TANZANIA SEED SECTOR ASSESSMENT

PARTICIPATORY NATIONAL SEED SECTOR ASSESSMENT FOR THE DEVELOPMENT OF AN INTEGRATED SEED SECTOR DEVELOPMENT (ISSD) PROGRAMME IN TANZANIA

SYNTHESIS REPORT

FINAL DRAFT April 25 2014

Commissioned by the Bill & Melinda Gates Foundation

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EXECUTIVE SUMMARY

Tanzania seed sector assessment

1. Improving agricultural productivity and production in African smallholder agriculture is widely recognised as a critical outcome in the pathway to growth and poverty alleviation. Increased crop productivity, especially for major staple crops, allows farmers to take advantage of growing market opportunities while increasing household food security and nutrition. In Tanzania, food crops account for 65 per cent of the agriculture gross domestic product (AGDP) (NAP 2013). A key ingredient to increased agricultural productivity and production is farmer access to inputs, particularly quality seed of superior varieties. The importance of enhancing smallholder farmers' access to quality seed and the role this can play in raising productivity of Tanzania agriculture is highlighted in the country's various policy and strategy documents such as the national agricultural policy (NAP 2013), the agricultural sector development programme (ASDP) and the Kilimo Kwanza national declaration of 2009.

2. Drawing from experiences elsewhere, and to add value to its existing interventions in the Tanzania seed sector and in agricultural development at large, the Bill & Melinda Gates Foundation (BMGF) engaged the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) to explore the possibility of investing to improve the seed sector performance through an integrated seed sector development (ISSD) programme. ASARECA partnered with the Royal Tropical Institute (KIT) from the Netherlands and collaborated with the BMGF local advisors in Tanzania to facilitate a participatory multi-stakeholder national seed sector assessment, as well as verify and validate the feasibility of implementing an ISSD programme.

3. The objectives of the assessment were to: i) identify entry points for an ISSD Tanzania Programme, ii) collect data to fill current knowledge gaps about the Tanzania seed sector, iii) identify potential partners and implementation modalities in the targeted zones and Zanzibar, and iv) create awareness of, and buy-in for, an ISSD Tanzania programme aimed towards the development of under-resourced crops.

4. The methodology was highly participatory, it was comprised of stakeholder workshops followed by interviews with resource persons (seed producers, service providers and project managers) and farmer focus group meetings in the Northern, Eastern, Central, Southern, Western and Lake zones and in Zanzibar. Seed system and seed value chain analyses and seed intervention gap analysis were done, and current seed policies and regulatory frameworks were assessed. In order to complement existing interventions and to ensure maximum impact on the food security and income of less advantaged farm households, this assessment focussed on food crops that are considered under-resourced. These include sorghum and millets, food legumes (chickpeas, cowpeas, common beans, groundnuts) and vegetatively propagated crops such as cassava, sweet potatoes and bananas. Based on the seed sector assessment, opportunities for intervention were identified and validated at a national multi-stakeholder workshop, and are now presented in this synthesis report.

5. From a preliminary scoping-out of the seed sector, four key areas for further intervention were identified and later endorsed by stakeholders: a) strengthening farm-saved seed production and community based seed systems; b) strengthening seed producers through local seed business development; c) facilitating innovation in seed value chains to address bottlenecks at the zonal level; and d) develop and implement seed policies and regulations conducive to a diverse, dynamic and integrated seed sector.

6. Results show that the Tanzanian seed sector comprises a wide variety of stakeholders from the public and private sector, as well as civil society actors. The public sector is strongly involved in all steps of the seed chain, from plant genetic resource management to seed production and marketing. Since 1989 private seed companies have been producing and marketing certified seed and some basic seed, with a main focus on modern varieties of maize. However, only 5.3 per cent of the seed used in Tanzania is certified, which doesn't come close to meeting farmers' needs. Agrodealers mainly sell maize and rice certified seed. Individually or as part of community based organizations (CBOs) or as members of farmer platforms (MVIWATA and TFA), farmers are involved in contract certified seed production, Quality Declared Seed (QDS) production and distribution and informal seed production. Seed chain support services are largely provided by the public sector (largely in the formal and intermediate systems). These services include seed

extension services, mainly provided through the local government district agricultural offices, and quality inspection and certification services by the Tanzania Official Seed Certification Institute (TOSCI). However, challenges associated with limited capacity (TOSCI) and skills have been observed. NGOs and farmer organizations are, to some extent, involved in seed extension often as part of projects, but largely in a facilitation role for the informal sector and QDS production. Most of the referred actors are represented in the National Seed Committee, an advisory body to the MAFC also responsible for variety release. Seed companies, agrodealers and farmers are under-represented, with negative implications on lobbying for favourable policies at this level.

7. Available data on seed production and use revealed that roughly only 5 per cent of the total cultivated area is planted with certified seed, with large variations between crops. A closer analysis showed that certified seed is only used for maize, sorghum, sunflowers and, to a lesser extent, wheat. For all other crops, including some that are a priority for food security and nutrition such as grain legumes, millets, cassava and sweet potatoes, farmers rely on informal sources for their seed. Information gathered from the scoping missions and stakeholder consultations in zonal workshops, which was verified during the zonal data collection and analysis, indicates that close to 95 per cent of the seed planted by farmers is obtained from the informal seed systems. What's more, women are the main actors in most operations in the informal seed systems that relate to the seed value chain of under-resourced crops. A good understanding of gender roles in the seed sector is therefore essential to the development of a dynamic seed sector that builds on the logic and strengths of this system. It was also noted that landraces which have not been released officially are among the preferred varieties for many of the crops being considered for an ISSD Tanzania programme.

8. During the assessment, it emerged that most ISSD principles are not entirely new to stakeholders. There are many examples of seed sector development following ISSD principles, such as participatory variety selection by breeders and farming communities, and the QDS system through which local individuals or farmer groups produce seed under minimal quality control for use within their own community. What does not exist is a seed sector development strategy in which the different seed systems are considered as complementary, and which would deliberately seek to strengthen the diversity in the systems and their interactions. When presented, such an approach was welcomed as a pragmatic approach to seed sector development, especially by farmer representatives and other actors operating at the grassroots level.

9. Nine seed systems were identified, but only eight were deemed relevant for an ISSD Tanzania programme; the closed seed chain was identified but was not further analysed as it is mainly relevant for industrial crops e.g., palm oil. Farm-saved and farmer-to-farmer systems are recognised as timely, affordable and reliable means of delivering seed of reasonably good quality; the main difficulty is that if no surplus seed is produced, or if crops fail during a drought, then seed production and availability is sub-optimal. In the community based system, there is purposeful production of surplus seed to satisfy the demand for quality seed; it also forms a good entry-point for new varieties from the formal system. The open market system is often the only available source at the start of planting season if a farmer is unable to obtain seed from neighbours; however, quality is not-controlled and seed is considered poor in meeting most parameters. Local seed businesses have specialised in responding to local demand and producers are known in their community, which provides a certain social pressure to maintain quality; marketing is however limited to the community and production, handling and storage could be improved. The relief system distributes seed to vulnerable groups in times of need; however it is an erratic and unreliable seed supply system, prone to be used as political leverage – and the manner in which seed is purchased for distribution often does more harm than good in terms of seed business development. Ideally seed used for relief efforts would be purchased from reputable seed multipliers, but producing seed in prevision of unanticipated disasters is near impracticable. The public seed system plays a significant role in Tanzania, in all steps of the seed value chain for all crops. However, while stakeholders from the seed sector recognised the importance of the public role, they also indicated that the availability of early generation seed is highly inadequate and that the public sector is competing with private enterprises in seed multiplication and marketing. It was concluded, that improvements could be made in the relation between actors from the public and private sector and their mandate in the Tanzania seed sector. The general focus on value chains and private sector involvement results in a bias towards private seed companies. To date, 54 private seed companies have been registered in Tanzania; they produce certified seed, focussing mainly on maize, and have shown willingness to branch out into other crops. Some companies produce all of their seed

themselves, while others grow part of their production on their own farms and contract out-growers for the rest. Most seed companies market their product through agrodealers.

10. In each zone, five priority crops were selected (except in the Southern and Lake zones where six and seven were selected, respectively). Each of the crops, which include Bambara nuts, bananas, beans, cassava, chickpeas, cowpeas, groundnuts, pearl millet, pigeon peas, sorghum and sweet potatoes, was selected in at least three zones, except Bambara nuts and chickpeas which respectively feature only in the Southern and Lake zone. Sweet potatoes, a recognized food security crop, are featured in all zones and in Zanzibar. Generally, the selection of under-resourced crops as priority crops within the boundaries set by the BMGF was largely undisputed, with fairly clear preferences by seed sector stakeholders. Though rice had been prioritized in Zanzibar, it was dropped due to the existence of strong government subsidy, which conflicts with ISSD principles.

