



Review of policies relating to legume intensification in N2Africa countries

Minke Stadler

With contributions from Ken Giller, Fred Kanampiu, Emmanuel Sangodele, Peter Ebanyat, Endalkachew Wolde-meskel, Fredrick Bajjukya, Samuel Adjei-Nsiah, Jeanmarie Sanginga, Speciose Kantengwa, Paul Woomer, Regis Chikowo, Lloyd Phiphira, Wilson Leonardo, Nkeki Kamai and Charlotte Schilt

Submission date: February 2017

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 Ethiopia, Tanzania and Uganda.

Email: n2africa.office@wur.nl
Internet: www.N2Africa.org

Name: M.M. Stadler
Address: P.O. Box 430
6700 AK
Wageningen
the Netherlands
E-mail: minke.stadler@wur.nl

Partner acronym: WUR

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Minke Stadler, 2017. N2Africa review of policies relating to legume intensification in the N2Africa countries. Report N2Africa project, www.N2Africa.org, 38 pp.



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Table of contents

Abstract	5
Introduction	7
1 Global policies relating to legume intensification	8
1.1 Sustainable Development Goals 2016-2030	8
1.2 The CAADP Results Framework 2015-2025	8
1.3 Association for Strengthening Agricultural Research in Eastern and Central Africa 9	
1.4 Science, Technology and Innovation Strategy for Africa 2024	9
1.5 Forum for Agricultural Research in Africa (FARA) Strategic Plan 2014-2018	10
FARA’s Strategic Plan 2014–2018 enhances African innovation capacity or agricultural transformation. Its overall aim is to ensure African agricultural innovation systems, which are functioning effectively in creating jobs, building wealth and improving food security on sustainable bases. It addresses three strategic priorities (p. 26), namely:.....	10
FARA will achieve its purpose by accomplishing the following objectives:	10
1.6 Global Forum on Agricultural Research and Innovation	10
2 National policies relating to legume intensification per N2Africa country	11
2.1 Agricultural policies in DR Congo	11
2.1.1 LOI important principes fondamentaux relatifs à l’agriculture	11
2.1.2 Programme national d’investissement agricole (PNIA) 2013–2020	11
2.2 Agricultural policies and research studies in Ethiopia	12
2.2.1 Agriculture Sector Growth and Transformation Plan II (ASGTP II), 2015-2020	12
2.2.2 Agricultural Sector Policy and Investment Framework (PIF), 2010-2020	12
2.2.3 Working Strategy for Strengthening Ethiopia’s Tef Value Chain.....	13
2.2.4 Maize Sector Development Strategy, 2013-2017.....	13
2.3 Agricultural policies in Ghana	14
2.3.1 Food and Agriculture Sector Development Policy (FASDEP II)	14
2.3.2 Medium Term Agricultural Sector Investment Plan 2011-2015 (METASIP)	15
2.4 Agricultural policies in Kenya.....	16
2.4.1 Kenya Vision 2030.....	16
2.4.2 Agricultural Sector Development Strategy (ASDS) 2010-2020.....	16
2.4.3 Policy Responses to Food Crisis in Kenya.....	17
2.4.4 National Food and Nutrition Security Policy	17
2.4.5 Guideline for Registration of Bio-fertilizers in sub-Saharan Africa	17
2.5 Agricultural policies in Malawi.....	18
2.5.1 National Agriculture Policy (NAP).....	18
2.5.2 The Agriculture Sector Wide Approach (ASWAp)	18
2.5.3 Adaptive Research Strategy 2015-2021	19
2.5.4 Malawi Growth and Development Strategy II (MGDS II).....	19
2.5.5 CAADP Technical Review	19
2.6 Agricultural policies in Mozambique	20
2.6.1 Strategic Plan for Agricultural Development (PEDSA) 2010-2019.....	20
2.6.2 National Agriculture Investment Plan 2014–2018	20
2.6.3 Plan operacional para o desenvolvimento agrario (PODA) 2015-2019	21
2.7 Agricultural policies in Nigeria	22
2.7.1 Agriculture Promotion Policy (APP) 2016 - 2020	22
2.8 Agricultural policies in Rwanda.....	23
2.8.1 Strategic Plan for the Transformation of Agriculture in Rwanda, Phase III (PSTA III) ..	23
2.8.2 The Economic Development and Poverty Reduction Strategy (EDPRS II)	23



2.8.3	Agriculture Gender Strategy	24
2.8.4	National Post-Harvest Staple Crop Strategy	24
2.8.5	Strategies for Sustainable Crop Intensification in Rwanda	24
2.9	Agricultural policies in Tanzania	25
2.9.1	Value Chain Roadmap for Pulses 2016-2020	25
2.9.2	Tanzania Agriculture and Food Security Investment Plan (TAFSIP) 2011-2020	25
2.9.3	National Agriculture Policy.....	26
2.9.4	Agricultural Sector Development Plan (ASDP)	26
2.9.5	Agricultural Marketing Policy, 2008	26
2.9.6	Nutrition Country Paper – CAADP Agriculture Nutrition Capacity Development Workshops.....	26
2.10	Agricultural policies in Uganda	27
2.10.1	Agriculture Sector Strategic Plan (ASSP) 2015/16-2019/20	27
2.10.2	National Agricultural Policy (NAP)	27
2.10.3	Agriculture Sector Development Strategy and Investment Plan (DSIP) 2010-2015	27
2.10.4	National Grain Trade Policy.....	28
2.10.5	National Nutrition Planning guidelines for Uganda.....	28
2.10.6	Uganda Nutrition Action Plan (UNAP) 2011-2016.....	28
2.10.7	Uganda Agriculture Investment Opportunities Brief	28
2.11	Agricultural policies in Zimbabwe	29
2.11.1	Comprehensive Agricultural Policy Framework 2012-2032	29
2.11.2	Zimbabwe Agriculture Sector Policy.....	29
2.11.3	Zimbabwe Agriculture Investment Plan (ZAIP) 2013-2017	30
2.11.4	Zimbabwe Agenda for Sustainable Socio-Economic Transformation (ZimAsset) 2013-2018	30
2.11.5	Results Based Management System - Provincial Integrated Performance Agreement	30
References		31
List of projects.....		34
Partners involved in the N2Africa project.....		38

Table of tables

Table 1: N2Africa target legumes mentioned in national policies per N2Africa country.	5
Table 2: Matrix of Harmonised Monitoring and Evaluation Indicators (FASDEP II, Appendix 2).....	14



Abstract

The 'N2Africa Review of policies relating to legume intensification in N2Africa counties' showed that governments in N2Africa countries acknowledge the importance of legume intensification and its significant potential to contribute to improving food security and health, especially for poor families.

At global level, the seventeen Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development developed by the United Nations (UN) aim to end all forms of poverty, fight inequalities and tackle climate change, while ensuring that no one is left behind. The SDGs recognize that ending poverty must go hand-in-hand with strategies that build economic growth and addresses a range of social needs including education, health and job opportunities, amongst others. Governments are expected to take ownership and establish national frameworks for the achievement of the seventeen goals. Particularly, SDG2 'End hunger achieve food security and improved nutrition and promote sustainable agriculture' seeks sustainable solutions to end hunger in all its forms and to achieve food security. It entails improving the productivity and incomes of small-scale farmers by promoting equal access to land, technology and markets, sustainable food production systems and resilient agricultural practices.

The Comprehensive Africa Agriculture Development Programme (CAADP) is the pan-African policy framework for agricultural transformation, wealth creation, food security and nutrition, economic growth and prosperity for all. The CAADP Results Framework 2015 – 2025 is prepared by the Food and Agriculture Organisation (FAO) of the UN in cooperation with the New Partnership for Africa's Development (NEPAD) Steering Committee. It recognizes the importance of increasing yield of food grains, tubers and legumes to catalyse transformation of Africa's agricultural systems and presents critical actions required to achieve agricultural development agenda targets. Furthermore, the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) serves as a platform for promoting regional research and in the sharing of benefits and spillovers that derive from such research. The association focuses on four thematic areas that are well aligned to the major ongoing regional and continental initiatives. These include (i) Integrated capacity strengthening, (ii) Development and scaling up of technologies and innovations, (iii) Policy advocacy, market analysis and institutional arrangement, (iv) Knowledge and information management. High yielding climbing bean varieties and training on different staking options are included in ASARECA projects that scale up best practices to address farmers' needs.

National governments in the N2Africa countries all developed national policies aimed at increasing agricultural productivity, improving food security, diversifying food production to improve nutrition, and increasing agricultural incomes of the rural people. All national policies refer to legumes, mostly indirectly (e.g. intercropping practices, as measure for soil fertility, amongst others). Table 1 presents the N2Africa target legumes mentioned in national policies per N2Africa country.

Table 1: N2Africa target legumes mentioned in national policies per N2Africa country.

