

## Policy recommendations for the legume sector in Tanzania



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## Summary

Since 2009, the N2Africa research-in-development project has worked on putting nitrogen fixation to work for smallholder farmers growing legume crops in 11 countries in Africa. In the last year of the foreseen project funding, ending mid-2019, the project has undertaken a policy advocacy activity, which involved bilateral interviews with 15 organisations, followed by a multi-stakeholder workshop on policy recommendations for the legume sector in Tanzania. The objective is to bring the N2Africa results under the attention of policy makers, which should contribute to more favourable policies and more support in general for growing grain legumes.

The potential of legumes in Tanzania is threefold:

1. For an economic objective: legumes contribute to farmer income. Soybean has a huge potential to contribute to national revenue by substituting import soybean and soy-cake as feed for the Tanzania poultry sector. To substitute current import, domestic soybean production should increase 12-fold, from 14,000 MT to 175,000 MT.
2. For an environmental objective: legumes contribute through N-fixation to soil fertility, and make the farming system less vulnerable to droughts and climate change. Considering a recommended cereal – legume rotation, the area under legumes could grow from the current 12% to over 30%.
3. For a nutritional objective: legumes address important micronutrient deficiencies. The current consumption of 15-20 kg legumes per person per year could further increase to the WHO recommended 25 kg per person per year, requiring an increase from 2.1 to 2.7 Mha under legumes.

Discussions of the current situation and constraints along the legume value chain have resulted in the following policy recommendations:

- 1) Give more attention to legumes in policies, strategies and guidelines.
  - a) For legumes as food crops, combine efforts of the Agriculture Sector Line Ministries and the Ministry of Health, and other development partners.
  - b) For soybean, combine efforts of the Agriculture Sector Line Ministries and the Ministry of Industry and Trade, the Ministry of Labour and Employment, private sector and development partners.
- 2) Strengthen linkages between agricultural research, extension and seed production, to improve farmer access to new seed varieties and technologies.
- 3) Consider (temporary) import tariffs to encourage local production of soybean. Consider flexible tariffs: protecting domestic soybean production, but allowing limited import if domestic production falls short.
- 4) Increase its diplomacy efforts with neighbouring and other legume importing countries to facilitate trade and export and guarantee market access.
- 5) Encourage investments in solvent extraction plants to encourage local soybean production and processing into high quality (low oil content) soy cake, and substitute soy cake import.
- 6) Consider the compulsory use of legumes in recipes and processing of e.g. porridge for school feeding, for better nutrition and to create a demand pulling local production.

For the organisation of the legume value chain, the following recommendations were made about the current platforms:

- 1) Encourage the organisation and strengthening of a legume platform and soybean platform, under the CPB, representing the sector, as policy dialogue partner with the sector.

- 2) For legumes: revitalise the existing Tanzania Pulse Network
- 3) For soybean: revitalise the existing soybean platform, and set up a steering committee led by the SCL (SAGCOT).
- 4) The legume platforms should review the existing government strategies, and make recommendations for improvements
- 5) The legume sector platforms should encourage government, its members, and other stakeholders, to:
  - a) Set up a market intelligence system, combining information about current and expected demand in Tanzania and abroad (volumes, quality, prices).
  - b) Organise farmers in producer organisations, for joint marketing.
  - c) Encourage farmer - buyer contracts and vertical integration.
  - d) Analyse and address efficiency constraints in the value chain.

## 1. Introduction and objective of this study

Since 2009, the N2Africa research-in-development project has worked on putting nitrogen fixation to work for smallholder farmers growing legume crops in Africa. N2Africa has been active in DRC, Ghana, Kenya, Malawi, Mozambique, Nigeria, Rwanda and Zimbabwe, and since 2013 also in Ethiopia, Tanzania and Uganda. By 2018, N2Africa had reached more than 800,000 smallholder farmers with improved technologies (seed varieties, rhizobia inoculant, fertilisers) for grain legume production. The project has worked with government, research, and private sector value chain actors to support the legume sector.