11. An overview of current and past initiatives identified more than 60 programmes and projects related to the Tanzania seed sector, though most are concentrated in a few zones, notably in the Lake, Central, Eastern and Southern zones, with little presence in the Western zone and hardly any in Zanzibar. These initiatives mainly focus on maize, rice and vegetatively propagated crops, particularly in Northern and Eastern zones. They also show a general emphasis on variety development in the formal system, as well as seed multiplication and distribution. Most of the national programmes are pegged at the district level, are largely implemented by NGOs and focus heavily on vegetatively propagated crops and some grain legumes. Key gaps noted were:

    - With the exception of the AGRA's initiatives on policies for the support of the formal seed systems, there is limited focused attention on policy and regulatory frameworks that could enhance private sector (including local seed business) involvement in the seed value chains, particularly for small cereal grains, vegetatively propagated crops and grain legumes. For example, issues like fair competition, access to germplasm and early generation seeds, and competition with subsidies and relief seed, are rarely addressed. A few projects, notably on vegetatively propagated crops in the Lake and Eastern zones, display some efforts to develop certification standards for planting materials.
    - The lack of seed policies and regulations, along with the near absence of relevant programmes and projects in Zanzibar.
    - None of the identified programmes or projects attempt to intervene from an integrated seed sector perspective, even for the small grain cereals and legumes where multiple systems are present.
    - Interventions tend to address one or two operations in the seed value chain rather than bottlenecks in the entire chain.
    - Looking at the identified programmes, projects and actors in the seed system reveals an uncoordinated array of efforts between the public, NGO and private sectors, with limited opportunities for information flow between players in the seed value chains.

    However, opportunities to work with these programmes and actors do exist, for example, to enhance the distribution of emerging superior seed varieties into the intermediate and informal systems; to build on the progress made in community based and potential business models for the development of viable local seed business and to scale up these innovations in seed value chains to the zonal level.

12. Opportunities for seed sector interventions were identified in each of the zones for the prioritised crops, for the different steps in the seed value chain, seed services and policies:

    Plant genetic resource conservation
    - Support participatory variety selection in collaboration with local seed businesses and community-based seed producers to respond to local demand.
    - Stimulate further recognition of local agro-biodiversity as a source for new varieties.
    - Develop a robust and cost effective system of local and central conservation of Tanzanian agro-biodiversity.

Variety development and screening

- Longer term public-community-seed business collaboration in variety screening of the selected under-resourced crops (see also plant genetic resource conservation).
- Support participatory variety selection in collaboration with local seed businesses and community-based seed producers to respond to local demand (see also plant genetic resource conservation).
- Fast-track the registration of popular landraces as official varieties.
- Performance based incentive structures for breeders in the public domain.
- Improve facilities for variety selection of under-resourced crops.

Early generation seed production

- Improve the balance between public and private roles in the seed sector, based on the principle that what the private sector is willing to invest in, the public sector can gradually withdraw from.
- Support the development of private seed enterprises that produce early generation seed.
- Improve the capacity of public institutions to produce early generation seed of under-resourced crops, to better respond to local demands.
- Develop a pre-season order and payment system to allow for a better response to demands.
- Develop the early generation seed production of vegetatively propagated crops such as cassava, sweet potatoes and bananas.

Seed multiplication

- Support seed producers' investments in water harvesting or other supplementary irrigation facilities to reduce the risks to their business and ensure the availability of seed for peak demands after drought.
- Support existing, emerging and new seed producers with seed extension, so that they have access to the most appropriate technologies for their circumstances.
- Provide existing and emerging seed producers with seed business support, so that they can improve their response to market demands and their revenues.
- Support TOSCI in the on-going decentralisation of seed crop inspections to district agricultural offices.
- Build on the current, much appreciated QDS system to ensure quality control of all crops for which seed is sold, and allow for marketing of seed beyond ward boundaries.
- Fast track the development and operationalization of QDS certification standards, protocols and quality control mechanisms for vegetatively propagated crops.
- Improve the quality of self-supply of seed through seed extension services to ordinary farmers.

Marketing and distribution

- Develop market information systems that make the availability of local businesses' seed stocks known in real-time, to allow for the flow of quality seed to areas where high demand exists.
- Help local seed businesses develop brands for their seed.
- Promote the collaboration between local seed businesses and private seed enterprises, through contract farming and other means.
- Promote seed fairs during times of peak demand and pilot marketing of QDS seed in open markets.
- Investigate and pilot opportunities for seed source traceability to fight counterfeit seed.
- Provide seed advisory services to ordinary farmers to create a larger market for quality seed and to promote locally produced quality seed.

Seed chain service providers

- Extension-seed producer collaboration to demonstrate the benefits of the use of high quality seeds to ordinary producers.
- Provide technical and business training to emerging seed businesses.
- Develop suitable financial products for seed multipliers.
- Develop quality control systems in seed marketing channels.
- Develop real time electronic seed availability systems.
- Fast-track the registration of popular landraces.
- Support the decentralisation of seed inspections.
- Train ordinary producers on seed quality maintenance.

Policies and legal frameworks supporting ISSD

13. The policy and regulatory frameworks which support the development and operations of the Tanzania seed sector are founded mainly on: (i) the Seeds Act (No 29, 1973), which marked the start of the formal seed system through the establishment of the Tanzanian Official Seed Certification Agency (TOSCA) and a public seed company (Tanzania Seed Company Ltd.) and government seed farms; (ii) Seeds Act (No 18, 2003) with its regulation in GN 37 2007, which regulates the governance of all issues pertaining to the seed industry, including private sector access to pre-basic seed of publicly bred varieties and the functioning of TOSCI for seed certification and quality control. It also recognises QDS, which was first established in 1998, and 'standard seed' (important in relief seed efforts). Through this Act, the National Seeds Committee was established to serve as a stakeholders' forum that would advise Government on all matters regarding the development of the Tanzania seed industry. The private sector is represented by the Tanzania Seed Trade Association. On the whole Tanzania has a strong legal regime that regulates seed variety release, seed certification, and quarantine and phytosanitary measures. They include: (a) the Seeds Act of 2003, read together with the Seeds Regulations of 2007; (b) the Plant Protection Act of 1997, read together with the Plant Protection Regulations of 1998; and (c) the Plant Breeders Right (No 222, 2002).

14. Though there are no similar seed policy and regulatory frameworks in Zanzibar, the Ministry of Agriculture, Livestock and Environment (MALE) enforces the Plant Protection Act, 1997, which regulates the control of seed imports to the islands, quarantine and subsequent destruction of pest infested seed or plant material. This potentially provides some protection for vegetative crops such as cassava against diseases. Zanzibar was also recently granted the establishment of a Variety Release Committee, with representation under MALE.

15. By and large, the existing policy and legal frameworks allow the existence of a pluralistic formal (public and private sector) system and an intermediary system, which produces and distributes QDS. In this context, the existing frameworks show an intention to support the development of a pluralistic seed sector, which is one of the basic tenets of an ISSD approach. However, the consultations with key stakeholders and the results from the awareness workshops and seed sector assessments across the zones and Zanzibar revealed various significant issues and gaps which call for intervention in order to enhance the performance of the seed sector:

    - At the top on the list of such issues is the fact that the different types of seed chain operations in the informal seed system, which tend to account close to 95 per cent of the seed used in the country, are neither officially recognised nor supported under policy and regulatory frameworks; some seed value chain operations such as plant genetic resource management in relation with community seed management, are neither recognised nor supported by regulatory frameworks. Secondly, QDS can only be marketed within its own ward and has to be multiplied from formally registered varieties. These requirements limit the operations of seed multipliers who aim to respond to local demand and develop viable local seed business.

    - Various issues concerning different seed chain operations and operators were identified, such as: (i) the need to simplify the variety release procedures and the involvement of the demand side actors; (ii) early generation seed production and distribution (or access), seed quality control and breeding, and the option to involve other stakeholders. Such issues are related to the capacity and effectiveness of public actors, including TOSCI and the Agricultural Seed Agency (ASA); TOSCI is looking at options to decentralize its quality control services, which would hopefully result in the reduction of red tape to start QDS local seed businesses; while ASA has a limited capacity to deliver on its mandate and involve private sector and farmer associations in Early Generation Seed production, seed quality control and breeding, as foreseen in the NAP 2013. This is crucial as there seems to be some concern about limited private sector access to early generation seed of publicly bred varieties; (iii) the need to mainstream and enhance seed extension and promote the use of quality seed, which requires some specialization in public extension, working with private extension (agrodealers and seed companies and farmer organizations), as well as seed market information services.

    - Cost-effective ways to manage subsidies/vouchers in order to stimulate the use of quality seed without undermining private enterprises.