Country	N2Africa target legumes promoted in national policies
DR Congo	Legumes, bean, cowpea, groundnut
Ethiopia	Cowpea, chickpea, bean, groundnut, soyabean, legumes, rhizobia
Ghana	Cowpea, soyabean, groundnut
Kenya	Bean, pigeonpea, cowpea, chickpea, soyabean, legumes, rhizobia
Malawi	Local inoculant, groundnut, soyabean, pigeonpea, common bean and cowpea
Mozambique	Bean, soyabean, groundnut, legumes, pulses
Nigeria	Soyabean, cowpea
Rwanda	Bio-fortified bean, soyabean, rhizobia
Tanzania	Bean, oil seed crop, chickpea, cowpea
Uganda	Bean, soyabean, groundnut
Zimbabwe	Bean, soyabean, groundnut



All national policies aim at increasing the production and productivity of various legumes by various strategies, such as (i) adopting modern production techniques, (ii) strengthening coordination, institutional capacity and skills across the key actors, (iii) providing timely and appropriate market entry support for effective market development and (iv) scaling up production and trade, amongst others. Rhizobia are only referred to in a few national policies (e.g. Ethiopia, Kenya, Malawi and Rwanda). The Tanzanian government is the only government that developed an explicit policy tool to promote the pulses sector (e.g. common bean, cowpea, pigeonpea, green gram and chickpea, mung bean and Bambara nut).

The study results will be completed and used to provide recommendations to governments about best-fit legume technologies, how to increase production and productivity of various legumes and how to stimulate farmers' use.



Introduction

This report presents a review of international and national African policies relating to legume intensification in the eleven N2Africa countries. It reviews the main goals and agricultural development strategies, as well as the main policy objectives, targets and action points per country. The report describes whether legumes are mentioned in the policies and whether they are related to agricultural development interventions. The main aim of the policy review is to see whether we can facilitate uptake of legume technologies through ensuring more enabling policies in the different N2Africa countries. Favourable policies in some of the N2Africa countries can be used to encourage other countries that do not (yet) address the role of legumes in diversification and intensification.



1 Global policies relating to legume intensification

1.1 Sustainable Development Goals 2016-2030

Governments, businesses and civil society together with the United Nations have developed the seventeen Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development. The agenda officially came into force in January 2016. The aim of the SDGs is to end all forms of poverty, fight inequalities and tackle climate change, while ensuring that no one is left behind. Tackling climate change and fostering sustainable development are two mutually reinforcing sides of the same coin; sustainable development cannot be achieved without climate action. Conversely, many of the SDGs are addressing the core drivers of climate change.

The SDGs are unique in that they call for action by all countries, poor, rich and middle-income to promote prosperity while protecting the planet. They recognize that ending poverty must go hand-in-hand with strategies that build economic growth and addresses a range of social needs including education, health, social protection, and job opportunities, while tackling climate change and environmental protection. While the SDGs are not legally binding, governments are expected to take ownership and establish national frameworks for the achievement of the seventeen goals. Implementation and success will rely on countries' own sustainable development policies, plans and programmes, and will be led by countries.

SDG2 'End hunger achieve food security and improved nutrition and promote sustainable agriculture' seeks sustainable solutions to end hunger in all its forms and to achieve food security. It entails improving the productivity and incomes of small-scale farmers by promoting equal access to land, technology and markets, sustainable food production systems and resilient agricultural practices. SDG2, amongst others, will be a compass for aligning countries' agricultural policies, with their global commitments.

1.2 The CAADP Results Framework 2015-2025

The Comprehensive Africa Agriculture Development Programme (CAADP) is Africa's policy framework for agricultural transformation, wealth creation, food security and nutrition, economic growth and prosperity for all. The New Partnership for Africa's Development (NEPAD), an African Union strategic framework for pan-African socio economic development, is both a vision and a policy framework for Africa in the twenty first century. The NEPAD Agency's Agriculture, Food Security and Nutrition thematic area and specifically CAADP Implementation Support Programme aims to catalyse transformation of Africa's agricultural systems and stimulate increased and sustainable agriculture performance in member states for effective contribution to achieving economic growth and inclusive development.

CAADP focuses on reducing poverty through supporting smallholder agriculture, and is structured round four pillars: land and water management; market access; food supply and hunger; and agricultural research. Its roll-out is supported through a multi-donor trust fund managed by the World Bank.

The CAADP Results Framework 2015 – 2025 'recognizes that an expansion in agriculture, particularly through increasing smallholders' output of staple foods, can contribute significantly to reducing the incidence of under-nourishment by raising local food availability, especially in poor families' (§4.3.3). It states that: 'Agricultural yields have also been level or falling for many crops in many countries of Africa. Significantly, yields of most important food grains, tubers and legumes (maize, millet, sorghum, yams, cassava, groundnuts) in most African countries are no higher today than in 1980' (§5.2.1) and '. Research on pearl millet, maize, sorghum, potatoes, beans, wheat and cowpeas has generated returns ranging from 16 percent to 135 percent' (§5.2.2). The framework does not mention target for legumes. However, 'Yields for the five most commodities' (e.g. per country) are defined as an overall indicator.



1.3 Association for Strengthening Agricultural Research in Eastern and Central Africa

Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) focuses on four thematic areas that are well aligned to the major ongoing regional and continental initiatives. These include (i) Integrated capacity strengthening, (ii) Development and scaling up of technologies and innovations, (iii) Policy advocacy, market analysis and institutional arrangement, (iv) Knowledge and information management. The four areas are considered cornerstone at sub-regional level in contributing significantly to the implementation of the major regional and continental frameworks such as CAADP 10-year Results Framework, amongst others.

Sustainable Agriculture, Food Security and Nutrition is one of the four strategic themes. It addresses challenges created by climate change, and pests and diseases of livestock and crops, biodiversity and the techniques and options provided by biotechnology. The theme will develop technologies and innovations for sustainable agricultural intensification to increase the overall system productivity. The theme addresses issues of nutrition and food security with links to human health and its effects on agriculture/livelihoods. It also addresses issues of mechanization; harvest processes; and postharvest handling, storage and processing. It is directly connected to Pillar IV of CAADP.

Priority sub-themes are:

1. Development and promotion of breeds, varieties and management practices for adaptation to climate change and variability; shorter maturing varieties, drought tolerant varieties, conservation agriculture, etc.;
2. Management of diseases and pests of strategic crops, livestock and fisheries;
3. Promotion of enabling gender responsive policies and institutions for sustainable agriculture, food and nutrition;
4. Post-harvest handling and processing of crop, livestock and fisheries resources;
5. Sustainable intensification of crop, livestock and fisheries systems (e.g. farming practices such as intercropping, integrated pest management, conservation farming and organic farming, improved crop varieties and animal breeds, amongst others);
6. Conservation and utilization of plant, animal and fish genetic resources;
7. Food and nutrition security for improved health.

Legumes, targets or action points as such are not explicitly mentioned.

1.4 Science, Technology and Innovation Strategy for Africa 2024

The Science, Technology and Innovation Strategy for Africa 2024 (STISA-2024) places science, technology and innovation at the epicenter of Africa's socio-economic development and growth. The strategy is part of the long-term people centered African Union (AU) Agenda 2063. The STISA-2024 is the first of the ten-year incremental phasing strategies to respond to the demand for science, technology and innovation to impact across critical sectors such as agriculture, energy, environment, health, infrastructure development, mining, security and water among others. The strategy is firmly anchored on six distinct priority areas, namely: Eradication of Hunger and Achieving Food Security; Prevention and Control of diseases; Communication (Physical and Intellectual Mobility); Protection of our Space; Live Together- Build the Society; and Wealth Creation.

The report mentions the Comprehensive Africa Agriculture Development Programme (CAADP) as an important instrument to alleviate poverty and spur social and economic transformation on the continent. Furthermore, it states: 'In this regard, Africa must build its response capacities and capabilities and leverage existing relationships with relevant partners outside Africa, to deal with emerging challenges, such as low commodity yields, climate change and variability, water and land management, and increasing price volatility in global markets which could undermine efforts to eradicate hunger and achieve food and nutrition security. Processing, conservation and distribution of agricultural products goes far beyond the framework of rural and agricultural development sectors and requires a concerted intervention of STI' (p22). The report does not mention particular priority crops, targets or action points.



1.5 Forum for Agricultural Research in Africa (FARA) Strategic Plan 2014-2018

FARA's Strategic Plan 2014–2018 enhances African innovation capacity or agricultural transformation. Its overall aim is to ensure African agricultural innovation systems, which are functioning effectively in creating jobs, building wealth and improving food security on sustainable bases. It addresses three strategic priorities (p. 26), namely:

1. Visioning Africa's agricultural transformation – with foresight, strategic analysis and partnerships
2. Integrating capacities for change – by connecting and learning
3. Enabling environment for implementation – by advocating and communicating

FARA will achieve its purpose by accomplishing the following objectives:

1. To enable Africa to determine the future agriculture it wants, with proactive approaches to making the best of opportunities in agribusiness, trade and markets, taking advantage of emerging sciences, technologies and risk mitigation, and using the combined strengths of public and private stakeholders.
2. To integrate capacities by connecting institutions and matching capacity supply to demand to create consolidated, high-capacity and effective African agricultural innovation systems.
3. To create an enabling environment for sustainable implementation of programmes for African agricultural innovation through evidence-based advocacy and widespread stakeholder awareness and engagement.

The Strategic Plan 2014-2018 does not mention legumes, or specific targets and action points related to legumes.

1.6 Global Forum on Agricultural Research and Innovation

The Global Forum on Agricultural Research and Innovation (GFAR) is the global multi-stakeholder forum on agricultural research and innovation. GFAR is an open, voluntary forum, made up of partners across public, private and civil society sectors working together, through collective advocacy and actions, to shape the future of agriculture and food and their role in achieving sustainable development. Partners are working to make agri-food research and innovation more effective, responsive and equitable, towards achieving Sustainable Development Outcomes. GFAR seeks to ensure agricultural innovation and delivers its intended development impact through collective advocacy, partnership development, transforming Institutions and sharing agricultural knowledge and technologies into development purposes.