In the last year of the foreseen project funding, ending mid-2019, the project has undertaken a policy advocacy activity, in Tanzania and Ethiopia. The objective is to bring the N2Africa results under the attention of policy makers, which should contribute to more favourable policies and more support in general for growing grain legumes. Chapter 2 describes steps in this policy advocacy process. Chapter 3 presents the potential of legumes in Tanzania, although a more detailed business case for soybean is currently being developed. Chapter 4 summarises the main policy recommendations, following some of the main constraints along the value chain, while Chapter 5 presents recommendations for better functioning platforms, for legumes, and for soybean. In the Annex, a short overview is given of more detailed recommendations along the value chain.

## 2. Steps in the policy advocacy process

Initial discussions were held in the N2Africa project management team in the Netherlands and (by Skype) in Tanzania. During a first country visit to Tanzania, 15 interviews were conducted with various stakeholders (in government, private sector, NGO's), between 3 and 7 Dec 2018. The review of agricultural policies (Stadler, 2017) plus a few additional policy documents and other studies on legumes in Tanzania were consulted. Perceptions about the current functioning and recommendations, for the whole legume sector and of specific segments in the value chain, were combined in a report with draft recommendations. These draft recommendations were discussed in a policy recommendations workshop in Iringa, on 8 May 2019, of which the results are incorporated in this final report. This document can assist further policy advocacy efforts by SAGCOT and development partners towards the Tanzanian government and donor organisations.

## 3. The potential of legumes in Tanzania

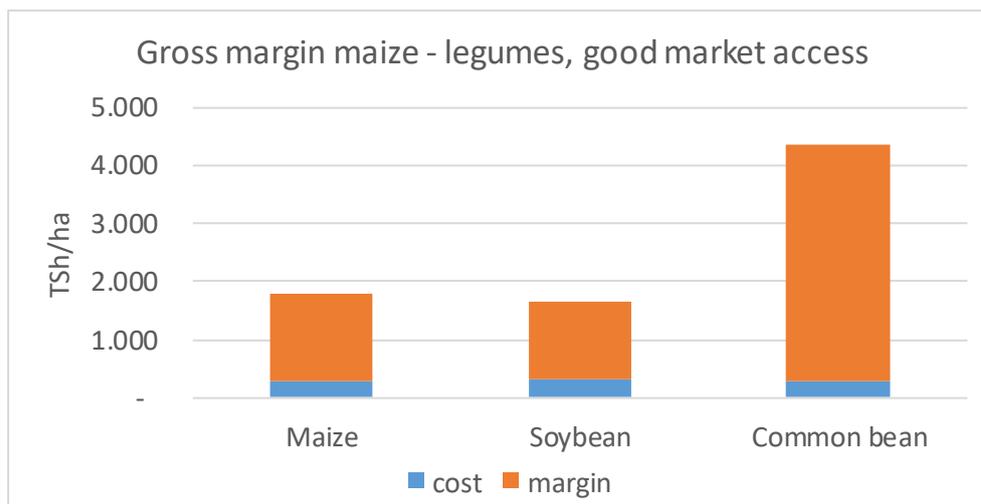
Legumes, including soybean, potentially contribute a lot to three main objectives: (i) economic, at household and national level; (ii) environmental; and (iii) nutritional objectives.

### ***Economic benefits<sup>1</sup>***

- Legumes contribute to farm household income. Calculations show the profitability for farmers of common bean compared to maize. For soybean, the yield and / or price should be slightly higher to compete with maize:

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<sup>1</sup> Note that a more detailed business case for soya in Tanzania is being worked on in 2019, which may replace some of the 'economic benefit' information below.