- How to make Plant Variety Protection work as an incentive for breeders to release more and better adapted varieties, along with how to register and protect local varieties.
- Though progress has been made in the development of protocols and certification standards for seed of vegetatively propagated crops (cassava, sweet potatoes and bananas), this needs to be fast tracked and implementation modalities need to be developed.

16. The National Agricultural Policy (NAP 2013) recognizes challenges in the seed sector, notably: inadequate knowledge on intellectual property rights; low participation of local and foreign bodies in seed production and breeding; and limited involvement of the private sector in the multiplication of breeders and foundation seed in order to enable a more ample supply of improved seeds. In particular, it states that: (i) local and international bodies shall be facilitated to participate in breeding and seed production; (ii) private sector participation in multiplication of pre-basic and basic seed shall be promoted. The seed policy, which is to be developed in the context of Tanzania Agriculture and Food Security Investment Plan (TAFSIP) and the National Agricultural Policy (2013), is anticipated to guide seed sector development. Its development and related regulatory frameworks along with NAP 2013 provide an opportunity for the proposed ISSD Tanzania Programme to engage with key stakeholders to address these challenges in a holistic and integrated manner.

17. So far, in view of the current landscape of seed producers and seed sector interventions in Tanzania, and considering the priority crops, the chosen entry point is to support community based seed multiplication and local seed businesses. For the vegetatively propagated crops, seed multiplication and commercialisation has to be local and close to the end-user since planting material is bulky and highly perishable. For pulses, the business case for seed is difficult to predict, but a combined effort through community based seed production and local seed business development can improve the availability of better quality seed, where it is less attractive for seed companies to intervene. National seed companies prefer to produce and market maize hybrids and vegetables, but in exceptional cases also see opportunity for pulses. They will however have a hard time competing with local seed businesses who are closer to their clients, understand their demands, and can build on their local reputation.

18. Current seed interventions in Tanzania largely focus on the major grains (maize, rice and wheat), and only cautiously venture into other crops. The decision to aim for under-resourced crops is challenging, as the business case for seed entrepreneurship is less clear. It does however provide clarity for an ISSD Tanzania programme, and assures diving into a niche where important progress can be made and nation-wide impact on food security and rural income can be realised. In each zone, for most crops, seed entrepreneurship already exists. It would be up to an ISSD Tanzania programme to support all those existing seed multiplication and distribution efforts and improve the quality of the seed produced and the services offered.

Emerging Implementation Framework

19. The main intervention structure proposed would be based at the zonal level, as this is where all key actors are present and can interact. The day-to-day operations will be conducted by zonal implementation teams, to be based at zonal Agricultural Research Institutes (ARI): Northern, Eastern, Central, Lake, Western, Southern and ZARI in Zanzibar, which will serve as nodes. A zonal ISSD task force made up of seed sector representatives would serve to build relationships and manage interactions between public, private, NGO and farmer organization extension efforts, researchers, seed producers, seed marketers and ordinary farmers, with the objective to create synergies and add value where others do not currently intervene. The nodes have been selected because of their presence in the target zones and their current role and mandate in crop improvement. Local partners will include the public sector (local government and seed services), private seed multipliers, NGOs with a strong local presence and farmer organizations or an apex body such as the Farmers' Organizations Network MVIWATA.

20. At the national level, two items are proposed: (i) an institutional arrangement managed by ASARECA that brings together institutions such as SUA, MUCCoBS to form the eight ISSD nodes, which will be responsible for technical backstopping on cross-cutting issues such as policy & regulatory frameworks, gender and M&E, training in entrepreneurship, while KIT will backstop and provide training on ISSD subject matters; (ii) a structure similar to that at the zonal level will be set-up to work on largely policy related issues which

cannot be handled at zonal level. A national task-force consisting of important seed sector stakeholders will work on policy change and implementation, and assess project progress and direction and advise the national ISSD Tanzania coordination. In a national seed sector platform, debate is facilitated and national seed issues are deliberated. A national project coordination team is similarly envisioned to convene the national level task force and platform and coordinate efforts at that level.

ACKNOWLEDGEMENTS

This report is the result of a joint effort by ASARECA, the Zonal assessment teams, BMGF national advisors and the Royal Tropical Institute.

The core ASARECA team consisted of Dr. Ivan Rwomushana, Dr. Kenneth Masuki and Dr. Lydia Kimenye. They were assisted by Dr. Brian Isabirye, Maureen Katafiire, Moses Odeke and Roland Mugumya

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The KIT team consisted of Willem Heemskerk and Peter Gildemacher.

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For ASARECA and KIT,

Lydia Kimenye, PhD., Programme Manager, Knowledge Management and Upscaling, ASARECA Team leader

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LIST OF ACRONYMS

ARDI	Agricultural Research and Development Institute
ARI	Agricultural Research Institute
ASA	Agricultural Seed Agency
ASARECA	Association for the Strengthening of Agricultural Research in Central and Eastern Africa
ASDP	Agricultural Sector Development Programme
ASDS	Agricultural Sector Development Strategy
ASP	Agricultural Sector PLAN
BMGF	Bill & Melinda Gates Foundation
CAADP	Comprehensive Africa Agriculture Development Programme
EAAPP	East-African Agricultural Productivity Programme
ESAFF	Eastern and Southern Africa small scale farmers' Forum
EU	European Union
FAO	Food and Agriculture Organization
FFS	Farmer Field School
FSDP	Forestry Sector Development Programme
FSSR	Food Self Sufficiency Ratio
ISSD	Integrated Seed Sector Development
Kilimo Kwanza	Agriculture First (Agricultural Strategy)
KIT	Royal Tropical Institute
LGAs	Local Government Authorities
LSDP	Livestock Sector Development Programme
MAFSC	Ministry of Agriculture Food Security and Cooperatives
MKUKUTA	Mkakati wa Kukuza Uchumi na Kuondoa Umaskini Tanzania (PRSP)
MUCCoBS	Moshi University College of Cooperatives and Business Studies
MVIWATA	Mtandao wa Vikundi vya Wakulima (National Network of Farmer's Groups)
NAP	National Agricultural Policy
NPGRC	National Plant Genetic Resource Centre
OFSP	On-farm Seed Production
PASS	Private Agricultural Sector Support
PBRDF	Plant Breeders Rights Development Fund
PBRO	Plant Breeders Rights Organization
QDS	Quality Declared Seed
SACCOS	Savings and Credit Cooperatives Societies
SADC	Southern Africa Development Community
SAGCOT	Southern Agricultural Growth Corridor of Tanzania
SGS	Société Générale de Surveillance
TAFSIP	Tanzania Agriculture and Food Security Investment Plan
TASTA	Tanzania Seed Trade Association
TOSCI	Tanzania Official Seed Certification Institute
UPOV	International Union for the Protection of New Varieties of Plants
URT	United republic of Tanzania
ZARDEF	Zonal Agricultural Research Development Fund

1. INTRODUCTION

Improving agricultural productivity and production in African smallholder agriculture is widely recognised as a critical outcome in the pathway to growth and poverty alleviation. Increased crop productivity, especially of major staple crops, allows farmers to take advantage of growing market opportunities while increasing household food security and nutrition. In Tanzania, food crops account for 65 per cent of agriculture GDP (NAP 2013). A key ingredient to increased agricultural productivity and production is farmer access to inputs, particularly quality seed of superior varieties. The importance of enhancing smallholder farmers' access to quality seed and the role this can play in raising productivity of Tanzania agriculture is highlighted in its various policy and strategy documents such as the national agricultural policy (NAP 2013), the agricultural sector development programme (ASDP) and the Kilimo Kwanza national declaration of 2009.

Drawing from experiences elsewhere and to add value to its own interventions in the Tanzania seed sector and agricultural development at large, the Bill & Melinda Gates Foundation (BMGF) engaged the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) to explore the possibility of investing to improve the seed sector performance through an integrated seed sector development (ISSD) programme. In this assignment, ASARECA is partnering with the Royal Tropical Institute (KIT) from Netherlands and is also collaborating with the BMGF local advisors in Tanzania to facilitate a participatory multi-stakeholder national seed sector assessment as well as to verify and validate the potential for an ISSD programme.

This report provides a synthesis of the main findings, proposals on opportunities for intervention through an ISSD Tanzania programme and recommendation on an institutional implementation framework for such a programme. The work was carried out between October 2013 and March 2014. Prior to this assessment, the BMGF had consulted with several national seed stakeholders in the public, private and civil sectors to identify the scope of the ISSD Tanzania programme by understanding the landscape of seed programmes and national priorities, developing ways to complement existing or other planned seed sector investments in Tanzania, and exploring the possibility to implement the programme through seven nodes. On the basis of the scoping mission the BMGF identified four key areas for intervention using an ISSD approach:

- Strengthening farmer seed production and community based seed systems, and informal farmer seed networks, with attention for seed extension, seed banks, seed fairs and use of new varieties in such systems;
- Strengthening seed producers through local seed business development, with an emphasis on seed entrepreneurship and with a focus on commodities with market potential;
- Facilitating innovation in seed value chains addressing bottlenecks largely at zonal level; addressing issues as participatory variety selection, quality declared seed, local agro dealers involvement, access to new varieties and services;
- Supporting policy development and implementation, with main attention for evidence-based innovation in the enabling environment; analysing the current structure and the challenges.

