channel comprises the small-scale farmer who grows beans as part of an integrated crop, primarily for household consumption. Any crop surplus to family requirement is then sold. ○ Wholesaler channel: Again the beans are grown by small-scale farmers, though on a slightly larger scale with the idea of the beans forming part of a cash crop. The beans are either sold to local traders or wholesale agents for sale to market retailers for regional and urban household consumption or to institutions (hospitals, prisons, schools). ○ Regional Trader channel: Here beans are produced by either small-scale farmers or larger more commercially orientated farmers. These beans are either sold into warehouses or to larger inter-regional traders for eventual disposal in an export market. ➤ Beans and other pulses are produced mainly by small-scale farmers, each farming an area ranging from 1 to 5 acres on average. Beans account for about 80% of total pulses produced in Tanzania. ➤ Seeds are generally retained and planted out the next season. A wide number of varieties are used. Improved varieties are not generally used as they are perceived as being too expensive and require a high seeding rate. ➤ Very little chemical inputs such as fertilizers or pesticides are used for the crop. The reasons given are that soils are fertile, fertilizer is not available and fertilizer is expensive ➤ Domestic consumption of pulses is estimated at 640,000MT. The percentage of bean harvest retained for self-consumption varies from year to year. ➤ Beans are generally purchased at the farm gate by local traders, wholesalers or their agents or larger inter-regional traders. Volumes will vary depending on the amount the farmer has available and the financial resources of the trader. ➤ In many districts traders use small warehouses (converted commercial or residential structures) with a capacity of 5-10 MT, some with 3 or more traders involved in buying, storing and selling. There are also Government owned Godowns with a capacity of 10,000MT used for the national Strategic Grain Reserve (SGR) in which space can be leased for storing beans. ➤ There are few private companies involved in the bean subsector. Among the few large traders are Mohamed Enterprises, Export Trading Company and Fida Hussein. Some smaller firms occasionally get contracts with World Food Programme (WFP) to supply beans to refugees in Tanzania, Burundi and DRC. ➤ Beans are both exported and imported by Tanzania. In addition to formal exports, there is considerable informal cross-border trade in beans. Tanzania exports to all her neighbours, but the most important trade is with DRC, Zambia and Kenya. Formal trade is insignificant ➤ The major driving force for the growth of the bean subsector has been a strong growing demand in both local and international markets (particularly the EU). The majority of exports (81%) of beans particularly kidney beans go to the Netherlands. Exports from Tanzania to Italy and France were growing at 6.7% (2001). 				

Source: Lewis et al. (2008)



Appendix 2: Summary McKnight Foundation Collaborative Crop Research Program in Tanzania, 2012

Common beans; Storage pest management	
Title	Introgression of Bruchid Resistance into Farmers Preferred Varieties for Increased Productivity and Stability of Bean Supply
Code, Grantee institution	09-273 Sokoine University, Tanzania;
Contact	Dr Paul Kusolwa, Department of Crop Science, SUA; pkusolwa@gmail.com
Other collaborators	Oregon State University; Department of Agricultural Research, Malawi
Grant Period	2009-2013
Amount funded	\$429,000
Location of Project	Tanzania and Malawi
Objective	Common bean is a major source of protein in southern African but producers commonly lose up to half their harvest in store to bruchids, destructive seed-eating insect pests. The project is introducing genetic resistance to bruchid attack into farmer preferred bean cultivars based on bean storage proteins that inhibit bruchid reproduction. This is facilitated by a Marker Assisted Breeding process, using DNA markers to confirm the presence of genes responsible for bruchid anti-nutritional proteins in new bean lines generated by the breeding program. The research includes MSc and PhD research projects with the later conducting work at Oregon State University to further characterise the APA locus and understand the mechanism of bruchid resistance.

Climbing beans; system productivity and disease resistance	
Title	Improving Bean Production and Utilization by Smallholder Farmers Through integration of Climbing Beans in the Smallholder Farming Systems in Malawi, Mozambique and Tanzania
Code, Grantee institution	10-713: Department of Agricultural Research Services, Malawi
Other collaborators	Uyole Agricultural Research Institute, Tanzania; IIAM, Mozambique; CIAT, Malawi
Tanzania Contact	Dr Catherine Madata, Uyole Agricultural Research Institute. Mbeya; madatacs@yahoo.co.uk
Grant Period	2011-2013
Amount funded	\$335,000
Location of Project	Malawi; Mozambique; Tanzania
Objective	CCRP-funded work by the Department of Agricultural Research Services (DARS), CIAT and NGOs in Malawi and Mozambique from 2006 to 2010 demonstrated that climbing beans can be productive at medium and high altitudes but suffered from drought and a virus disease (BCMV) in dry years. To develop the potential of climbing beans, a second phase of this project is now focusing on developing models that will enable land- and labor-constrained growers to integrate climbing beans into the existing maize-based system without the need to use staking systems that are expensive in resource use. Inter-cropping will be tested in the summer rains and sole crops will also be evaluated on irrigated plots in valley bottoms where high value winter crops are grown. Work will also be undertaken to select virus-resistant lines using climbing bean lines bred by CIAT that are now available for testing in Africa.