The GCARD Roadmap describes the broad transformative changes needed in national systems, as articulated by the sector, while GFAR's Medium Term Plan sets out how GFAR will get there, specifying the practical actions GFAR needs to take collectively through six Work Streams, each one with a concrete outcome:

- Foresight for Better Futures: Farmers and national stakeholders empowered and informed to better negotiate their own agricultural futures.
- Partnerships for Impact: Equitable and effective demand-driven partnerships to transform agricultural research and innovation into meaningful impacts at scale.
- Transformative Investments: Transformative AR4D investments stimulated to provide tangible opportunities for the world's poor.
- Capacities for Change: Collective initiatives fostered to improve capacity in Agricultural Research for Development.
- Research in Society: Agriculture and innovation is embedded into rural development agendas.
- Accountability for Action: Accountability, transformational change and development impacts in Agricultural Research for Development systems increased through more effective governance and greater and more transparent stakeholder involvement.

The GCARD Roadmap does not mention particular priority crops, targets or action points.



2 National policies relating to legume intensification per N2Africa country

2.1 Agricultural policies in DR Congo

The Government of DR Congo (DRC) formulated two formal regulations aimed at increasing agricultural productivity, improving food security, diversifying food production to improve nutrition, and increasing agricultural incomes of rural people. These regulations are the Loi important principes fondamentaux relatifs à l'agriculture and the Programme national d'investissement agricole (PNIA) 2013–2020.

2.1.1 LOI important principes fondamentaux relatifs à l'agriculture

The Law No11/022 (2011) provides an overview of fundamental principles related to agriculture. It promotes the growth of agricultural production in order to ensure food security and the development of the rural environment. The Law includes broad guidelines for the development of the agricultural sector and the agro-industry, training and research, the conservation and sustainable use of plant genetic resources for food and agriculture and the production and marketing of inputs and (processed) food products, amongst others. However, the Law does not mention any particular crop (e.g. legumes), targets or action points to promote legumes.

2.1.2 Programme national d'investissement agricole (PNIA) 2013–2020

The government of DRC initiated the national agricultural investment program 2013-2020 (2012) to reduce extreme poverty, hunger and malnutrition and improve food security. The National Agricultural Investment Program DRC (PNIA) aims to stimulate sustained agricultural growth (at least 6%). The CAADP pillars led to and are integrated in the current PNIA. The Government's vision is to revitalize the productive structure of the rural sector focused on the development of a modern agro-industrial production and strengthening smallholder farmers, while ensuring the conservation of its natural resources.

This overall strategic goal is reached by implementing seven subprograms. The primary objective of subprogram 1 is to promote the development of the green industry (e.g. food crops). For example, the production of pulses are expected to increase from 0.11 million tons to 0.31 million tons between 2015 and 2020 (p. 18). Groundnut and beans are considered as traditional food crops, which are cultivated under rain-fed smallholder farm systems and used for home consumption (p. 26, p. 70).

Subprogram 1 focuses on improved productivity of food crops (cereals, legumes, tubers and horticulture), particularly by producing and distributing certified plant materials, such as seeds and cuttings (p. 12, p. 35). Furthermore, it promotes sustainable management of natural resources, improved productivity and reduced drudgery of farm work, promoted the export of crops and fruit and reduces post-harvest losses (p33). Subprogram 1 mentions bean/cowpea and groundnut as priority crops. The aim is to improve bean/cowpea production from 224 (in 1,000 tons) in 2016 to 437 (in 1000 tons) in 2030. Groundnut production is projected to increase from 450 (in 1,000 tons) in 2016 to 873 (in 1,000 tons) in 2030 (Appendix 6.2, p. 133). The objective is to increase the production of bean/cowpea and groundnut up to 268, 536 (1,000 tons), respectively in 2020 (Appendix 6.4, p. 136).



2.2 Agricultural policies and research studies in Ethiopia

Ethiopia has four policy frameworks for developing the agricultural sector. The most notable one is the Agriculture Sector Growth and Transformation Plan II (ASGTP II), 2015-2020, setting targets including for major legume crop foods, such as faba bean, field pea, soyabean, groundnut, white pea bean, red bean, chickpea. The Agricultural Sector Policy and Investment Framework (PIF), 2010-2020, Working Strategy for Strengthening Ethiopia's Tef Value Chain and Maize Sector Development Strategy are other frameworks that drive Ethiopia's agricultural growth and development.

2.2.1 Agriculture Sector Growth and Transformation Plan II (ASGTP II), 2015-2020

The country's vision, the existing policies and strategies, achievements of GTP-I and lessons drawn from its implementation were the basis for formulation of second generation Growth and Transformation Plan (GTP-II) 2015-2020. The objective of this plan is to realize fast and sustainable growth of the agricultural sector and ensure the citizens benefited from the growth (p. 2).

In the second phase of the plan, crop development will continue holding the lion share for food security, export earnings and fulfilling the demand to the growing agro-industries. Strategic Objective 1 'Increasing crop production and productivity' is categorized into major food crops. Increased average productivity of pulse crops (goal 3, p. 5) and oil crop (goal 4, p. 5) are goals that contribute to achieve this objective. Agricultural program 9 (p. 127) focuses on 'Pulse and oil seed supply support'. Furthermore, The ASGTP II sets clear baseline, appraisal targets and end-line targets for major crop foods, such as faba bean, field pea, soyabean, groundnut, white pea bean, red bean, chickpea (p. 6-8).

ASGTP II outlines different implementation strategies for the priority crops. These strategies and crops are:

- Faba bean and field pea (p. 17),
- Soyabean - Introduction of disease resistant with high oil and protein content soyabean varieties and supply of quality soyabean seeds, amongst others (p. 19),
- Groundnut - Varieties which have high oil content, have large size and attractive colour, which the export market demands, tolerate insect attack and resist disease infection will be developed (p20),
- White pea bean and red bean - Varieties which have drought tolerance ability, disease resistance and pest tolerance will be developed and demonstrated on the farmer's fields (p. 21),
- Chickpea - Large seed variety which, has drought tolerance ability, disease resistance and pest tolerance will be developed and demonstrated on the farmer's field (p. 22).

2.2.2 Agricultural Sector Policy and Investment Framework (PIF), 2010-2020

The Policy and Investment Framework (PIF) provides a strategic framework for the prioritisation and planning of investments that will drive Ethiopia's agricultural growth and development. It is designed to operationalise the CAADP Compact signed by the Government and its development partners. This 10-year road map covers four thematic areas: (i) sustainable growth of agricultural productivity and production, (ii) agricultural commercialization and agro-industrial development, (iii) conservation and productivity of natural resources, (iv) food security and disaster prevention in Ethiopia. Increasing productivity in smallholder agriculture is the Government's top priority.

The priority investment areas (for strategic objective 'Productivity and Production) are irrigation development, skill development (including DAs and farmers), seed and fertiliser supply, soil fertility management, livestock development and research. The framework does not explicitly mention priority crops (e.g. legumes), although it refers to CAADP pillars that do mention priority crops.



2.2.3 Working Strategy for Strengthening Ethiopia's Tef Value Chain

This National Strategy document (2013) has been designed to refocus national attention on tef and work towards doubling productivity in the next five years by defining a vision, identifying challenges, and proposing interventions to drive transformation of the tef value chain. The document describes several interventions to improve the tef value chain.

Intervention 3 promotes efficient cropping systems (crop rotations, double, relay, agroforestry). 'An ideal tef variety in a double-crop system consistently produces high yields of high-quality grain, yet matures early enough to permit timely establishment of a pulse crop (usually chickpea)' (p. 55). Furthermore, the document states: 'Improved cropping systems of various kinds will enable farmers to achieve higher yields and lead to a higher earned income, both through increased tef yields and also, in some cropping systems, through harvest of double crops in one season' (p. 58).

The document explicitly refers to the importance of legumes and rhizobia, as it states: 'In particular, tef can benefit hugely from the practice of crop rotation, specifically with legumes such as chickpea or faba bean. The best nutrient management practice is achieved when legumes are used in crop rotations to supply biologically fixed, atmospheric nitrogen as a replacement or supplement for inorganic nitrogen fertilizer. Legumes in the rotation can be used to increase the available soil nitrogen. Symbiotic nitrogen-fixing bacteria called rhizobia form nodules on the roots of legume plants and convert or fix atmospheric nitrogen to organic nitrogen. The amount of nitrogen fixed varies by species, available soil nitrogen, and many other factors. Fixed nitrogen not removed from the land by harvest becomes available to succeeding crops as the legume tissues undergo microbial decomposition. When the legume crop is seeded, rhizobia inoculum should always be applied to the seed. To ensure the most productive symbiosis, commercial strains should be applied to form effective nodules and that inoculated bacteria are always present. Even though indigenous bacteria may be present in the soil, research shows improved commercial strains of rhizobia have more capacity to fix nitrogen. Rotations are used to reduce pests and diseases in the cropping system and to control weeds by including smothering crop species (e.g. cowpeas) or green manure cover crops' (p. 58).

Finally it states: 'The best economic returns from rotations can be expected if legumes are included, because of the nitrogen they add to the system' (p. 59).

2.2.4 Maize Sector Development Strategy, 2013-2017

The Maize Sector Development Strategy was formulated to ensure all components of the maize sector are addressed in a comprehensive and coordinated manner through a value chain approach. The five core components of the maize value chain are: research and technology development, access to inputs, on-farm production, post-harvest processing and storage, and trade, marketing and demand sinks (p. 7).