Furthermore, the BMGF decided on the target crops and zones based on potential impact while maximizing on complementarity with other interventions. In this regard, the target crops identified were the less resourced ones which are also key for improving household food security and livelihoods. These include sorghum and millets, food legumes (chickpeas, cowpeas, common beans, groundnuts, and others in this category), cassava, sweet potatoes and bananas. Crops such as maize, rice[1], oil crops, vegetables, and potatoes were excluded on the basis that they are relatively covered through other seed interventions and by complementary partners. The same reasons led to the exclusion of the Southern Highland zone, leaving the Northern, Eastern, Central, Southern, Western and Lake zones plus Zanzibar as those targeted in an ISSD Tanzania programme.

The Tanzania Seed Sector Assessment had the dual purpose of raising awareness about Integrated Seed Sector Development (ISSD) in Tanzania and collecting the information required for programme development. Specifically the objectives of the assessment were identified in the Terms of reference as:

- Identify entry points for an ISSD Tanzania programme, including identifying potential partners and participating districts, and build national and zonal ISSD structures;

[1] The inclusion of rice in Zanzibar, though proposed for consideration during the zonal awareness workshops, was dropped by the Foundation.

- Collect information to fill the current data gaps in: existing seed systems, capacity needs, gender mainstreaming in the seed sector, seed systems related to crops, and existing legal and policy frameworks – in connection to the four key areas identified;
- Develop an endorsed and validated synthesis report that will provide inputs on the programme content and implementation modalities, as well as the institutional frameworks for implementation.

2. METHODOLOGY

Basically, the methodology that led to the development of the synthesis report consisted of four components:

1. Stakeholder workshops to raise awareness on the ISSD approach in the six zones, plus Zanzibar (two-day workshops).
2. National stakeholder workshop for validation and commitment for support on the development of an ISSD Tanzania programme.
3. District level data collection in a sample of districts for each of the six zones, plus Zanzibar.
4. Final national stakeholder meeting to present and debate the main findings presented in this synthesis report.

STAKEHOLDER MEETINGS

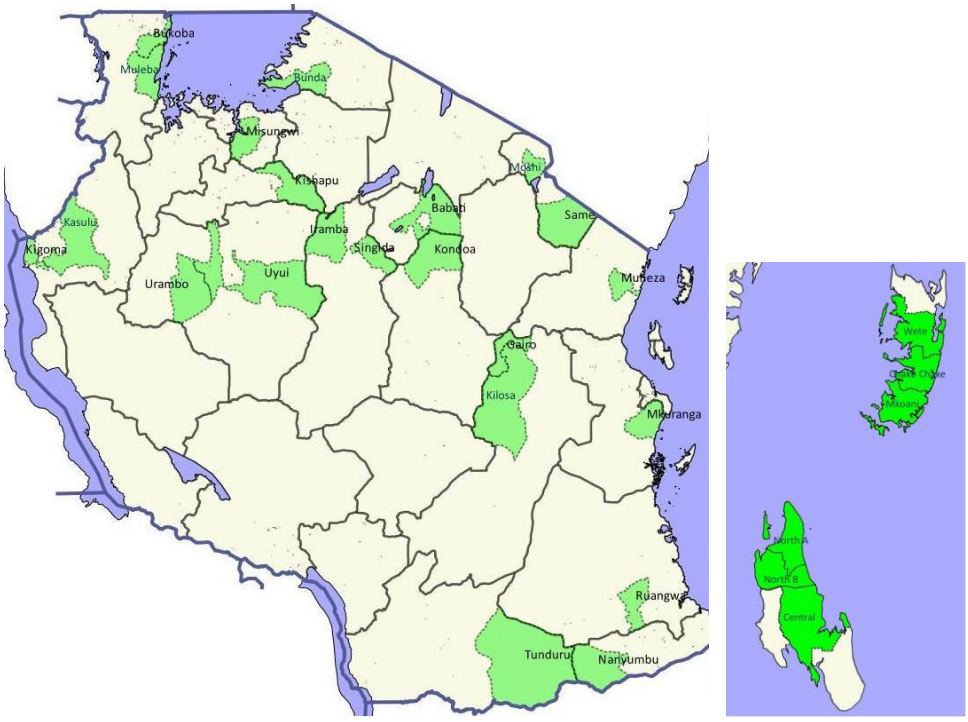
During the stakeholder workshops, representatives for the different actors in the seed sector of each zone were invited; they represented the private seed entrepreneurs, NGOs, public bodies and ordinary producers. The principles of Integrated Seed Sector Development were explained to these representatives. The zonal and national stakeholder workshops yielded commitment and support for a seed sector development approach based on the ISSD principles. Suggestions were made for possible collaboration in the four key areas for intervention.

The different seed systems recognised by the participants were identified and described. Priority crops were voted on for each of the zones from a long list of eligible crops within the pre-set criteria of the BMGF. Further data collection in the field would focus on these priority crops. A seed value chain analysis was done for each one, in addition to an assessment of the seed service provision landscape.

FIELD DATA COLLECTION

Field data was collected in a selection of three or four districts in each zone and Zanzibar. The districts were sampled in such a way as to represent the main production areas of the five chosen priority crops in each zone and Zanzibar (Figure 1). In each of the chosen districts, data collection focussed on two of the priority crops.

Figure 1: Sampled Districts in Tanzania Mainland and Zanzibar



Three separate data collection methods were used:

1. Secondary data collection at the district level: mainly facts and figures on seed production and productivity for the target crops, their geographical location, and available varieties (both improved and local) used by the majority of smallholder farmers of both genders.
2. Focus group interviews with seed users: two per district, one for each of the selected crops.
3. Individual resource person interviews:
    a. Interviews with resource persons in seed projects and programmes (four per district);
    b. Interviews with seed multipliers (three per selected crop per district);
    c. Interviews with seed service providers (minimum four per district).

A list of questions was developed and used by all data collectors for each of the interviews. The questionnaires were pre-tested in each of the zones and Zanzibar by the complete team of data collectors before they split into teams of two persons per district.

DATA ANALYSIS

Seed System Analysis: The description of the seed systems started during the zonal workshops was complemented with data collected during the fieldwork.

Seed Value Chain Analysis: The seed value chain analysis which was done during the stakeholder meetings was verified and complemented using field data.

Crop prioritisation: The crop prioritisation established during the stakeholder meetings was verified with stakeholders in each zone during individual interviews.

SWOT analysis for seed value chains of prioritised crops: Based on the collected data, a SWOT analysis was done for the prioritised crops by the zonal data collection teams.

Coping strategies/Opportunity identification: Following the SWOT analysis, the zonal data collection teams used the collected information to list suggested interventions and actions to improve seed sector functioning in their assigned zone, with a brief justification for each suggestion.

Gap analysis in seed interventions: Using the data collected on seed sector interventions at district and zonal levels, an overview was made of the division over informal, intermediate and formal seed systems, over seed multiplication & marketing, seed services and enabling environment interventions.

3. SEED SECTOR BACKGROUND DATA

CROP SECTOR IN TANZANIA

In 2008, the total arable land available in Tanzania was 14,642,284 hectares, 99.1 per cent (14,516,893 ha) of which is on the Mainland and 0.9 per cent (125,391 ha) in Zanzibar. Land utilization in most regions was above 70%, with the regions of Arusha, Kilimanjaro, Pwani, Shinyanga and Zanzibar using 90 per cent or more of arable land. Generally, land utilization per household has remained constant at an average of 2 ha in 2002/03 and 2007/08 Agriculture Sample Census. This number varies largely between regions depending on land availability. For example, the total utilizable land has remained slightly above the 2002/03 national average in the Shinyanga, Singida and Tabora regions. Farmers across the board attempt to utilize almost the entire usable land available, as the majority of them maintained a land utilization rate between 80 and 100 per cent (NBS, 2012).

Most of the land (66 per cent) was planted with annual crops, while permanent or perennial crops occupied 15 percent and about 8 per cent was planted with a mixture of annual and permanent crops; the remaining area (11 per cent) was kept under fallow. Land sufficiency varied largely between regions. For example, in Mtwara, Lindi, Ruvuma and Tabora, at least 50 per cent of households reported land sufficiency, while all other regions reported land sufficiency below 50 per cent. Land scarcity was most acute in the Mara, Manyara, Arusha and Kilimanjaro regions, where 80 per cent or more of households reported of land insufficiency.