Maize: 3600 kg/ha (N2Africa MSc Paul); 500 TSh/kg; 100 urea + 50 DAP

Soybean: 1600 kg/ha (N2Africa 2017, 2018, no P); 900 TSh/kg; 100 kg TSP; inoculant

Common bean: 2000 kg/ha (N2Africa, 2016); 2300 TSh/kg; 90kg NPK; inoculant

- Gross margins of additional costs and additional benefits (soybean or common bean), of using inoculant, improved seed, and fertiliser. The yield effect of additional inputs is presented as a range: the high estimate is based on the average effect, expressed in % yield increase, found in N2Africa on-farm demo plots with chickpeas in Ethiopia (Wolde-meskel et al., 2018)<sup>2</sup>; the low estimate is 50% of this, assuming lower yield effects under large scale adoption. This shows that inoculant is the cheapest option and has the best benefit-cost ratio.

	yield kg/ha	add. cost TSH/ha	add. benef TSH/ha	B/C
no inputs, local seed	900			
+ Inoculant	90-180	12,000	67,500-135,000	6-11
+ Improved seed	125-250	38,000	93,750-187,500	2-5
+ Fertiliser	112-224	65,000	84,000-168,000	1-3
All inputs	1,227-1,555	115,000	245,250-491,250	2-4

Inoculant every year; improved seed 1 in 4 years; 50 kg NPK/TSP; soya 750 TSh/kg

- By increasing national-level efforts in the legume sector, farmer adoption of inoculant, improved legume seed, and fertiliser for legumes, yields are expected to increase. The estimated +56-112 kg/ha yield increase, averaged for the whole country, would result in an additional legume production worth US\$ 76-152 million per year.

<sup>2</sup> Wolde-meskel, E., van Heerwaarden, J., Abdulkadir, B., Kassa, S., Aliyi, I., Degefu, T., Wakweya, K., Kanampiu, F., Giller, K.E. 2018. [Additive yield response of chickpea \(\*Cicer arietinum\* L.\) to rhizobium inoculation and phosphorus fertilizer across smallholder farms in Ethiopia](#). Agriculture, Ecosystems & Environment, 261, 144-152.

legumes	potential	projection		projected
	add kg/ha	2019	2023	add kg/ha
% using Inoc	90-180	1%	25%	22-43
% using impr seed	125-250	38%	55%	19-37
% using fert	112-224	4%	20%	16-32
Yield	300-600			56-112
Additional production Tz 2.1m ha				118-236 * 100 ton
Value additional production per year				76-152 MUS\$

\* 2019 average price legumes 1400 TSh/kg; exchange rate 2177 TSh/US\$

Increased soybean production may reduce the Tanzanian import bill for soybean, edible oil and feed. Tanzania has a large, underutilised soybean processing capacity, and imports most of the required soybean. The cost price in Tanzania competes with import. Soybean could complement sunflower and oil palm that is currently being promoted by the Government.

- Tanzania currently imports 90,000 – 120,000 tons soybean cake as feed for the poultry sector – about 90% of total feed need. Current soybean production is estimated at 14,000 MT. So to achieve 130,000 MT of soy cake, grain production need to reach 175,000 MT, assuming soy-grain : soy-cake ratio of 4:3. This would require a soybean production area increase by more than 12-fold, to about 175,000 ha.
- The Country Strategic Plan has set the ambitious objective of producing 2 million tons by 2020/2015, which this could lead to producing ca 200,000 MT of edible oil, in additional to about 500,000 MT of soybean cake. This represents an import substitution of about US\$ 242 million (taking a world market price of US\$ 340/ t soybean cake; \$360 / t soy oil for both; as of April, 2019).
- Legumes fix nitrogen, which reduces the import bill and farmer costs for mineral Nitrogen fertiliser (economic benefit) and reduces soil fertility depletion (environmental benefits, see below). If we value avoided soil fertility depletion equal to the costs of using mineral fertiliser to avoid soil depletion, the amount of x 25 kg N is fixed per 1 ton of legumes produced. With an average legume yield of 0.9 t/ha, this corresponds with approximately 16 \$ mineral fertiliser per ha. Extrapolating this to 2.1million ha under legumes, it becomes 33 MUS\$ N fertilizer cost equivalent.