	Common beans; seed systems
Title	Supporting communities to increase bean productivity through enhanced accessibility to seed of preferred bean varieties in Malawi, Mozambique and Tanzania
Code, Grantee institution	10-351; CIAT, Malawi;
Other collaborators	DARS, Malawi; Uyole AResearch Institute, Tanzania; IIAM, Mozambique; CIAT, Malawi
Tanzania Contact	Dr Catherine Madata, Uyole Agricultural Research Institute. Mbeya; madatacs@yahoo.co.uk
Grant Period	2010-2012 (Phase2)
Amount funded	\$328,000
Location of Project	Malawi, Mozambique, Tanzania
Objective	Since 2006, CCRP has been funding research in Malawi, Mozambique and Tanzania to identify the bean cultivars preferred by farmers, to test out alternative seed dissemination models and build capacity in the bean cultivar selection and seed market chain. With the exception of Malawi where a government seed subsidy guarantees a market for seed, beans have not been of interest to private sector seed companies as they are self-pollinated so farmers can grow crops from seed that they save. Diversified local systems (including community seed groups, individual farmers, and local stores using small seed packets) will therefore be critical for farmer access to new varieties. Research, led by CIAT and implemented in national programs focuses on further development and analysis of local seed systems to determine which are most efficient at providing farmers with quality seed. The project also aims to develop bean commodity functional platforms in the three countries to ensure better information flow and understanding among stakeholders

	Cowpea, pest management
Title	Development and promotion of <i>Alectra</i> resistant cowpea cultivars for smallholder farmers in Malawi and Tanzania
Code, Grantee institution	09-1206; Ilonga Agricultural Research Institute, Kilosa.
Contact	Dr A. Mbwaga, Uyole Agricultural research Institute; ambwaga@gmail.com
Other collaborators	Bunda College, University of Malawi; University of Virginia
Grant Period	2010-2013 (Phase 2)
Amount funded	\$383,000
Location of Project	Malawi and Tanzania
Onjective	Since 2006 CCRP has funded work to reduce cowpea losses from the parasitic weed <i>A. vogelii</i> that is widespread in fields of the main producing areas in Southern Africa. The project has selected early maturing lines of cowpea that perform well on parasite infested fields, established a breeding program to improve locally preferred cultivars, identified local seed systems for cowpea seed multiplication, developed labour saving methods of processing cowpea and established that there are local market opportunities. A second four year phase of the cowpea project is working on the release and pilot promotion of new and more productive cowpea cultivars in both Malawi and Tanzania. The project works with farmer groups, extension officers, seed agencies and the NGOs. Through partnership with the University of Virginia an MSc. student is investigating genotypic variation within <i>A. vogelii</i> , learning molecular based methods, skills that will benefit further legume breeding in the region.



	Cowpea, utilisation and nutrition
Title	Inception Grant to study Social Factors and Food Practices affecting Cowpea Use in central Tanzania
Code, Grantee institution	11-734 Cornell University, USA
Contact	Dr R Bezner-Kerr, Cornell University; rbeznerkerr@gmx.com
Other collaborators	Ilonga Agricultural research institute, Tanzania
Grant Period	2012-13
Amount funded	\$50,000
Location of Project	Tanzania
Objective	CCRP funding in Tanzania since 2006 has led to the selection of early maturing and root parasite-resistant cowpea lines. The availability of new cowpea cultivars raises the possibility that the crop may play a greater role in future diet diversification and infant nutrition in semi-arid areas of Tanzania. There has been limited effort, however, to understand how increasing cowpea production can in turn lead to improvements in nutrition. This 12-month project inception grant will involve exploratory research in Tanzania to identify social factors and current child feeding practices that might foster or inhibit household use of cowpea, the main legume option in maize, sorghum and pearl millet based systems of semi-arid areas of Southern Africa. The work program will be led by Cornell University working in collaboration with the CCRP cowpea project. The Principal Investigator and a post-doctoral student will undertake interviews, focus group discussions and a survey in the central zone of Tanzania to identify key mechanisms and social constraints to increase household consumption of cowpea, as well as the possible trade-offs between market and home use. Additional interviews will be conducted in Dar es Salaam and Morogoro to understand the institutional context and to build collaborative linkages for a longer term project aimed at increasing household consumption and use of cowpea to improve food security and nutrition for food insecure households within an agroecological intensification framework in the dry areas of central Tanzania.