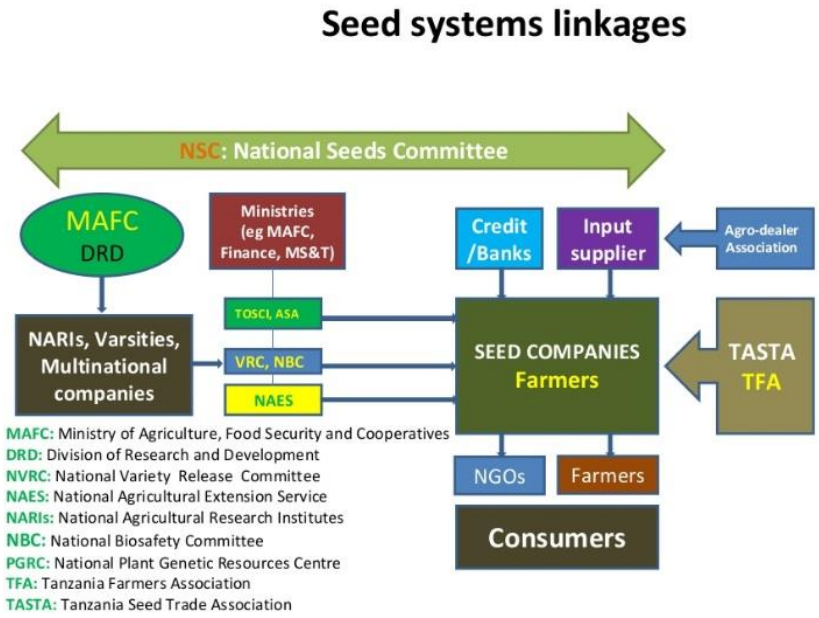
In a study by NBS (2012) a total of 5,838,523 households engaged in agriculture (field and horticulture crop production, livestock and fish farming and pastoralism) were sampled, 5,706,329 (97.7 per cent) of which were on the mainland and 132,193 (2.3 per cent) were on Zanzibar. Nationwide, maize was the priority crop of choice for an overwhelming majority (5,107,264) of households across seasons followed by beans, paddy, groundnuts, sorghum and sweet potatoes, in that order, each engaging at least 500,000 households (NBS, 2012). Most of the land in Tanzania (8,808,771 ha/85 per cent) was planted with annual crops and the remaining 15 per cent (1,550,798 ha) was used for permanent crops (Table 1). This implies that most of the land has to be replanted every year and requires large amounts of seed and planting material (cassava, sweet potatoes and Irish potatoes). Some 20 per cent of the cropped area is planted in the short rainy season and 80 per cent in the long rainy season (Table 1).

SEED SECTOR IN TANZANIA

MAIN ACTORS IN THE TANZANIAN SEED SECTOR

The Tanzanian seed sector has a wide variety of public, private sector and civil society actors. The public sector is strongly involved in primary chain functions such as genetic resource management (NPGRI), variety development (MAFC DRD Research organizations and Universities), basic seed and certified seed production and distribution (ASA), and quality control (TOSCI). The private sector (seed companies, organized in TASTA) produces and markets certified seed and some basic seed. Agrodealers are involved in the retail of certified seed produced by various seed companies. Individual farmers or farmer organizations (CBOs or members of MVIWATA and TFA platforms) are both on the end-user side of the seed chains but can also be involved in on-contract certified seed production, QDS production and informal seed production. Seed value chain supporting services are provided by the public sector (80 per cent of extension services), TOSCI (quality inspection and certification services), complementary to private sector extension, and seed use promotion services (agrodealers and seed companies). NGOs and farmer organizations are also involved in seed extension, largely as facilitators for the informal sector and QDS seed production (see also Table 1).

Figure 2: Main actors in the seed sector in Tanzania
Source: Otunge, 2012.



Until the early 90s, the Tanzanian Government had a monopoly on the seed sector. The 1989 National Seed Industry Development Programme set out to reduce state control in the seed sector, allowing private seed companies to operate in the country. Since then, the private sector has strongly moved into maize seed production and trade. Seed companies have started importing maize hybrid seed, as well as some sorghum hybrids (70 per cent of all certified seed). Other seed (sorghum, rice, legumes and some OPV maize) is produced by small local seed companies or by ASA (rice in particular).

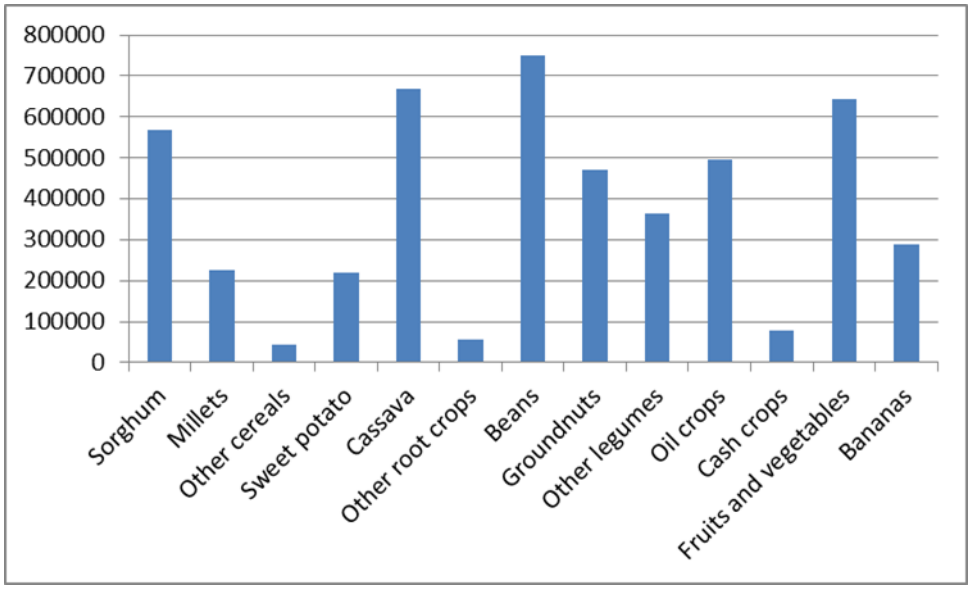
The overall policy in Tanzania is to support the development of a strong private sector, which also applies to the seed sector. The general trend is further privatization of the seed sector. Some seed companies are starting breeding programmes with support from CIMMYT and other international research organizations. The private sector, notably agrodealers and seed companies, is increasingly involved in the promotion and demonstration of improved varieties, field days etc. The private sector is also moving into seed quality services. Société Générale de Surveillance (SGS), the world's leading inspection, verification, testing and certification company, has established an office in Dar es Salaam. SGS is ISTA certified and offers seed certification services for seed export. Further development of the private seed industry will, however, depend strongly on how public bodies intervene and if seed subsidies are applied.

Most of the referred actors are represented in the National Seed Committee, which is also responsible for variety release. Seed traders (seed companies), agrodealers and farmers are under-represented in the National Seeds Committee, an advisory body to the MAFC, with negative implications for lobbying of favourable policies at this level (Barnett et al., 2011).

CROP AND SEED STATISTICS

Maize is by far the most important crop in Tanzania and occupies 41 per cent of farm land. Together with rice (nine per cent), it accounts for half of the total planted area and contributes significantly more to national food security (see

Figure 3: Area in 2007/2008 season for all crops excluding maize and rice (ha)
Source: NPS, 2012



Sorghum, beans, other legumes, cassava, groundnuts, oil crops (sesame and sunflower) and vegetables are the other most important crops. Large zonal differences exist in terms of the importance of these crops with regards to areas under cultivation, household income and food security.

The statistical data (Table 1) allows for a rough calculation of the amount of seed used in 2007/2008 for the combined two planting seasons. This calculation combined with the statistics of supplied seed (in 2008/2009) gives a general idea of how much of the total seed used is actually certified seed. This amounts to an average of 5.3 per cent, with large differences between commodities. The Agricultural National Sample Census (NPS 2012) also provided data on the actual use of improved varieties, which was almost 17 per cent, on average.

For maize, 12.9 per cent of the total seed used is certified, or at least that was the seed available. In recent years the amount of maize and sorghum seed sold doubled (2011/2012), but the cropped area has also gone up. No recent data are however available yet. A large part of the certified seed is not actually produced in Tanzania; in 2007/2008, 48 per cent of the seed (mostly hybrid maize and sorghum seed) was imported (WB, 2012). Sorghum is a somewhat special case in this context, as white hybrid sorghum varieties and a higher seed rate compared to common farmer practice is actively being promoted by beer brewing companies, leading to some possible distortion of the data. The percentage of improved variety use in traditional food security sorghum could be considerably lower.