The strategic interventions in the document explicitly refer to the importance of legumes, as it states: 'Sound intercropping, relay cropping, double cropping or crop rotation can fit within a sustainable cropping system for maize farmers depending on agro-ecology. Such cropping systems have the benefit of increasing yields, reducing nitrogen fertilizer needs (if cropping systems involve nitrogen fixing plants) and reducing the risk of income loss for farmers due to a diversity of crops and markets. Within the overall maize sector strategy, these agronomy practices provide an opportunity to increase overall efficiency of production while not flooding maize market outlets, since part of the land currently under maize could be replaced by legumes or alternative crops with alternative market outlets' (p. 38).



2.3 Agricultural policies in Ghana

Ghana has two major policy frameworks for developing the agricultural sector. These are the Food and Agriculture Sector Development Policy (FASDEP II) launched in 2007 and the Medium Term Agricultural Sector Investment Plan (METASIP) launched in 2010.

2.3.1 Food and Agriculture Sector Development Policy (FASDEP II)

FASDEP II emphasises the sustainable utilization of all resources and commercialisation of activities in the sector with market-driven growth in mind. Enhancement of productivity of the commodity value chain, through the application of science and technology, with environmental sustainability is emphasised. Greater engagement of the private sector and collaboration with other partners will be pursued to facilitate implementation of policies.

The policy aims to ensure consistency with national development objectives as specified in the Growth and Poverty Reduction Strategy II (GPRS II). GPRS II aims to achieve accelerated and sustainable shared growth, poverty reduction, gender equity, protection and empowerment of the vulnerable and excluded within a decentralised and democratic environment. Agriculture is expected to lead the growth and structural transformation of the economy. Furthermore, the vision for the food and agriculture sector is linked to the Comprehensive Africa Agriculture Development Programme (CAADP).

FASDEP II has six main policy objectives:

1. Food security and emergency preparedness;
2. Increased growth in incomes;
3. Increased competitiveness and enhanced integration into domestic and international markets;
4. Sustainable management of land and environment;
5. Science and technology applied in food and agricultural development;
6. Improved institutional coordination.

Key elements of the first objective 'Food security and emergency preparedness' are nutritive quality of food, self-sufficiency and physical and financial availability. The broad strategy for the attainment of food security is to focus at the national and agro-ecological levels on the development of five staple crops (maize, rice, yam, cassava and cowpea). These commodities will receive support in terms of:

- irrigation and sustainable management of land,
- Improved planting materials,
- appropriate mechanisation, to enhance productivity along the whole value chain

These five crops and their value chain feature prominently for productivity improvement. Cowpea features here because it is the most widely consumed legume in Ghana. Under this policy strategy, the productivity of these crops will be improved through increased use of certified seeds and good agricultural practices (GAPs).

Appendix II shows the indicators and monitoring method to improve objective 1. Table 2 shows the indicators related to N2Africa promoted legumes.

Table 2: Matrix of Harmonised Monitoring and Evaluation Indicators (FASDEP II, Appendix 2)

Objective 1 - Indicator	Monitoring method/Activities
Per capita production of key staple foods (crops, livestock and fish) in kg/annum, except for live animal/annum. (Quantitative & Outcome indicator)	Area, yield and production measurement for maize, rice, cassava, yam, cocoyam, cowpea, soyabean, plantain, sorghum, groundnut, millet, poultry, sheep/goat, pig, cattle and fish



2.3.2 Medium Term Agricultural Sector Investment Plan 2011-2015 (METASIP)

The METASIP is a sector wide investment plan and includes activities of agriculture-related Ministries, Departments and Agencies (MDAs) based on the classification of functions for the agricultural sector. METASIP is based on FASDEP II policy objectives and has six main programmes. These programmes correspond with the policy strategies and the priority staple crops (maize, cassava, rice, yam and cowpea) of FASDEP II. Three main legumes cowpea, soyabean and groundnut feature in this policy under two different programmes.

Programme 1 'Food security and emergency preparedness' will increase productivity and total production and improve food distribution to vulnerable groups and enhance nutrition. This programme has selected cowpea as priority staple crop to improve productivity (p. 20). The improved productivity is supposed to be achieved through increased use of agro-inputs including certified seeds and GAPs. Under this programme cowpea yield is expected to increase by 25% (Output 1.1.1., p. 24). Output 1.4.2. emphasizes the private sector capacity (including FBOs) to process (mill and/or package) 25,000 Mt of maize, cassava, yam, sorghum and cowpea products annually (p. 27).

Groundnut and soyabean fall under the second programme 'Increased growth in income'. The objective is to increase rural industrial processing of soyabean and groundnut by 30% by 2015 (Output 2.5.2, p. 36).



2.4 Agricultural policies in Kenya

Kenya's overall development plans are captured within the Kenya Vision 2030, the country's development program from 2008 to 2030. This plan is the basis for several major policy frameworks for developing the agricultural sector. These are the Agricultural Sector Development Strategy (ASDS) 2010-2020, launched in 2010, the National Food and Nutrition Security Policy, launched in 2011, the Agricultural Sector Development Support Programme (ASDSP) and Guideline for Registration of Bio-fertilizers in SSA, both launched in 2013.

2.4.1 Kenya Vision 2030

Kenya's overall development plans are captured within the Kenya Vision 2030, the country's development program from 2008 to 2030. In the Vision, agriculture is identified as a key sector in achieving the envisaged annual economic growth rate. This shall be achieved through transformation of smallholder agriculture from subsistence to an innovative, commercially oriented and modern agricultural sector. The Vision is based on three "pillars": Economic, Social, and Political. Increasing Value in Agriculture is one of the thrusts within Economic Pillar. The Kenya Vision 2030 is being implemented in successive five-year plans, with the current plan covering the period 2013-2017.

Within the thrust Increasing Value In Agriculture, Kenya intends to raise incomes in agriculture, livestock and fisheries by processing and thereby adding value to its products before they reach the market. It also raises three specific strategies: transforming key institutions in agriculture and livestock to promote household and private sector agricultural growth; increasing productivity of crops and livestock; and developing more irrigable areas in semi-arid areas. The Flagship Projects for the Agricultural and Livestock Sector do not directly address legumes technologies (Woomer, 2016).

2.4.2 Agricultural Sector Development Strategy (ASDS) 2010-2020

The Agricultural Sector Development Strategy (2010) focuses upon food security, poverty reduction and transforming agriculture from subsistence to commercial farming. The stated vision of the ASDS is "A food-secure and prosperous nation". The overall development and growth of the agricultural sector is anchored in two strategic thrusts: (i) increasing productivity, commercialization and competitiveness of agricultural commodities and enterprises and (ii) developing and managing key factors of production. The Agricultural Sector development Support Programme (ASDSP) is a framework programme of the government of Kenya aimed at kick-starting the implementation of the Agricultural Sector Development Strategy (ASDS) 2010-2020.

Section 2.4 of the ASDS strategy covers crop production. It has two categories based on the use of the harvested produce: food crops; and industrial crops. Food crops include cereals (maize, wheat, sorghum, rice, millet); pulses (beans, pigeonpea, cowpea, chickpea, green gram); and, roots and tubers (sweet potato, Irish potato, cassava, arrow root and yam) (p. 12). Beans are mentioned as one of the main food crops (p. 12). Oil crops are mentioned as commercial crop.

Legumes and oilseed cake are mentioned as feed for non-grazing animals such as pigs and poultry, as concentrates are made from cereals such as maize, wheat, barley, oats, millet and sorghum, legumes and oilseed cake—soyabean... (p. 38). The policy states: 'Kenya's agro-ecological zones are suitable for producing cereals and leguminous crops. Crop residues could be mixed with other fodders or processed for feeding animals, especially during the dry season. Use of crop residues is constrained by inadequate knowledge on how to use them, limited conservation technologies, low nutritive value, post-harvest loss and their bulkiness'. In addition, research in and adoption of drought-tolerant crop varieties such as cotton, sisal, sorghum, millet and pigeonpeas will be promoted.

ASDSP mentions legumes as option for environmental "proofing" of the beef value chain (p. 34). It reports: 'Exploitation of selective grazing behaviour, decreased grazing pressure, improving natural diversity through introduction of legumes, like *Leucaena*, could improve and buttress land condition. Groundnuts are explicitly mentioned as option to increase soil fertility. It reports: 'Its (e.g. groundnut) leguminous nature help in soil nitrification¹- add nitrogen into the soils'.

¹ Presumably meaning nitrogen fixation



2.4.3 Policy Responses to Food Crisis in Kenya

The Kenya Agricultural Research Institute (KALRO) developed this policy response that focuses largely upon food security as the key objective. It attributes food insecurity to several factors: (i) frequent droughts, (ii) high costs of inputs, especially fertilizer, (iii) displacement of a large number of farmers following the post-election violence in early 2008, (iv) high global food prices and low purchasing power for large proportion of the population due to high degree of poverty. Its policy response focuses upon three areas: supply, prices and income. It indirectly relates to legumes, by reporting the importance of crop and dietary diversification (Woomer, 2016).

2.4.4 National Food and Nutrition Security Policy

The new Food and Nutrition Security Policy (FNSP) (2011) provides an overarching framework covering the multiple dimensions of food security and nutrition improvement. This policy is framed in the context of basic human rights, child rights and women's rights, including the universal 'Right to Food' (p. vii).

The policy states that: 'Over the past 30 years the government has successfully promoted the production of legumes such as beans, grams and peas, and their important role in ensuring dietary diversity needs to be reinforced' (p. 25). Furthermore, legumes (for complementary feeding) are mentioned to address issues related to early childhood nutrition (p. 27).