### **Environmental benefits**

- Legumes improve soil fertility and soil health. They fix N, which, besides reducing input cost for farmers, also reduces soil fertility depletion if otherwise no fertilisers would be used, or reduces pollution and soil acidification if otherwise too much or wrong types of N fertiliser would be used.
  - From an environmental and agronomic point of view, in many areas, legumes are grown in a 3 year rotation with cereals and other crops. Another option is to intercrop legumes with cereals. From this point of view, the current area under legumes, only about 12% of arable land, could easily expand to 30-35% of arable land.

- A systematic review and of research (Franke, 2018<sup>3</sup>) has shown that cereal yields are between 25% higher (fertilised cereals) and 41% higher (unfertilised cereals), when grown in rotation after legumes.
- Including legumes make the cropping system less vulnerable to climate change. Legumes serve as cover crops, making farmland less drought sensitive than pure maize on bare soil, and reduce soil and water erosion. In general, the effect of a more diversified cropping system (species and varieties), including legumes of various duration, reduces the risk of crop failure.

### **Nutritional benefits**

- Household surveys in Tanzania generally show high rates of household dependence on grain legumes as cheaper source of dietary protein, contributing to 16.9% protein and 7.3% calories. Increased consumption of legumes, combined with increased consumption of vegetables, dairy products and eggs, is the most affordable option to reduce malnutrition in Tanzania. Legumes contain many of the macro and micro nutrients that are currently not eaten enough, and they are cheaper than meat and fish.
  - Current legume consumption in Tanzania is about 15 kg per person per year (excl. soybean and groundnuts (Akibode and Maredia, 2011)<sup>4</sup>; we assume 20 kg incl. groundnuts).
  - If the increase legume consumption up to the recommended level of 25 kg per person per year would be produced locally, this would require an increase of the land under legumes by about 30% (see text box below).
  - Grain legumes are also known to be a critical source of folic acid, a necessary nutrient for prenatal and early childhood health, thus a potent tool to fight childhood stunting
  - Soybean oil has more poly-unsaturated fats and is healthier than palm oil. Besides, soybean can be cultivated in much more areas in Tanzania than oil palm, and has a quicker return on investment.
  - Milk and eggs, and, as far as affordable, small amounts of meat, also contribute to improved nutrition. Legumes are important ingredients for livestock and poultry feeds.

Nutrients deficiencies	Protein	Vit A	Vit B9	Vit B 12	Calcium	Iron	Zinc
Legumes	X		X		X	X	X
Dark leafy vegetables		X				^	
Milk				X	X		
Eggs		X		X	X		

<sup>3 3</sup> Franke, A. C., van den Brand, G. J., Vanlauwe, B. & Giller, K. E. (2018). [Sustainable intensification through rotations with grain legumes in Sub-Saharan Africa A review](#). *Agriculture, Ecosystems and Environment* 261: 172-185.

<sup>4</sup> Akibode S. M Maredia. 2011. [Global and Regional Trends in Production, Trade and Consumption of Food Legume Crops](#). Report submitted to the CGIAR Special Panel on Impact Assessment, 27 March 2011.

Generally, the most limiting nutrients in African diets are vitamin A, and B12, calcium, iron and zinc. The food items that should be eaten more of include dark green leafy vegetables and fruits for Vit A, animal source foods for Vit B12, and legumes for calcium, iron and zinc (N2Africa, Ilse de Jager<sup>5</sup>).

The EAT Lancet Committee recommends a global healthy reference diet that includes about 36 kg legumes per person per year (18 kg dried legumes, 9 kg soybean products, and 9 kg ground nuts; to be adjusted by country and region). In a reaction, WHO recommended a legume consumption of about 25 kg per person per year. Compared to the current diet, the EAT Lancet reference diet includes more legumes and less cereals and tubers, and would reduce deficiencies in several micro nutrients, and reduce malnutrition.