Table 1 shows that for some of the important food crops like sweet potatoes, cassava and bananas, there is no data on demand and quantity of seed produced, while for some crops which occupy large cultivated areas such as beans (over 7M ha) and sorghum (over 6M ha), there is a significant shortfall between the demand and the quantities of seed produced.

Table 1: Total planted area and estimated seed need, as well as use of improved varieties and seed
Source: 2007/2008 Agricultural Sample Survey (NBS, 2012) and World Bank (2012)

Crops	Area Planted (ha)	Seed rate (kg/ha)	Seed needed (MT)	Certified seed sold(MT) 08/09	% of total seed which is certified	% area with improved seed
Maize	4086555	20	81731	10545	12.9%	16.2
Paddy	906708	50	45335	150	0.3%	5.1
Beans	749766	50	37488	80	0.2%	4.7
Cassava	669134	n/a				4.6
Cash crops	643831	n/a	n/a			79.7
Sorghum	568650	8	4549	320	7.0%	7.1
Groundnuts	471296	50	23565		0.0%	5.8
Sunflower	347478	10	3475	160	4.6%	14.3
Bananas	289496	n/a	n/a			n/a
Sweet potatoes	218251	n/a				1.7
Bulrush millet	156797	5	784		0.0%	3.1
Simsim	139910	5	700		0.0%	18.6
Pigeon peas	112361	15	1685		0.0%	n/a
Cowpeas	89949	20	1799		0.0%	3.8
Fruits/vegetables	78711	n/a	n/a			49.6
Finger millet	68847	10	688		0.0%	1.6
Chick peas	63207	40	2528		0.0%	2.0
Wheat	43182	100	4318	73	1.7%	9.9
Bambara nuts	40441	50	2022		0.0%	4.0
Irish potatoes	38814	1500	58221		0.0%	26
Green gram	36016	10	360		0.0%	1.6
Field peas	15270	50	764		0.0%	7.9
Cocoyam	10941	n/a				2.4
Mungbeans	8219	10	82		0.0%	13.0
Soya beans	7522	50	376		0.0%	1.5
Yams	6335	n/a				1.1
Barley	233	100	23		0.0%	60.0
Total	**9867920**		**212274**[2]	**11328**	**5.3%**	**16.7%**

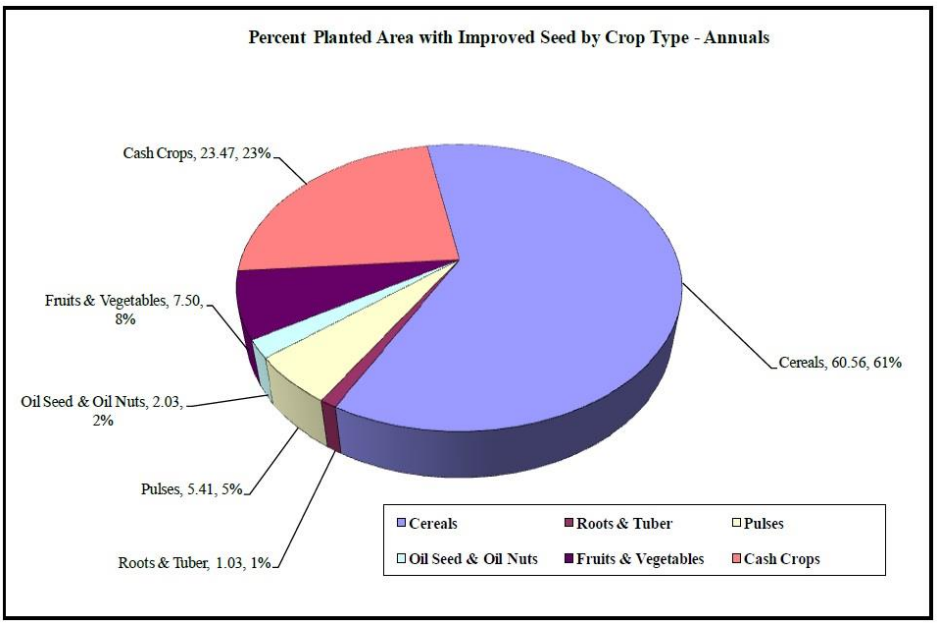
FORMAL AND INFORMAL SEED SYSTEMS

The formal seed system mainly consists of public agricultural variety development and early generation seed production, certified seed multiplication by public and private seed companies, marketing by registered agrodealers and agricultural offices. Certified seed is normally available for maize, sorghum, beans, and rice, as well as vegetables and some oil crops.

Tanzania has 54 registered and active seed companies, which are also members of the Tanzania Seed Trade Association (TASTA), as well as some 1500 registered agrodealers. Several NGOs support farmers through training on seed production and marketing. The registered seed companies and ASA produce and import certified seed of hybrid and open pollinated varieties (OPVs). The need for quality seed is estimated at 212,274 MT per year. Even though the effective demand by farmers willing to pay for quality seed is not substantial, the less than 30,000 MT produced in 2011/2012 appear to be well below the actual market demand for seed (Table 1). The formal seed system in 2008 accounted for about 5 per cent of all seed used. Almost all improved seeds are cereals and cash crops, vegetables and some pulses. In 2011/2012, more than 25 per cent of all required maize seed, half of all vegetable seed, and almost 80 per cent of all cash crop seed (cotton, tobacco etc.) originated from the formal seed system (WB, 2012). All other crops largely relied on the informal seed system for seed. Only in rice, sorghum, wheat and sunflower production is some certified seed being used (see Figure 3).

[2]Not including Irish potatoes

Figure 3: Percentage of improved (here certified) seed used for annual crops (2007-2008)
Source: NBS, 2012



The data presented in Figure 3 only represent five per cent of all seed used. The implication is that the largest proportion (95 per cent) of seed used by Tanzanian farmers is not produced by formally registered seed multipliers. It has either been saved from previous crops on their own farm, obtained from neighbours, purchased form producers who have specialised in producing seed informally, or bought form local markets where merchants offer seed at the onset of the season.

Table 2: Cumulative number of released seed varieties
Source: URT, 2008, Ngwediagi et al., 2009

Crop	1990	2000	2008[3]
Cereals	31	51	117
Maize hybrids	5	17	48
Maize Composites	8	12	27
Sorghum	2	4	7
Wheat	11	11	23
Paddy rice	5	5	10
Pearl millet	0	2	2
Legumes	8	18	32
Common Beans	3	14	22
Soya	0	1	1
Green grams	2	2	2
Cowpeas	3	0	4
Pigeon peas	0	1	3
Oil seeds	4	10	13
Sunflower	1	2	4
Simsim	0	3	4
Groundnuts	3	5	5
Root crops	0	5	11
Sweet potatoes	0	5	6
Cassava	0	0	5
Total	**43**	**84**	**173**

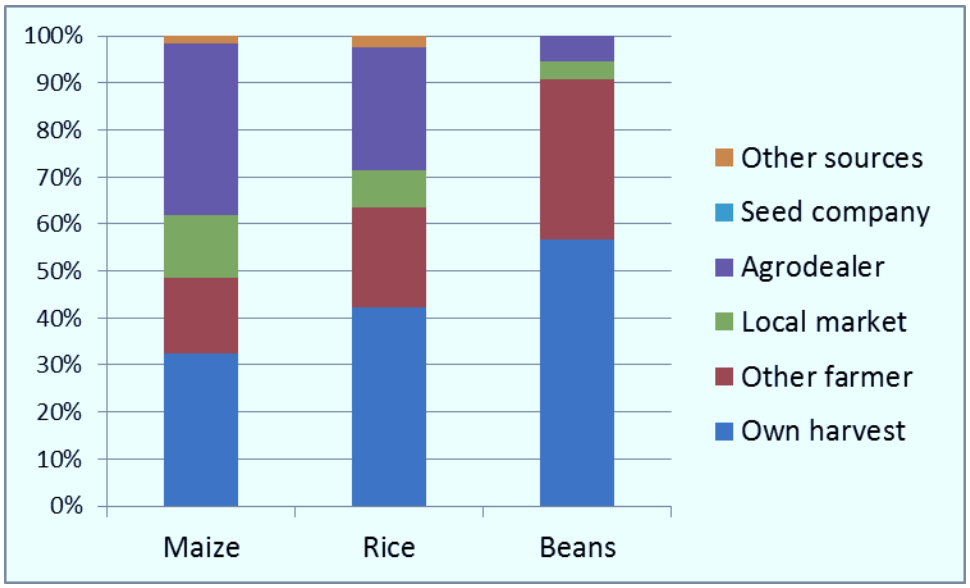
[3] The number of released varieties has increased since 2008 but no complete data could be obtained.