2.4.5 Guideline for Registration of Bio-fertilizers in sub-Saharan Africa

The guideline for the registration of microbial bio-fertilizers has been drafted by the African Agricultural Technology Foundation (AATF) supported through Objective three of COMPRO II Project. Bio-fertilizers are products containing carrier based (solid or liquid) living microorganisms which are agriculturally useful in terms for instance of nitrogen fixation, phosphorus solubilisation or nutrient mobilization, to increase the productivity of the soil and/or crop. It is hoped that this guideline will be a useful tool for the establishment of national procedures for registration of bio-fertilizers in sub-Saharan Africa (SSA) in general (p. 4). The guideline are used by the Kenya Plant Health Inspection Service (KEPHIS) for legume inoculants, which are tested in the KEPHIS-sanctioned MIRCEN laboratory at the University of Nairobi (Woomer, 2016).



2.5 Agricultural policies in Malawi

Malawi has four major policy frameworks for developing the agricultural sector. These are the National Agriculture Policy launched in 2016, The Agriculture Sector Wide Approach (ASWAp) launched in 2010, the Adaptive Research Strategy 2015-2021 launched in 2015 and the Malawi Growth and Development Strategy II 2011-2016, launched in 2012. The CAADP Technical Review (2010) in Malawi should be seen as an exercise to lay the groundwork for successful implementation of the strategy through the Agriculture Sector Wide Approach (ASWAp).

2.5.1 National Agriculture Policy (NAP)

The National Agriculture Policy (2016) seeks a transformation of the agriculture sector that will result in substantial increases in agricultural production, productivity, and real farm incomes. The NAP identifies a set of priority actions necessary for realising this envisaged agricultural transformation. The NAP is aligned to Malawi's Vision 2020 and the Malawi Growth and Development Strategy II, which are the overarching long-term and medium-term development strategies, respectively. The NAP also builds upon the existing Agriculture Sector Wide Approach (ASWAp) investment plan and will provide the policy foundation for the development of the next ASWAp.

The second policy objective is directly related to legumes. It states: 'Double the contribution of legume and oilseed crops (e.g. groundnut, soyabean, common bean) to overall agricultural production and to Malawi's agricultural exports, particularly in processed form' (p. 8). Furthermore, the policy facilitates the creation of new structured markets, especially in legumes, oilseeds, sugarcane, coffee, horticulture, livestock, and fisheries products (p. 11 and p. 38). The Legume Council and the Legume Development Trust, among others, will promote production and continue to provide technical support on agricultural research and extension for the development of agricultural value chains.

In order to increase the development and adoption of agricultural technologies (Policy objective 3.1.2), MoAIWD will promote the development and commercial application of agricultural biotechnologies, including tissue culture, local production of inoculant for legumes, veterinary vaccines and medicines, and pesticides (p. 27).

Promoting the introduction of nitrogen-fixing plants, such as legumes, and agroforestry technologies and systems in crop farming systems is used as a strategy to improve agricultural productivity through sustainable land management (Policy objective 3.1.4., p. 29). Furthermore, the government ensures that national food and nutrition security is achieved through production and utilization of sufficient quantities of high-quality foods (Policy objective 3.5.1., p. 44). This is realised by promoting the production of high value and nutritious legumes, drought-resistant crops, horticultural crops, livestock, and aquaculture.

Increased average farm yield targets are mentioned for groundnut, soyabean, pigeonpea (2 tons ha⁻¹), common bean (1 tons ha⁻¹) (p. 62).

2.5.2 The Agriculture Sector Wide Approach (ASWAp)

The Government of Malawi (GoM) formulated the Agriculture Sector Wide Approach (ASWAp) aimed at increasing agricultural productivity, contributing to 6% growth annually in the agricultural sector, improving food security, diversifying food production to improve nutrition at household level, and increasing agricultural incomes of the rural people. The ASWAp is, therefore, a priority investment programme in the agricultural sector and is based on the priority agricultural elements of the Malawi Growth and Development Strategy (MGDS). It is also consistent with the Comprehensive African Agricultural Development Programme (CAADP).

Food security is one of the ASWAp strategies. Malnutrition will be reduced by agricultural diversification that includes legumes, vegetables, fruits, small stock (Goat meat and milk), pigs, rabbits, chicken and guinea fowl meat and eggs, and fish. In order to improve the availability of core food security technologies, the GoM decided to extend the Farm Input Subsidy Programme to include crops other than maize (especially legumes which can, when planted in improved combinations with maize, improve fertiliser use efficiency substantially). The Malawi government is including legume seed to the portfolio of subsidized inputs as a step towards sustainability (p. 40). Also because



shrubby legumes could transform the economic viability of fertilizer subsidy policies. The government facilitates the multiplication of foundation, breeders and basic seed, and promote multiplication and distribution of improved certified legume seed varieties for inclusion in the Input subsidy programme (p. 55).

Nutrition security is a second ASWAp strategy. The ASWAp stimulates the diversification of food production based on suitability of locations by increasing productivity of high nutritive value foods, such as legumes (bean, soyabean, pigeonpea, cowpea and groundnut) (p. 41, p. 82-83, p. 112, p. 125).

2.5.3 Adaptive Research Strategy 2015-2021

The Government of Malawi launched a programme known as Sustainable Agriculture Production Programme (SAPP) to address the development challenge affecting the country's agricultural sector. The Sustainable Agriculture Production Programme aims at contributing to poverty reduction and improved food security among rural populations through achieving a viable and sustainable smallholder agricultural sector employing good agricultural practices (GAP) in Malawi. The project is being implemented in six districts, namely: Chitipa, Nkhosokota, Lilongwe, Balaka, Chiradzulu and Blantyre. SAPP focuses on seven crops: maize, groundnut, pigeonpea, sorghum, cowpea, soyabean and bean (p. 1). Strategic outcomes by 2021 and objectives are: increased legume productivity, increased exports and improved seed availability of legumes (p. 9, p. 17, p. 19), identify type of fertilizers and amounts to apply to legumes, establish planting patterns that would increase legume productivity (p. 11), amongst others.

2.5.4 Malawi Growth and Development Strategy II (MGDS II)

The Malawi Growth and Development Strategy II (MGDS II) is the second medium term national development strategy formulated to attain the country's long term development aspirations. The objective of MGDS II is to continue reducing poverty through sustainable economic growth and infrastructure development. Agriculture and Food Security is one of its key priority areas. Within the agricultural sector the objective will be to increase the country's market share in traditional agricultural products, such as pulses (p. 17). The government continues prioritizing industries that add value to agricultural products. Focus is on soyabean, groundnut, amongst others (p. 59). Furthermore, increasing the production of pulses is one of the focus actions and activities to increase agricultural diversification (p. 50).

2.5.5 CAADP Technical Review

The purpose of the review (2010) was to enhance the quality of agricultural development and increase effectiveness of domestic and foreign development assistance for agricultural growth, food security and reduction of hunger and poverty and to ensure that every possible action is being taken to achieve the objectives and targets laid out in Malawi. One of the recommendations is to develop intensive dairy farming (cut-and-carry) along with cultivation of grass-legume mixture plots and wide distribution of multipurpose trees as supplements to the fodder requirement, soil re-nitrification² and moisture conservation (p. 24).

² Presumably meaning rebuilding of soil nitrogen



2.6 Agricultural policies in Mozambique

The Government of Mozambique formulated several policies aimed at increasing agricultural productivity, improving food security, diversifying food production to improve nutrition, and increasing agricultural incomes of the rural people. These policies are the National Agriculture Investment Plan 2014–2018, Plan operacional para o desenvolvimento agrario (PODA) 2015 and the Strategic Plan for Agricultural Development (PEDSA) 2010.

2.6.1 Strategic Plan for Agricultural Development (PEDSA) 2010-2019

The PEDSA 2010-2018 presents a medium/long term vision based on national directives for agriculture and the priorities set out in Africa's common guiding framework for improving agricultural sector performance – the Comprehensive African Agriculture Development Programme (CAADP). It focuses in particular on the Green Revolution Strategy, the Priorities of the Agriculture Sector, the Research Strategy, the National Extension Programme, the Re-forestation Strategy, the National Forestry Plan, the Irrigation Strategy, the Food Production Action Plan, and the Strategic Plan for Livestock. PEDSA's implementation approach is based upon the value chain, so its operationalisation takes into consideration all the activities linked to: (a) the development and transfer of technologies and provision of agricultural inputs; (b) agricultural production; (c) processing and marketing activities that add value to agricultural, livestock, forestry and wildlife products; and (d) sustainable natural resource management (p.vi). All proposed interventions pay particular attention to the special role of women farmers, young people and people suffering from chronic diseases such as those living with HIV/AIDS (p. 35).

The Programmes for priority funding from the treasury have identified a Sub-program for Legumes (AGR 01) (p. 64).

2.6.2 National Agriculture Investment Plan 2014–2018

The National Investment Plan for the Agricultural Sector (PNISA) reaffirms the vision of the agricultural, livestock and fisheries sector established in the PEDSA. The main goals established for the PNISA are (i) achieve an average growth of at least 7% per year over the next 10 years; (ii) the reduction of chronic malnutrition in children under 5 years of age, of 44% in 2008 to 30% in 2015 and 20% in 2020; (iii) the reduction by half of the proportion of people who suffer from hunger by 2015.