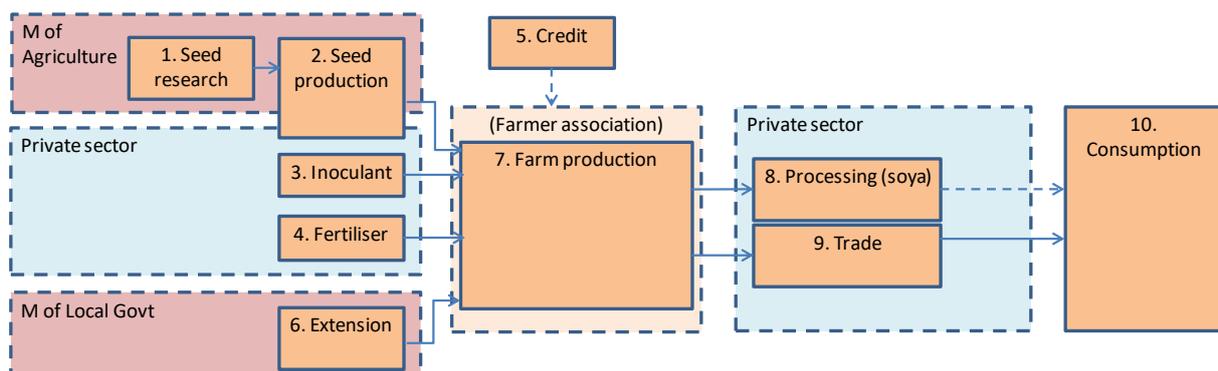
If the Tanzanian population of 60 million would increase legume consumption by 10 kg per person per year, this would require an additional 0.6 m ha under legumes (average yield 1.0 t/ha), an increase from the current 2.1 m ha to a desired 2.7 m ha under legumes.

#### 4. Policy recommendations

In the interviews held with various actors along the value chain, including people from government, private sector, development partners, researchers and farmer representatives, many detailed constrains and recommendations were given. Here, we present the main policy recommendations. More detailed recommendations, along the various steps in the value chain, are presented in the Annex.

The Agricultural Sector Development Programme (ASDP) – Phase 2 (2015-2024) has recently been launched, and gives opportunities to develop more detailed plans. This is an opportunity to make policy recommendations for the legume sector. So far, there are only weak linkages between agricultural policy and food and nutrition policy, and with the role legumes can play in these linkages.

Some recommendations concern the whole legume sector, other recommendations are linked to a specific node in the value chain.



#### General recommendations

- 1) **More policy attention to legumes, requiring joint efforts from different ministries.**

<sup>5</sup> de Jager, I. (2013). [Nutritional benefits of legume consumption at household level in rural areas of sub-Saharan Africa](#). N2Africa Report. Wageningen: Wageningen University.

- a) **Policy constraint:** A review of policy documents shows that the economic, environmental and nutritional benefits of legumes are insufficiently linked in policies for agriculture, value chain development, food security and climate smart agriculture. For example, while ASDS-2, and to a lesser extent the Food Security Investment plan, clearly refer to all three objectives, the importance given to legumes in these policies is very limited. On the other hand, the value chain roadmap for pulses and the Soybean development strategy hardly refer to environmental and nutritional objectives. There is room for improved collaboration between the concerned ministries and departments.
- b) **Policy recommendation:** The government should give more attention to legumes in policies, strategies and guidelines, to achieve different objectives: national and farmer economy, environment and climate change adaptation, and nutrition and food security. These ambitions should be documented in policies, so new strategies, action plans, and programmes by government and development partners can link up to these policies.
  - i) For legumes as food crops, combine efforts between the Agricultural Sector Line Ministries and the Ministry of Health, and other development partners, in a joint public campaign to promote eating more legumes.
  - ii) For soybean, mainly as cash crop, improve the coordination between the Agricultural Sector Line Ministries and the Ministry of Industry and Trade, the Ministry of Labour and Employment, private sector and development partners, for: (i) considering inclusion of soybean as a national strategic crop in ASDP-2; (ii) having a desk responsible for finding resources for soybean investment; and (iii) a joint campaign to encourage farmers to grow more soybean.
- c) **Plan:** The main targets are the Agricultural Sector Line Ministries, that can be reached by a convincing policy brief on legumes, in high level consultative meetings (PS's, Directors, in particular DPP and DCP).