The Tanzania list of released seed varieties in 2008 indicates that cereals, most notably maize (two thirds of which are hybrids) and wheat, are predominant. A large number of varieties have also been released for common beans. These varieties emanate entirely from the public sector, except for maize hybrids (40 out of 48 are from the private sector), while the same private sector until 2008 only released only 8 out of 27 composite maize varieties (Ngwediagi, 2008).

Although no certified seed is bought for most of the listed crops, this does not imply that there is no linkage between the informal and formal system; producers still have access to improved varieties informally (2007/2008 Agricultural Sample Census, NBS, 2012).

An analysis was made of farmers' seed source for the three dominant crops, with regards to areas under production for which certified seed is available (AGRA, 2010). Farmers source a relatively large percentage of their maize and rice seed from agrodealers, but farmer saved seed (indicated under "own market") remains high in both crops. For beans, only 15 per cent of seed is acquired through agrodealers (Figure 4). Differences between regions and between male and female farmers also exist. The role of the agrodealer is mainly dominant in Northern Zone. Female farmers mainly rely on their own saved seed and their neighbours' than male farmers, most notably for beans. The majority of farmers grow improved varieties for 2-4 years, before replacing their crops with a new variety. At the same time, certified seed is bought once every 2-4 years, which appears to suggest that farmers purchase improved seed only when they change varieties and not as a routine practice to keep the yield potential of their crops high. For rice, it was noted that producers can refrain from buying seed for more than 10 years (AGRA, 2010).

Figure 4: Sources of seed for three main crops
Source: AGRA, 2010



GENDER AND SEED SYSTEMS

Gender analysis is an important component of the seed system analysis, as men and women have different and complementary roles in seed systems. Women play a stronger role in informal seed systems and men are more involved in formal seed systems where marketing plays a role.

A gender dichotomy exists in terms of access to, and use of, quality seed, which continues to increase, particularly in rural areas. The limited involvement of women in the decision-making process on family income, as well as on access to land, extension, education and other factors of production, continues to limit their impact on seed demand; and this even though women represent a large percentage of African farmers. The benefits of modern crop improvements on the productivity of their farming ventures are consequently seriously diminished (JAO/ASN, 2014, Draft paper Durban CAADP meeting).

Similarly, in an open letter to the African Green Revolution Forum, an alliance of 28 civil society organizations (CSOs) from eight African countries led by Action Aid highlighted the lack of a gender dimension to AGRA ("women produce 70 per cent of Africa's food") and claimed that "AGRA and other philanthropic and corporate initiatives in the region are promoting corporate control over seeds, with negative implications for 'local agricultural systems, farmers' rights and food sovereignty" (Cooksey, 2013).

Gender sensitivity is also important in identifying the needs for change in the different steps of the seed value chain in different seed systems. The needs and priorities in each step of the chain can vary between men and women. Women prioritize different traits in varieties than men, while seed marketing also has to take into consideration the diversity in purchasing power and seed marketing and distribution networks have to be adapted to the different places men and women frequent.

Gender roles can be changed and optimized to reach a more efficient seed production. Changing the roles of men and women in seed production can be achieved through group and household mentoring and coaching. Women have traditionally had a strong role in community seed management, notably for household food security crops. Men and women can have complementary roles in local seed business development, roles which can be further optimized through the mentoring of households involved in seed business development (Farnworth, 2012).

COMMUNITY SEED MANAGEMENT

Community seed management is the process through which seed is produced and exchanged or otherwise distributed, not in order to make a profit, but to provide farmers with access to new varieties or to lost varieties which have been saved by the community. Community rights are those belonging to members of an identifiable indigenous community, where each member is entitled to the use of common property and any management issue pertaining to said property must have the consent of the entire community. There is currently no specific law for the protection of community rights in Tanzania (Ngwediagi, 2009). Different mechanisms have been developed (seed fairs, seed banks and vouchers, seed exchange programmes) which built on the referred traditional exchange and local market systems as an important source of seed and notably varieties.

Community based seed multiplication exists for sesame, groundnuts, sorghum, cowpeas, pigeon pea, maize, green gram, rice and cassava and involves an estimated 30,000 farmers (Ngwediagi et al., 2009). This number can be further increased by the farmers involved in seed fairs and seed voucher schemes so long as these involve local germplasm.

The main purpose of a seed fair, which is quite common in the Southern Zone, is to promote local seed exchanges, it is therefore an important technology transfer system. Monitoring of seed fairs will help identify the origin of the seed exchanged and will help maintain linkages and farmer seed networks. In some areas, a seed voucher system has been linked to seed fairs and has been used mainly in emergencies or relief situations for agricultural recovery purposes. Instead of giving out free seed, farmers are given vouchers with a specific value, which they can exchange for seed – the vouchers are then cashed at the end of the fair. Vouchers can be distributed through a specialised relief system to the needy or most vulnerable, as identified by the community itself, or they can be made available to everyone where aid is forthcoming (Practical Action, 2013).

LOCAL SEED BUSINESS DEVELOPMENT

The term "local seed business" (LSB) refers to initiatives led by farmers or their associations to produce and market seed as a business. Different forms of LSB exist: there are farmers and associations that are contracted by seed companies or agrodealers to produce certified seed; some farmers and associations are involved in QDS production; while others are involved in market-oriented seed production fully in the informal sector, e.g. in cassava and sweet potato production, the latter, often with support from various projects and NGO's. Seed companies generally find it difficult to identify qualified seed producers who can be contracted for quality seed production (AGRA, 2010).

A Quality Declared Seed (QDS) production system has been successfully introduced by the government in Tanzania. By means of QDS, a market-oriented local seed trade delivering quality seed to farmers has been

built up. Since 1998, 18 pilot districts have been introduced by the DANIDA programme, and in 2007 more than 90 per cent of the districts in Tanzania decided to support and include QDS production in their respective areas. A country-wide training of District Extension Officers/Supervisors in QDS production was carried out in 2007/2008. Other District Extension officers have also been trained as Authorized District Seed Inspectors/Samplers. The seed supply chain to the famers has been strengthened and QDS producers can now access parental seed (Granqvist, 2009).

The FAO QDS system was modified and adopted by Tanzania in the year 2000. Subsequently, QDS was incorporated into the formal seed system in the national Seeds Act of 2003, along with seed rules, regulations and procedures and guidelines for control (URT, 2007) of QDS production.

A brief description of QDS, as it is applied in Tanzania, is as follows (Granqvist, 2009):

- QDS is produced by a registered trained small-scale farmer or a group of small-scale farmers producing seed for their own use or for sale to neighbouring farmers within the ward where the QDS is produced. Therefore any farmer who wishes to become a QDS dealer must submit an application to the Tanzanian Official Seed Certification Institute (TOSCI).
- A QDS producer should have an alternative source of income before starting up seed production to avoid economic hardship if there are unanticipated problems, such as drought, or if the produced seed does not pass the germination test.
- It is essential to build up a sustainable production to ensure that a crop and a variety can be sold in the area. A producer should know her/his customers – the market. To avoid conflicts in the market place, QDS producers are advised not to produce crops or varieties already successfully sold by the seed trade in that market area and to produce quantities that can be sold the same year.
- It is essential that the genetic background/pedigree is known and therefore either basic seed or certified seed should be used to ensure quality. In Tanzania only OP varieties that are on the official national variety list can be produced under QDS – this excludes F1 Hybrids.
- After a QDS producer has been trained in QDS production of a crop, he/she can decide to add additional crops or varieties to his/her seed production at his/her own risk if the market exists.
- Authorized District Seed Inspectors carry out seed inspections and a minimum of 10 per cent of a district's registered QDS production is inspected by TOSCI. Seed sampling is done by an Authorized Seed Inspector, in accordance with QDS and International Seed Testing Association (ISTA) rules. The seed lots are tested by TOSCI, using ISTA Rules and procedures. Lots passing the quality test will be registered as QDS and can be sold. A declaration is completed for each seed lot and the producer labels the QDS bags. Registration, control inspection and seed lot test costs are minimal.
- The sale of QDS production normally totals a few tons of a maize or rice variety, or a few kilos of a vegetable variety. QDS addresses the key gap area between the formal seed sector and small-scale farmers and the quality declared seed is sold at affordable prices that are generally lower than certified seed.

ZONAL SEED VALUE CHAIN DEVELOPMENT

All key stakeholders in the seed value chains are present at local zonal levels, except for ASA and TOSCI, resulting in two main constraints: access to quality control services and access to early generation seed. Zanzibar is a unique case in which there are no registered private seed companies, only agrodealers, who purchase seed for re-sale on the islands from the mainland or, in some cases, from local informal multipliers. In some relatively less resourced zones such as the Western zone, some seed companies have appointed sales agents but their focus is mostly maize. Zonal Research and Development Centres play a central role in the zonal seed value chains, notably for priority crops. This role relates to the development of varieties as well as the provision of Early Generation Seed, notably in the absence of ASA.