	Groundnut; disease resistance and mycotoxin (food safety) management
Title	Groundnut varieties improvement for yield and adaptation, human health and nutrition
Code, Grantee institution	09-207 International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
Other collaborators	National Smallholder Farmers Association, Malawi; Naliendeli Agricultural Research Institute, Tanzania
Tanzania Contact	Dr O. Mponda, Naliendeli ARI; kalanjekanduru@gmail.com
Grant Period	2010-2013 (Phase 2)
Amount funded	\$669,000
Location of Project	Malawi and Tanzania
Objective	<p>From 2006 to August 2010 CCRP funded a Groundnut Breeding project led by ICRISAT to strengthen existing work on foliar disease resistance breeding in Malawi, build capacity in the Tanzania NARS to select resistant lines, engage farming communities in the breeding and selection process and pilot local groundnut seed initiatives through the NASFAM farmers association in Malawi and by working with NGOs in Tanzania. A second four years period of funding for this research partnership takes forward breeding and selection work to release and promote GRD resistant cultivars in Tanzania and by the end of the project provide cultivars that combine resistance to all three major foliar diseases that constrain groundnut productivity in region.</p> <p>Having revealed that the proven carcinogen aflatoxin is a widespread contaminant of groundnuts and groundnut based foods consumed in Malawi, the project is now diagnosing the extent of the problem in Tanzania. In partnership with medical</p>



	<p>researchers in Malawi is investigating consumer exposure. Activities, including on-farm trials and demonstrations are being undertaken with extension and NGOs:</p> <ul style="list-style-type: none"> to evaluate the potential of reducing aflatoxin contamination via improved pre- and post-harvest practices. to raise awareness among producers, traders and consumers of improved cultivars and aflatoxin risks/mitigation options taking the lead to advocate appropriate policy to national governments to establish aflatoxin quality standards, establish education programs and routine testing of groundnuts in local food.
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	Groundnut; post-harvest handling and infant nutrition
Title	Enhancing Child Nutrition and Livelihoods of Rural Households in Malawi and Tanzania Through Post-Harvest Value-Chain Technology Improvements in Groundnuts
Code, Grantee institution	09-262 Compatible Technology International (CTI) USA
Other collaborators	Sokoine university of Agriculture, Tanzania; ICRISAT, Malawi
Tanzania contact	Dr Y. Muzanila, SUA; muzanila1@yahoo.com
Grant Period	2009-2013
Amount funded	\$673,000
Location of Project	Malawi and Tanzania
Objectives	One quarter to one third of under five year olds remain malnourished in Malawi and Tanzania despite improvements in farmer access to improved crop cultivars and production technologies. By formulating and testing legume rich complimentary foods the project complements on-going investments by CCRP in southern Africa to increase legume production and productivity as a strategy to enhance nutrition of the poor and vulnerable. The project also investigates the need for inexpensive, labour saving tools for post-harvest handling and processing of groundnuts. SMEs that fabricate agricultural tools will be provided with support to make prototypes of new tools for testing and with business plans to undertake manufacture and promotion to groundnut farmers so precluding the need to import equipment.

	Bambara groundnut; crop diversification and markets
Title	Bambara groundnuts for improved human nutrition
Code, Grantee institution	10-724; Bunda College, University of Malawi
Other collaborators	Naliendeli Agricultural Research Institute, Tanzania; IIAM, Mozambique Natural Resources Institute, University of Greenwich, UK
Tanzania contact	Dr O. Mponda, Naliendeli ARI; kalanjekanduru@gmail.com
Grant Period	2011 - 2014
Amount funded	\$328,000
Location of Project	Malawi, Mozambique, Tanzania