### Recommendations related to improved seed access

#### 2) **Strengthen links between research, seed production and extension.**

- a) **Policy constraint:** Currently, the tasks of agricultural research, seed production, agricultural extension, and an information system to inform farmers about opportunities and to assess the seed needed by farmers, are divided over different ministries departments, private sector and farmer organisations (Ministry of Agriculture, Ministry of Local Development, ASA, private seed companies, seed producing farmer organisations), and are not well integrated. There is little investment in legume sub-sectors in terms of human resources (incentives for scientists) and funding, and there is inadequate promotion of soybean production. This is a major cause for the limited supply and demand of improved legume seed varieties.
- b) **Policy recommendation:** The government should strengthen linkages between agricultural research, extension and seed production, to improve farmer access to new seed varieties and technologies. Local seed dealers can work with hub farmers to produce quality declared seed, certified by ASCI. For effective participation, farmers need to be organised. For soybean in particular, quality requirements from processors need to be communicated to farmers, agricultural research and seed producers. These linkages involve the Agricultural Sector Line Ministries, the Ministry of Local Government, the Ministry of Cooperative Development, and the private sector, for example by having one focal point at the ministry for seed related issues regularly convening all stakeholders. Farmers can be supported with a 'starter pack' of seed, fertiliser and inoculant, on credit.

- c) **Plan:** A legume platform can link actors in the value chain. The target group includes TARI, seed producers, agro-dealers, extension (Local Govt), and farmer organisations (Ministry of Cooperative Development). The Director of Crop Development, together with private sector, should take the lead in this, for which they need resources (human, funding) and a policy brief.

## Recommendations related to trade and investment

### 3) **Support and protect the domestic emerging soybean sector**

- a) **Policy constraint:** Currently, Tanzania imports 90% of the soybean and soy-cake that is needed as feed the poultry sector, and imports palm oil. Tanzania can produce soybean at competitive prices, and has large areas suitable for soybean cultivation. Supply and demand are poorly connected, partly by the lack of organisation of soybean farmers, and by poor communication from processor to farmers about demand and prices. It will be hard to develop the domestic soybean sector without (temporary) protection against import.
- b) **Policy recommendation:** The government could consider (temporary) import tariffs to encourage local production of soymeal and chicken; flexible tariffs and import quotas are possible as well: protecting domestic soybean production, but allowing limited import if domestic production falls short, to assure feed access for the domestic poultry sector. Livestock policies for poultry should be reviewed as well.
- c) **Plan:** The targets are the Agricultural Sector Line Ministries, international donors, local government, farmer commodity organisations, and private sector. These can be reached in a joint action (e.g. a platform) that combines research private sector, government and development partners. The platform can organise a series of multi-stakeholder dialogues to influence policy change; IITA, as knowledge centre, can creating and present evidence on policy gaps to support the case.

### 4) **Diplomatic efforts to assure export markets**

- a) **Policy constraint:** In the last years, Tanzania was hit by import bans from destination countries, for example pigeonpea, while other countries (Ethiopia) managed to negotiate a waiver for this import ban.
- b) **Policy recommendation:** The government could further increase its diplomacy efforts with neighbouring and other legume importing countries to facilitate trade and export and guarantee market access.