The PNISA gives priority to the production of food and cash crops. Priority food crops are maize, rice, wheat, beans, cassava, tomato (and horticulture more broadly), potato and orange fresh sweet potato; priority cash crops are cashew, cotton, soyabean, sesame and tobacco (p. 10).

The Food Crop Programme comprises actions by the following sub-programmes

- The objective of the 'sub programme to support the production of beans and other pulses' is the intensification of the production of red kidney beans in areas with agro-ecological potential, using technology packages with improved seeds (PT1) (p. 15).
- The Sub programme to Support the Soyabean Value Chain aims specific objectives establish include: (1) increase the availability of improved seed; (2) provide fertilizer; (3) ensure major pest and disease control; (4) increase irrigated areas through the construction / rehabilitation of major irrigation systems; (5) ensure the sustainable use of irrigated areas; (6) secure the market by promoting direct links with consumers, and (7) promote soyabean processing, in particular for nutrient-dense foods for undernourished mothers and children (p. 27).

The strategic objectives of the research program will be implemented through programs and research projects through its network of national research (p. 44).

(1) Pemba-Lichinga - concentration in potato, wheat, beans, corn, soyabean, cotton, tobacco;

(2) Nacala - concentration on cassava, maize, cotton, fruit, chicken and peanut;

(3) Border - concentration in corn, wheat, vegetables, soyabean, rice, cattle and chicken;



- Sub-program for research focuses on basic supply chains, food security and nutrition. Part of production chains and basic nutrition security and nutritional food crops consist of cereals (maize, rice, sorghum, millet and wheat), grain legumes (beans and peanuts), roots and tubers (cassava and sweet potato), vegetables, fruit trees and chickens, as defined in the Strategic Plan IIAM (p. 44).
- Sub-program research chain performance aims to contribute to increasing the productivity and competitiveness of producers in the agricultural sector by 10% in five years. The main agricultural products considered are: cotton, peanuts, cashew nuts, timber, fuelwood, sesame, soyabean, amongst others (p. 45).
- Sub-program on the availability of high nutritional value foods identified main priority actions: (i) promote the production and consumption of foods rich in micronutrients (e.g. orange flesh sweet potato, amaranths, moringa, cashew, mango, leafy greens, pulses) and protein (bean, chicken, fish, egg, goat, and milk) (p. 67).

2.6.3 Plan operacional para o desenvolvimento agrario (PODA) 2015-2019

The PODA identified fifteen strategic products for the development and investments in the Agrarian Sector. Soyabean is defined as one of the priority crops (p. 13, p. 85, p. 89-p. 94). Mass production of seed and vegetative material (soyabean) through the PITTA approach is mentioned as an strategic action (p. 21, p. 27, p. 43). Furthermore, the plan aims to improve production of beans (p. 13, p. 21, p. 30, p. 42, p. 93).



2.7 Agricultural policies in Nigeria

The policy environment affecting legumes and BNF technologies in Nigeria fall into three categories: the Green Alternative: Agriculture Promotion Policy 2016-2020, Nigeria's response to the global Strategic Development Goal 2 under its Zero Hunger Program and the new ENABLE-Nigeria Program that mobilizes finance for youth-led agribusiness development (Woomer, 2016).

2.7.1 Agriculture Promotion Policy (APP) 2016 - 2020

The Green Alternative APP started in mid-2016 with the new Federal Government and is already resolving major bottlenecks in food production and marketing. The Federal Ministry of Agriculture and Rural Development has identified a pool of priority crops. Two legumes are specifically covered within the APP, one of which is soyabean (p. 5). The initial focus in 2016-2018 will be expanding the production of rice, wheat, maize, soyabean and tomatoes (p. 12). The plan also identifies eleven key commodities for expansion of export markets, one of which is cowpea (p. 5).



2.8 Agricultural policies in Rwanda

Rwanda has five major policy frameworks for developing the agricultural sector. These are the Strategic Plan for the Transformation of Agriculture in Rwanda, Phase III launched in 2013, the Economic Development and Poverty Reduction Strategy 2013-2018, the Agriculture Gender Strategy, 2010, National Post-Harvest Staple Crop Strategy (2011) and the Strategies for Sustainable Crop Intensification in Rwanda launched in 2011.

2.8.1 Strategic Plan for the Transformation of Agriculture in Rwanda, Phase III (PSTA III)

The Strategic Plan for the Transformation of Agriculture in Rwanda Phase III (PSTA I, II, III) aims to reduce poverty and drive growth by increasing production of staple crops and livestock products and greater involvement of the private sector to increase agricultural exports, processing and value addition. The PSTA is aligned to guide Rwanda in implementing and achieving the continental and global socio-economic development goals as guided by the Comprehensive African Agricultural Development Program (CAADP) of NEPAD and the Millennium Development Goals.

The government uses an agricultural sector strategy based on resource management, human capacity and private sector driven value chains. The Ministry of Agriculture and Animal Resources (MINAGRI), and the Rwanda Agriculture Board (RAB) supported by development partners and public-private partnerships (PPP) are the key implementing actors.

PSTA III, Program 1 'Agriculture and animal resource intensification' mentions the development of bio-fortified food (e.g. beans fortified in iron) (Sub-program 1.7.3.) to reduce malnutrition. Furthermore, the government continues to maintain a National Strategic Reserve, for selected staples, like beans (sub-program 1.7.5.). Program 2 'Research, technology transfer and professionalization of farmers' mentions that, in addition to the on-going research in RAB, the government wants to develop and support lines of research devoted to market-related issues and crops with strong market potential (e.g. soyabean, Sub-program 2.1.1.).

Soyabean and beans have been selected as a priority value chain (Sub-program 3.2.7 and Sub-program 3.2.8).

Interventions focus on increasing the supply of soyabean for processing, following the priorities below:

1. Strengthen research on soyabeans to introduce high yielding and disease resistant varieties;
2. Increase production capacity of rhizobium to be supplied to farmers;
3. Promote soyabean as a Crop Intensification Program (CIP) crop to increase production.

Interventions for bean focus on the following priorities:

1. Continue and strengthen research to introduce new bean varieties appropriate for each agro ecological zone of Rwanda and with higher levels of micro-nutrients and iron;
2. Support cooperatives through the provision of improved post-harvest procedures through providing machinery and training farmers (Sub-program 3.8.2).

2.8.2 The Economic Development and Poverty Reduction Strategy (EDPRS II)

The Government of Rwanda developed the second Economic Development and Poverty Reduction Strategy (EDPRS II), from 2013-2017. EDPRS II aims to increase the pace of economic growth and further reduce the incidence of poverty, and lay the basis for sustainable growth into the future. The objectives of this strategic plan are closely coordinated with its thematic areas (e.g. economic transformation, rural development, productivity and youth employment and accountable governance) and priorities. Food reserves (e.g. beans and maize) are mentioned as outcome indicators to enhance food security and nutrition (p. 131). 'Increasing productivity of priority crops (maize, cassava, rice and beans) by increasing the use of fertilizers for both food security and exports to Burundi' is mentioned as economic transformation priority for Ruhango District (p. 139).



2.8.3 Agriculture Gender Strategy

The purpose of this gender strategy is to provide guidance to the Ministry of Agriculture and Animal Resources (MINAGRI), its agencies and development partners to be gender sensitive in their programming and interventions. This strategic document is an important lens with which to view the transformation of the agriculture sector. As such, gender will be mainstreamed in the implementation of the PSTA III programs.

The men and women farmers consulted indicated that at the family level, conflicts arise due to competition between cash and food crops. This aspect becomes a gender issue because food crops (e.g. beans, maize, amongst others) are tendered and managed by women, while men are heavily involved in cash crops (Irish potatoes, coffee, amongst others) (p. 6-7).

2.8.4 National Post-Harvest Staple Crop Strategy

This strategy is a framework to assist with strengthening the harvesting, post-harvest handling, trade, storage, and marketing within staple crop value chains; strengthening markets and linkages for farmers, and reducing post-harvest losses. The main objective is to reduce food insecurity through an efficient post-harvest private sector system delivering staple foods to the people of Rwanda. Axis seven 'Transparent strategic grain reserve supporting food emergency needs and liberalized markets' focus on Rwanda Strategic Grain Reserve (RSGR). Based on storability, availability, and consumption needs the RSGR will stock maize (representing general carbohydrate needs) and beans. The delivery of this component of the Strategy will be led by Ministry of Agriculture (p. 35).

2.8.5 Strategies for Sustainable Crop Intensification in Rwanda

The Crop Intensification Program (CIP) is a flagship program implemented by the Ministry of Agriculture and Animal Resources to attain the goal of increasing agricultural productivity under PSTA II. CIP aims to accomplish this goal by significantly increasing the production of food crops across the country. CIP currently undertakes a multi-pronged approach that includes facilitation of inputs (improved seeds and fertilizers), consolidation of land use, provision of extension services, and improvement of post-harvest handling and storage mechanisms. Started in September 2007, the CIP program focuses on six priority crops namely maize, wheat, rice, Irish potato, beans and cassava. The document states that: 'Since the dietary needs of human involve carbohydrates, proteins and lipids (fat), banana, soyabean and sunflower shall be added to the list of priority crops' (p. 19). The objectives are to double the productivity levels.

Crop rotation is critical in controlling the pressure from pests and diseases. The document states that: 'Cereals followed by legumes (beans, soyabean) or root and tuber crops (cassava, Irish potato) should provide sustainability and stability against the growing incidences of pests and diseases. Concepts of crop rotation need to be instilled amongst farmers. In addition to maize and wheat, seeds of improved varieties of non-cereal crops such as beans, sunflower and soyabean shall be made available to farmers to encourage crop rotation' (Target 5.5.1.2).