Background	Bambara groundnut (<i>Vigna subterranea</i>) is a highly nutritious “orphan” legume crop grown on light soils of semi-arid zones in Southern Africa. The main thrust of this project is to facilitate increased bambara ground nut production through creating local, regional and international demand. University, national program and NGO partners are undertaking a comprehensive program to select high yielding bambara cultivars, pilot local seed supply and explore “best bet” production practices. A major focus will be to understand how market demand can be stimulated to motivate farmers to plant more bambara.
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	Grain legume pest management; botanical insecticides
Title	Optimized Pest management with <i>Tephrosia</i> on Legume Cropping Systems in Malawi and Tanzania
Code, Grantee institution	09-297 Department of Agricultural Research Services, Malawi
Other collaborators	Royal Botanic Garden Kew, UK; NRI, University of Greenwich, UK; CIAT, Malawi Uyole Agricultural Research Institute, Tanzania
Tanzania Contact	Dr Catherine Madata, Uyole Agricultural Research Institute. Mbeya; madatacs@yahoo.co.uk
Grant Period	2009-2012
Amount funded	\$423,000
Location of Project	Malawi and Tanzania
Background	<p>Despite availability of early maturing, drought tolerant and multiple disease resistant legume cultivar yields on -farm, remain low, commonly below 400 kg ha⁻¹ due to pests. The management and control of insect pests is an important component of crop production and storage for poor farmers since it remains one of the few constraints over which they have some direct control. While commercial insecticides are usually effective, for small-scale farmers their availability is limited, their cost is high and knowledge issues such as poor labelling can compromise application guidance. The project activities seek to:</p> <ul style="list-style-type: none"> • Identify candidate plants which provide activity against key field and storage pests of beans and other legumes • Optimise bio-assays, extraction methods and identify active compounds. • Confirm activity under farmer use

	Groundnut value-chain; Knowledge communication
Title	Innovative communication media and methods for more effective aflatoxin mitigation, variety uptake and use interventions in groundnut in Malawi and Tanzania
Code, Grantee institution	12-117 Danish Management, Copenhagen
Other collaborators	ICRISAT, Malawi, Naliendeli Agricultural research Institute, Tanzania
Tanzania contact	Dr O. Mponda, Naliendeli ARI; kalanjekanduru@gmail.com
Grant Period	2012-13
Amount funded	\$200,000
Location of Project	Malawi and Tanzania



Background	<p>This project, led by Danish Management, is a 2-year continuation of work started in an inception year by ICRISAT Malawi, Naliendeli Agricultural Research Institute (Tanzania) and local media providers. The project builds upon established stakeholder relations (farmer and trader communities, professional media organisations, extension services, local leaders and policy makers) and further develops promising communication interventions piloted in the inception year. The project explores how visual and other communication media and processes add value to interventions for behaviour change of key groundnut value chain stakeholders for effective aflatoxin mitigation and uptake of alternative preferred varieties and uses of groundnut. A range of methods will be used to evaluate communication interventions including tracking of knowledge, attitude and perception changes of audiences and rapid surveys using partners and stakeholders existing networks. The project will also use innovative ways to capture audience responses to radio programs using SMS. The work will be implemented as an informal Learning Alliance to learn from the methodology for encouraging stakeholders to meet, debate, share and build linkages and commitments for action. At periodic meetings stakeholders from local, national producer, entrepreneur and policy spheres will be invited to discuss the issues, contribute to design of communication interventions and subsequently participate in evaluation of results and decisions on next steps.</p>
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	Legume integration; policy issues
Title	Benchmark study of legume policies in Malawi, Tanzania and Mozambique
Code, Grantee institution	11-383 Natural Resources Institute, University of Greenwich, UK
Contact	Dr Kate Wellard, NRI; wellarddyer@yahoo.co.uk
Grant Period	2011-2012
Amount funded	\$75,000
Location of Project	Malawi, Mozambique, Tanzania
Background	<p>Agricultural policy in southern Africa over the post-Independence period has primarily been directed towards national food security, with a focus on maize. With renewed support in recent years for smallholder food production by national governments and donors, legumes have been attracting increasing attention from research programs. A favourable policy environment is needed to stimulate this move towards agro-ecological intensification by motivating and facilitating farmers to adopt new cultivars, expand areas planted to particular legumes and hence improve access to safe, mycotoxin free food. The study, led by Natural Resources Institute, University of Greenwich, UK, working with southern African institutions with knowledge of legume research and national policy issues, is developing an improved understanding of policy gaps and opportunities affecting legumes and the processes by which these policies are initiated, formulated and implemented in Malawi, Mozambique and Tanzania. Relevant and useable information on policy formulation will be made available for stakeholders and opportunities for further policy research in SAf will be identified.</p>



List of project reports

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



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



Partners involved in the N2Africa project



Bayero University Kano (BUK)



Caritas Rwanda



Diobass



Eglise Presbyterienne Rwanda



Resource Projects-Kenya



Sasakawa Global; 2000



Université Catholique de Bukavu



University of Zimbabwe