### 5) **Facilitate investments in high quality soybean processing**

- a) **Policy constraint:** Currently, Tanzania, compared to other countries, has limited soybean processing capacity that is efficient in oil extraction and produces high quality (low oil content) feed.
- b) **Policy recommendation:** The government could consider 'tax holidays', VAT exemption on agricultural machinery, and incubation investment for smaller companies, to encourage investments in solvent extraction and high quality mechanical extraction plants for local soybean processing into high quality (low oil content) soy cake, and substitute soy cake import.
- c) **Plan:** The soybean platform can organise multi-stakeholder meetings to influence policies, supported by a business plan that shows the costs and benefits at national level of the proposed policies.

## Recommendations related to consumption

### 6) *Government food procurement and school feeding to use more legumes*

- a) **Policy constraint:** Current consumption of legumes in Tanzania (15 kg per person per year) is lower than recommended from a nutritional point of view (25 kg pp py). There is a National Multi-sectoral Nutrition Action Plan, but there is no clear link yet to agriculture and legumes.
- b) **Policy recommendation:** The government could consider the compulsory use of legumes (and other nutritional ingredients) in recipes and processing of e.g. porridge for school feeding, possibly other government food procurement, for better nutrition and to create a demand pulling local production. Nutritional awareness should be part of the training curriculum at school, and could be advocated through an annual 'Healthy Diet Day'. Nutritional aspects should be included in the inception of new agricultural programmes from the start.
- c) **Plan:** The target are nutritional focal points in the Agricultural Sector Line Ministries, the Ministry of Health and TNFC, the Ministry of Education; and mass media, e.g. for nutritional awareness and cooking programmes. The 11 ministries involved are organised in the Scaling Up Nutrition movement, under the Prime Minister's office. TFNC is a good entry point. What is needed is a better understanding of consumer behaviour: what determines their food choices, and how can they be tempted to choose a healthy diet including legumes?

## 5. Recommendations for organising the legume sector

From the interviews and some of the other studies reviewed, the organisation of the legume sector in Tanzania came out as a main challenge.

**Policy constraint:** Currently, There is no well-functioning platform yet that assures a good communication within the legume value chains, that represents the different stakeholders, and that is considered by government as formal policy dialogue partner. There are several platforms (TPN, Soybean platform), that need revitalisation and recognition by the government.

### ***This resulted in the following recommendations:***

- 1) The government, in particular the Cereals and Other Produce Board (CPB), should encourage the **organisation and strengthening of legume platforms:** one for soybean, one for other legumes, representing the sector, as policy dialogue partner with the sector. The CPB could assign a central focal point for these legume network platforms. These platforms can signal and address various constraints along the value chain, in dialogue with government and other stakeholders (see below). The platforms will be informal, but **recognised by government as policy dialogue partner**, to make sure that found issues are followed up.
- 2) **Legume platform:** revitalise the existing Tanzanian Pulses Network (TPN),
- 3) **Soybean platform:** There should be a separate platform for soybean, given the specific actors (e.g. processors) involved. The existing soybean platform, set up CRS and IITA (through N2Africa), which was then handed over to EAGC, and then to SAGCOT, will be structured as follows:
  - a) The **Platform** is voluntary, open, and informal. Members sign an MoU, and pay their own participation; no additional funding will be needed.
  - b) The smaller **Steering committee**, which convenes the larger platform, consists of the most active members, including government and private sector. The membership is based on organisations, not on individuals:
    - i) SCL (SAGCOT): will take the lead
    - ii) ANSAF (includes farmers rep)