2.9 Agricultural policies in Tanzania

Tanzania has five major policy frameworks for developing the agricultural sector. These are the Value Chain Roadmap for Pulses 2016-2020, the Tanzania Agriculture and Food Security Investment Plan (TAFSIP) 2011-2020, the National Agriculture Policy launched in 2013, the Agricultural Sector Development Plan (ASDP) and the Agricultural Marketing Policy launched in 2008. Finally, the Nutrition Country Paper – CAADP Agriculture Nutrition Capacity Development Workshops presents an overview of the current nutritional situation in Tanzania as well as the role of nutrition within the country context of food security and agriculture.

2.9.1 Value Chain Roadmap for Pulses 2016-2020

The roadmap aims at increasing pulses production and productivity by adopting modern production techniques; strengthening coordination, institutional capacity and skills across the key actors in pulses with a view to improving quality of pulses produced in Tanzania in line with international standards. It also aims at stimulating pulses industry's growth by implementing coherent and supportive policies in line with the national development objectives; providing timely and appropriate market entry support for effective market development; enhancing the effectiveness of the sector for forward planning and marketing as well as scaling up production and trade by strengthening PPPs for seed development, access to finance, technology transfer and farmers support services.

Pulses are leguminous plants characterized by high nutrition content. They are an affordable source of protein and also a substitute for animal protein. Major and important types of pulses cultivated in Tanzania include common beans, cowpeas, pigeonpeas, green gram and chickpeas, mung beans and bambara nuts. The first strategic objective of the roadmap seeks to strengthen policy support institutions, promote pulses as a viable agricultural crop, improve quality standards and improve inter-institutional coordination. The second strategic objective tackles weaknesses in supply chain generally and production level inputs in particular. The third strategic objective is towards building effective skills of stakeholders throughout the different segments of the value chain, in order to ensure that productivity rises, postharvest losses fall and professionalism in pulse production improves (p. 16).

The Government of the United Republic of Tanzania has implemented a series of plans and policies with the objective, among others, of improving access to inputs, seeds, machinery and skills to increase the production and irrigation of pulses, and develop postharvest services and infrastructures. These plans include the Tanzania Development Vision 2025, the Agriculture Sector Development Strategy, and the Tanzania Agriculture and Food Security Investment Plan (TAFSIP) (p. xv).

The Ministry of Agriculture Food Security and Cooperatives (MAFSC) and the Ministry of Industry and Trade (MIT), and their related departments and affiliated institutions, have a key role to play in enabling the development of the Tanzanian pulses sector. These institutions have only recently defined pulses as an emerging and vibrant sector, and as a result there are still limited resources allocated to support this specific value chain (p. 35).

2.9.2 Tanzania Agriculture and Food Security Investment Plan (TAFSIP) 2011-2020

The TAFSIP is a 10-year road map for agricultural and rural development that identifies priority areas for investment and estimates the financing needs to be provided by the government, the private sector and its development partners to support the on-going implementation of the main long-term agricultural sector development programmes (ASDP/ASP) to “contribute to the national economic growth, household income and food security in line with national and sectoral development aspirations” transforming the sector to achieve food and nutrition security, create wealth, and poverty reduction.

A study by the International Food Policy Research Institute (IFPRI) provided helpful policy guidelines for the TAFSIP (Debowicz *et al.*, 2011). The IFPRI analyses shows that improving the productivity of maize, root crops, pulses and oilseeds, crops grown mostly by the poor, is most effective in reducing poverty and improving nutrition (p. 19). TAFSIP will focus on increasing productivity of the main food and export crops. Priority food crops are maize, rice, cassava, wheat, beans, sorghum, sugar and oil



seed crops (p. 38). This resulted for example in the Tanzania Bread-Basket Transformation Project (2010-2015) that aimed to increase smallholder incomes and improve food security by focusing on the development of maize, rice and beans (p. 74).

2.9.3 National Agriculture Policy

The National Agriculture Policy (2013) aims to develop an efficient, competitive and profitable agricultural industry that contributes to the improvement of the livelihoods of Tanzanians and attainment of broad based economic growth and poverty alleviation agricultural sector.

The policy emphasizes that agricultural commodity production in Tanzania has in the past been dominated by few commodities which were mainly for export, namely, coffee, cotton, cashew nuts, tobacco, tea, sisal, sugarcane and pyrethrum. Other crops have become equally important in local and export markets in their ability to generate national income and farmers' earnings. A number of these crops have found market outlets in regional and international markets. These crops include (but are not limited to) spices, fruits, oil seeds, pulses, vegetables, flowers, medicinal plants of commercial value and bio-fuel crops (p. 18). However, the policy does not mention specific objectives, statements or targets directly related to legumes.

2.9.4 Agricultural Sector Development Plan (ASDP)

The Agricultural Sector Development Plan enables farmers to have better access to and use of agricultural knowledge, technologies, marketing systems and infrastructure, all of which contribute to higher productivity, profitability, and farm incomes. The strategy sets the framework for achieving the agricultural sector's objectives and targets. In Tanzania, within food crops, maize is the most important (accounting for over 20 percent of total agricultural GDP, followed by rice/paddy, beans, cassava, sorghum, and wheat (p. 7).

The strategy mentions a number of new technologies that have been identified through agricultural research that promises improved returns in farm production or savings. These technologies are mostly already in use by a small but growing number of farmers as a result of pilot testing/adaptation or of delivery through extension. Improved bean varieties Uyole 94, Uyole 96, Uyole 98 and Kabanima are high yielding and tolerate diseases and mentioned as newly released technologies (p2). However, the document does not mention specific targets for legumes.

2.9.5 Agricultural Marketing Policy, 2008

The Agricultural Marketing Policy facilitates strategic marketing of agricultural products that ensure fair returns to all stakeholders based on a competitive, efficient and equitable marketing system. The policy guides the operations of the agricultural marketing systems (e.g. crop and livestock), ensures coherence, profitability and sustainability of activities by various market participants and promoting efficient marketing of agricultural products in the domestic, regional and international markets. However, the document does not mention specific interventions for specific legumes.

2.9.6 Nutrition Country Paper – CAADP Agriculture Nutrition Capacity Development Workshops

This paper presents an overview of the current nutritional situation in Tanzania as well as the role of nutrition within the country context of food security and agriculture, including strategy, policies and main programs. The purpose of this document is to increase knowledge on the nutrition situation, technical resources, sector programs and policies and identify the challenges and opportunities to scale up nutrition in agricultural and food security strategies and programs. The paper states that 'the diet in Tanzania is based on cereals (maize and sorghum), starchy roots (cassava) and pulses (mainly beans)' (p. 3).

The paper does not describe specific objectives, statements or targets directly related to legumes.



2.10 Agricultural policies in Uganda

Uganda has several major policy frameworks for developing the agricultural sector. These are the Agriculture Sector Strategic Plan 2015/16-2019/20 (ASSP), launched in 2015, the National Agricultural Policy (2011), the National Grain Trade Policy (2015), the National Nutrition Planning guidelines for Uganda, Uganda Nutrition Action Plan (2011). The Uganda Agriculture Investment Opportunities Brief (2015) was developed by the Government to share information about what initiatives the government is undertaking, or planning to make.

2.10.1 Agriculture Sector Strategic Plan (ASSP) 2015/16-2019/20

The Agriculture Sector Strategic Plan is a five-year strategy for the Ministry of Agriculture, Animal Industry and Fisheries for the period 2015/16 to 2019/20. It defines the priorities and interventions to be implemented over the five year period. The strategic direction of the agriculture sector is based on five outcome indicators that are aligned to the National Development Plan II (NDP II), Government of Uganda (GoU), regional and international commitments. 'Increase productivity by farmers to at least 50% of the yields at research stations for the twelve priority commodities' is one of the outcome indicators. The selected commodities include beans (high potential for food security), amongst others (p. 10). The Ministry will undertake investments to support production of these commodities including: seeds and planting materials; fertilizer; mechanization; water for agricultural production; and pests and disease control (Strategic Action 3) (p. 42). Furthermore the government will improve capacity for quality assurance, regulation, food and safety standards for beans (Strategic Action 2) (p. 50).

The minimum value chain activities related to beans include (p. 61):

- Increase seed production, multiplication and distribution
- Facilitate information and knowledge provision through extension
- Promote mechanization of bean production
- Promote fertilizer use and sustainable soil management
- Support irrigation technologies in beans production
- Facilitate marketing, post-harvest handling and value addition
- Strengthen the institutions and enabling environment

Soyabean and groundnut are promoted as key oil seeds, the government has set specific production targets to be achieved during the medium term (until 2020) (p. 68).

2.10.2 National Agricultural Policy (NAP)

The NAP (2011) guides the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) and other stakeholders in planning and making sector investments that enable households to progressively move towards higher incomes from daily, seasonal and long-term sources from the three sub-sectors: crops, livestock and fisheries. MAAIF developed a Development Strategy and Investment Plan (DSIP) as its medium-term plan. It was designed to translate national goals and priorities into a plan for public sector interventions in the agricultural sector. The NAP does not mention legumes.

2.10.3 Agriculture Sector Development Strategy and Investment Plan (DSIP) 2010-2015

On the basis of progress made and lessons learnt from specific commodity approaches to date and also because of a pressing need to show immediate impact, MAAIF has decided to support the development of specific value chains in addition to maintaining general support to agriculture. Accordingly, ten commodities have been selected under this sub-programme. Legumes (beans) are one of these selected commodities, as they are a major food security crop, become increasingly important as an export crop and several organisations (e.g. National Agricultural Research Organisation (NARO), Uganda Grain Traders Limited, Uganda Cooperative Alliance (UCA), United Nations World Food Program (WFP), National Agricultural Advisory Services (NAADS) and Uganda National Bureau of Standards (UNBS) have implemented programmes to promote bean production



and marketing (e.g. Dryland Legumes Research Program (NARO) and the National Bean Programme (NACRRI)).

Interventions related to beans are (p. 140):

- Research to develop new high yielding bean varieties;
- Seed multiplication and dissemination to integrate both the formal and informal seed production and distribution system for sustainability and wider reach of the communities;
- Policy Development to support development of the pulse sub-sector will be pursued;
- Extension and farmer support to improve their participation in the sub-sector and increase productivity of beans;
- Standards and quality assurance;
- Value addition/primary processing and marketing.

2.10.4 National Grain Trade Policy

The National Grain Trade Policy focuses on interventions aimed at improving the supply of quality grain through adoption of postharvest handling best practices, and use of modern storage and value addition facilities. It highlights strategic policy actions that will transform the grain sector to ensure sustainable and accelerated growth in grain production, quality storage, value addition and trade volumes. Beans and groundnuts are one of the primary agricultural commodities (p. 7).

2.10.5 National Nutrition Planning guidelines for Uganda

These guidelines are intended for planning teams and all those involved in nutrition planning at sectoral and local government level. The guidelines respond to the need for comprehensive multi-sectoral guidance for those involved in planning for nutrition activities at different levels. The government recognizes nutrition as a cross-cutting issue, relevant to a number of sectors such as health, agriculture, education, gender and social development, trade and industry, among others. Therefore, all relevant sectors at national and local Government levels must address nutrition in their development plans. To promote the uptake of nutrition-related agriculture technologies, bio-fortified iron-rich beans and legumes are promoted (develop information, education, p. 47). Specific interventions are targeted to increase farmers' awareness of benefits of bio-fortified crops such as iron-rich beans (p. 52).

2.10.6 Uganda Nutrition Action Plan (UNAP) 2011-2016

The UNAP (2011) aims to reduce levels of malnutrition among women of reproductive age, infants, and young children through 2016 ensuring that all Ugandans are properly nourished will enable them live healthy and productive lives. One thematic objective is to increase the target populations' consumption of diverse nutritious foods by increasing the production of and access to micronutrient-rich foods at the household and community levels (p. 5). Specific interventions are related to bio-fortified staple food crops (p. 22). The UNAP does not mention particular crops or legumes.

2.10.7 Uganda Agriculture Investment Opportunities Brief

The Uganda Agriculture Investment Opportunities Brief (2015) is developed by the Government of Uganda to highlight the analysis that has been undertaken to date and to share with agriculture and agribusiness sector investors and existing sector actors information about what initiatives the government is undertaking, or planning to make, with the objective that these public sector investments and incentives will attract investment from the domestic and international private sector (p.1). This brief is intended to support the interest of the government in outlining the related private sector investment opportunities in the country and to serve as a comprehensive and easy to use tool to promote investment opportunities in the agricultural sector of Uganda. The brief recalls that the Government of Uganda has prioritized the development of twelve value chains: beans are one of those (p. 5, p. 6, p. 25). Soyabeans are mentioned to be considered as a rapidly expanding export commodity (p. 33).



2.11 Agricultural policies in Zimbabwe

Zimbabwe has five major policy frameworks for developing the agricultural sector. These are the Comprehensive Agricultural Policy Framework (2012), Zimbabwe Agriculture Sector Policy, the Zimbabwe Agriculture Investment Plan (ZAIP), the Zimbabwe Agenda for Sustainable Socio-Economic Transformation (ZimAsset) and the Results Based Management System - Provincial Integrated Performance Agreement (2016). Zimbabwe had maize grain deficits for years. To overcome this burden new programs are attempts to reverse the fortunes. Several grain legumes are mentioned as other/minor crops.

2.11.1 Comprehensive Agricultural Policy Framework 2012-2032

The Comprehensive Agricultural Policy Framework document gives a summary of the situation analysis of the agricultural sector, highlights the vision, goals, objectives and detailed policy statements and strategies for the development of the Zimbabwean agricultural sector during the period 2012 – 2032.

Policy Issue 2 (see The Crop Sector Policy Statements, p. 10) states that the government will:

- (i) Promote crop rotations to include nitrogen fixing crops (p. 10);
- (ii) Promote research and adoption of high value crops, such as horticulture as well as small grains, green legumes³, pulses and tubers for inclusion in cropping patterns (p. 11).

The level of production of pulses should be raised due to their potential to provide food and nutrition security especially in low rainfall areas' (p. 4). Increased production of minor crops (groundnut, bean, cassava, rice, Bambara nut) are mentioned as target of Programme/Project output 9 (e.g. production increased from 539 to 734 tons year⁻¹ by 2015). The long term total allocated budget until 2032 is UD\$15,997,000 (p. 32). Programme/Project output 6 sets the target for increased soyabean production (allocated budget is US\$1,054,000,000 up to 2032).

2.11.2 Zimbabwe Agriculture Sector Policy

This policy addresses issues concerning crop and livestock production, marketing and trade in Zimbabwe. It promotes the development of an efficient, competitive and sustainable agricultural sector, which assures food security and increased income strives to contribute to the overall goal of poverty reduction and fulfilment of the Millennium Development Goals.

The principal food crops include maize, sorghum, pearl millet, finger millet, groundnuts, soyabeans, wheat, sugar-cane, barley and sunflower (p. 1). Legumes are described in Chapter two. It states that: 'legume crops such as soyabeans, groundnuts, dry field beans and cowpeas have experienced growth in recent years, although yields have been low. This growth was ascribed to an expansion of area grown, driven by reasonable returns, low cash input demands and absence of price controls' (p. 5).

Policy Issue 2 'Increasing crop diversification' emphasizes the potential value of legumes. It states: 'There has been over emphasis on promotion of a few crops such as maize, cotton, soyabeans and tobacco in the past. Very little land has been put to legumes, with most land being used to continuously grow maize in most smallholder areas. This has resulted in excessive and unbalanced soil fertility mining as well as poor soil structure.... Given the risk posed by climate change, there is need to promote greater crop diversification with potential to improve output and farm income stability' (p. 14). Therefore, the government will promote fertility friendly crop rotations (p. 15).

Furthermore, legumes are mentioned in Policy Issue 2 'Market related pricing'. 'Vulnerable groups will be supported from the fiscus using instruments that stimulate market development. In particular, food subsidies will involve food commodities such as small grains and legumes that currently are not widely traded in formal markets' (p. 35).

³ Presumably legumes and green manures



2.11.3 Zimbabwe Agriculture Investment Plan (ZAIP) 2013-2017

The Zimbabwe Agricultural Investment Plan 2013-2017 was initiated by the Ministry of Agriculture, Mechanization and Irrigation Development (MAMID). It is the sector plan for implementing the Agricultural Policy Framework in line with core CAADP principles.

ZAIP states that ‘the focus [on maize] tends to marginalize production of other staple foods, legumes and vegetables, leading to high levels of malnutrition, continued poverty which leads to food insecurity through inability to purchase food’ (p. 33). Leguminous oil seed crops are considered as important rotational crops with the staple foods, since they leave residual plant nutrients in the soil, thereby reducing the quantities and cost of fertilizer. In addition, the relatively short growing period enables farmers to plant oil seed crops after staple crops have been planted, increasing the income. Moreover, the by-products of oil seed crops processing are important in stock feed production (p. 29).

Soyabean is considered to be a commodity that has potential for growth and impact on the agriculture GDP (p. 7). Therefore, projected soyabean production targets are set (Table 7, p. 110). Furthermore, ZAIP shall focus on building the capacity of Zimbabwean farmers, service institutions, and private sector to increase production of commodities (e.g. soyabean, p. 56). In addition, ZAIP shall also build capacity for reviving production of irrigated wheat and soyabeans, in rotation, to provide the raw materials for processing and the by-products for blending of livestock feeds for dairy, poultry, pigs, and aquaculture (p. 81).

Groundnut is one of the oil seed staple crops (p. 28). However, ZAIP does not explicitly mention groundnut interventions.

2.11.4 Zimbabwe Agenda for Sustainable Socio-Economic Transformation (ZimAsset) 2013-2018

The Zimbabwe Agenda for Sustainable Socio-Economic Transformation (ZimAsset) was crafted to achieve sustainable development and social equity. It provides a framework for enabling environment for sustainable economic empowerment and social transformation to the people of Zimbabwe. The document does not mention legumes (except for picture front cover page – nuts, peas, oil seed).

2.11.5 Results Based Management System - Provincial Integrated Performance Agreement

The Results Based Management System - Provincial Integrated Performance Agreement (2016) provides an overview of key results areas, goals related to agricultural sector development at national, sectoral and ministry level. An increased production of minor crops (e.g. groundnuts, sugar beans, Bambara nuts, rice, cassava and sweet potato) are set as a goal, at national level (p. 3, p. 14). One of the strategies to release this goals is to mobilise and support 50,000 farmers to increase productivity, train 50,000 farmers on cash crop production, and link and train 5,000 of farmers on contract farming (p. 18).



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Partners involved in the N2Africa project