- iii) TAFMA (includes farmer org.)
  - iv) MoA, DPP → Prime minister Office
  - v) EAGC
  - vi) TOSCI
  - vii) TASTA (includes seed)
  - viii) IITA
  - ix) CPB
- 4) The legume platforms should **review the existing government strategies**, and make recommendations for improvements. Specifically for soybean, develop a long-term plan for the development of the soybean sector. Anticipate the time and phases that the development of a new crop will go through, e.g. looking at the earlier introduction of sunflower.
- 5) The legume sector platforms should encourage government, its members, and other stakeholders, to:
- a) **Set up a market intelligence system**, combining information about current and expected demand in Tanzania and abroad (volumes, quality, prices). Farmers should be able to respond to changes in expected demand. Information about (anticipated) quality criteria on the demand sides should also be forwarded to the seed sector and farmer extension.
  - b) **Organise farmers in producer organisations**, for joint marketing and a better bargaining position, efficiency in the value chain, and to estimate farmer's demand and organise seed and other inputs.
  - c) **Encourage farmer - buyer contracts** (currently lobbied for by AGRA), that can be the basis of vertical integration and provision of inputs and advice to farmers. Because of the strong market demand and private sector involved, soybean could be a good case to start with.
  - d) Analyse and **address efficiency constraints** in the value chain (transport and transaction costs, timeliness, post-harvest mgt.), to reduce the production costs and increase the competitiveness on the international market.

## Annex. Specific recommendations along the value chain

The interviews yielded more detailed recommendations, following the (numbered) legume value chain step-by-step, from seed, inoculant, fertiliser, and extension, to production, processing and trade, and consumption; in short, bullet form. One of the main recommendations is to have a functional legume platform, which then could address most of the more detailed constraints and recommendations in tis overview.

### 1. Seed research:

- Discuss TOSCI, national research: quicker release?
- Simultaneous testing in multiple countries
- Regional coherence of policies for varietal release (ISSD experiences?)

### 2. Seed Production:

- ICT assisted intelligence: farmer demand → seed producers
- Govt to allow parallel seed systems (ISSD)
  - Central, for improved vars (ASA and PS).
  - Decentral, for improved vars. Local seed producing farmers org, business. QDS.
  - Community saved seed systems for local varieties. Quality improvement.
- Create better linkages research - farmer extension (creating and assessing demand), and seed production and distribution system.

- Clarify roles: MoA, research, ASA, LG extension, coops, agro dealers, private seed companies, seed producing farmers. (complementing)

### 3. Rhizobium:

- Create farmer awareness: demo's, train extension staff (Local Govt)
- Distribution channels (besides agro dealers), together with seed, fertiliser; through buyers of soybean.
- Smaller packages.

### 4. Fertiliser:

- Stop blanket recommendations. Use research info and soil maps for adapted recommendations).
- Consider special legume fertiliser blends.
- New knowledge: update agricultural extension training.

### 5. Credit:

- Improve access, better farmer negotiation position and farm gate prices

### 6. Farmer extension

- Better coordination, and clarify roles
  - M Agriculture – M Local Govt; Research
  - Research – Extension – seed production + distribution
- Include new knowledge in demos, training of staff, extension materials.

### 7. Production

- labour saving technologies, mechanisation
- Facilitate vertical integration:
  - Farm production and marketing contracts; contract enforcement. (price setting)
  - Processor or Exporter to provide inputs, advice (credit) and assure market

### 8. Processing:

- Private sector funds for agro-processing.
- Joint campaign (govt, private sector) encourage farmers to grow soybean.
- Encourage foreign investment in agro-processing (lower corporate tax; VAT exempt)
- Consider import taxes to encourage local production of soybean (careful)

### 9. Trade:

- Better market info (+ forecast, in and outside Tanzania) to inform farmers.
- Avoid export bans, which harm farmers; diplomacy, to avoid import bans other countries
- Flexible import tariffs: encourage local production, mitigate domestic shortfall

### 10. Consumption:

- Promote legumes in school feeding (porridge): nutrition and encourage local prod.
- Promote home consumption of legumes, ion broader nutrition campaign
- Link dietary gap analysis (M Health) to nutrition sensitive agriculture (M Ag.)