Seed sector coordination takes place at the zonal level to some extent (zonal multi-stakeholder committees on research priorities, ZARDEF committees, etc.). Relations between research on the one side and agrodealers and seed users on the other side are limited and not structurally focused on seed sector development.

The zonal assessment studies which are presented in this document to a large extent focus on the relations between actors in the various zonal seed value chains, including primary chain actors and support services. However, the enabling environment for all of this is largely addressed at the national level.

POLICY DEVELOPMENT AND ENABLING ENVIRONMENT

Different studies have presented constraints in the seed sector which are encountered at the local level but require attention at the national level in terms of policy and enabling environment development. Some of these constraints, which will require follow-up, are (ESAFF, 2013, Barnett, 2011, AGRA, 2010, WB, 2012, etc.):

- *Local variety breeding*: The local indigenous germplasm owned by farmers who are the repositories of local knowledge is not given due emphasis in the whole industry.
- *Breeders lack funds* to adequately carry out breeding and maintenance of germplasm, particularly variety maintenance and breeder seed production.
- *Certification, regulation and variety registration*: Charges by TOSCI (they do not cover the full inspection costs) may be costly for breeders. TOSCI's faces financial, human and infrastructure capacity constraints. Indigenous local varieties and cultivars are not recognized in the whole process. Owners of the local indigenous and cultivars germplasm are not known, recognized, or acknowledged.
- *Foundation seed production*: There are ASA seed farms in Arusha, Mwele, Dabaga, Kilangali, and Msimba and they use very old processing machinery. The links with purchasers of foundation/certified seed (particularly for non-commercial varieties) is relatively ad hoc. The involvement of the private sector for public varieties is still a bit problematic
- *Certified seed production*: Contract farmers supplying seed companies do not have access to finance and credit to either get loans or grants to purchase irrigation equipment and other inputs. ASA has 43 seed production contract farmers.
- *Marketing and promotion*: There is a general lack of awareness of, and demand for, certified seed of improved varieties. This impact on the depth of marketing and promotional activities is required to encourage farmers to adopt new varieties.
- *Distribution*: The coverage of agrodealers in some rural areas is poor, resulting in the limited use of agro-inputs by a large proportion of the population. As with other countries, there are also problems with adulterated inputs which, in turn, undermine farmers' trust in agrodealers and in the use of agro-inputs.
- *Agro-biodiversity policy*: The whole policy does not recognize the agro-biodiversity which is maintained by local farmers and their local and indigenous knowledge. It is important to note that farmers have bred their own varieties according to their own circumstances for a long time. It is also quite true that farmers do not have any control on the policy which is supposed to take them out of poverty.
- *Seed adulteration* ("fake seed") with grain by some agrodealers was also identified as a serious problem and the regulatory system has completely failed to address the issue. In some instances, original packaging was even photocopied and packed with fake seed (Barnett et al, 2011, ASA, 2013).
- *Corruption sensitive voucher scheme:* at secretariat and agrodealer levels, farmers are failing to raise the additional 50 per cent necessary to match the costs of certified seed. This is also caused by the fact that certified seed is relatively expensive in Tanzania, at 7 times the grain price for OPV seed and 10 times the grain price for hybrid seed. Even if sold at half-price, certified seed remains relatively expensive in comparison to informal seed.
- *Agrodealers face specific problems* in terms of financing their stock as well as by being obliged to sell only certified seed; special permission is even needed to sell quality declared seed. Agrodealers sell most of the subsidized (Box 1) seed, which also makes it more difficult to sell non-subsidized seed (Bartnett, 2011).
- *Zanzibar presents an exception*. It is currently lacking a seed policy which provides guidance to sector development. The autonomy of the islands within the United Republic of Tanzania means that Zanzibar has its own policy and regulatory framework. In the seed sector environment, this creates complications in regards to the import and export of seed and the compliance of URT with international obligations in signed treaties and agreements. Recognising this, the Zanzibar administration is labouring to develop Zanzibar seed policies and regulations which are aligned with the mainland policies and regulations.

Box 1 Agricultural subsidies

Agricultural subsidies have gradually been increasing in Tanzania from TShs 7,400 million in 2005/2006 to TShs 110,038 Million in 2009/2010 representing an Agricultural GDP growth from 0.21% to 1.91%. The crop sector, which is 75% of AgGDP has increased exponentially with 17% over the same period, but AgGDP as % of overall GDP decreased to 17.3% in 2010 (was 25.37% in 2006). Almost all subsidized seed (maize, sorghum and rice) is distributed through vouchers (50% matching fund) by agrodealers (90%).

A total of 607,264 ha of crops or 5% of total cropped land was planted with a subsidized package of improved seed and fertilizer through the National Agricultural Input Voucher Scheme (www.kilimo.tz: 2006-2010 Report). Sorghum is part of the subsidy programmes (at least 400 MTs in 2013).

Alternative subsidy schemes have been tested by NGOs, such as by SNV, Matchmakers and IFDC to stimulate local Quality Declared Seed Production with initial provision of starter's seed at 20% of the total price.

4. ISSD GUIDING PRINCIPLES

The discussions on ISSD guiding principles during the zonal workshops yielded insights about the ISSD approach and how it would apply to Tanzania. In summary the following points emerged:

- ISSD principles are not new, many examples already exist. As such it describes an existing but not always well acknowledged practice.
- Breeders are already collaborating with local communities in variety selection and release, for example on sorghum and cowpeas.
- Although variety release regulation is blamed for the slow release of varieties, a more thorough analysis is required to understand whether there is indeed a problem with the speed of variety releases, and if so, what are the true reasons behind it, as the release process bureaucracy was said to be light in terms of administrative and testing requirements.
- It would appear that problems arise after the variety release process, during early generation seed production. Poor access by the private sector to basic seed was identified as a constraint for the seed sector. Currently ASA is the sole provider of publicly released basic seed varieties to the private sector. The implication is that private seed enterprises have little control over their business and are highly dependent on ASA. Private companies prefer to work with varieties they release themselves, as they are allowed to produce the starter seed themselves, even when these varieties are of lower quality than those released by the public system. The monopoly of ASA in the production of public varieties of basic seed is not anchored in the law but is an accepted practice. Discussions on this topic have been going on for quite some time already, and at the national level it had been indicated that public policy had already been changed, but this was not reflected in discussions in the zones.
- The recognition of QDS in the Tanzanian seed sector was identified as a strong point, and an important example of the ISSD approach in practice, where the formal and informal seed systems integrate. There is however room for improvement of the QDS system. For example the official marketing boundary within the ward was not considered helpful for LSBs.
- There is a strong concern in relation to fake seed entering the market with adulterated packaging. A lack of quality control in seed distribution channels was identified as a problem, as it allows for the sale of fake seed. Whereas TASTA is confident its 52 members are not a source of fake seed, the status of seed obtained from agrodealers or their business practices are sometimes doubtful
- The link between research and extension with regard to seed sector development was identified as sub-optimal. The need to strengthen farmer-research-extension interactions was noted as an important necessary step to improve the seed sector.
- TOSCI's seed inspection services are considered inadequate in some of the more remote zones. The delegation of some of its responsibilities to district seed inspectors is much appreciated and encouraged; it is however not yet everywhere felt. Similarly, the presence of ASA is felt locally but does not effectively cover the entire country.
- The linkage to the informal system and agrodealers is grossly lacking. This creates difficulties for the distribution of highly informal seed such as cassava cuttings as well as the marketing of QDS.
- A National Seed Act is in place but there is yet to be a Seed Policy for the country. Currently, all aspects of the seed industry are covered under the agricultural policy. The agricultural policy promotes the use of certified seed. However, the informal seed system does not offer certified seed. This presents a challenge for the extension system although there are undocumented by-laws promoted for the informal seed system.
- In Zanzibar, the seed sector functions differently from the mainland. It does not have a fully formal seed certification system. The Zanzibar seed sector is strongly public sector driven, but seed entrepreneurship exists and can be built up. Basic seed is hardly produced on Zanzibar, but purchased by the seed unit from ASA. A seed policy needs to be developed in order to guide the redefinition of seed regulations in line with mainland regulations. The current practice does not stimulate private investment in the seed sector and the high level of subsidy, especially for rice, hampers entrepreneurship. A gradual partial withdrawal of the government from the seed sector was suggested.

MINDSET OF SEED SECTOR ACTORS WITH REGARD TO THE ISSD APPROACH

The zonal workshops were instrumental in explaining the ISSD approach to local seed actors. In general the response to the principles of ISSD was very positive. Many actors see in the ISSD approach the recognition of the current situation of the seed sector, and a pragmatic approach to analyse and intervene in the seed sector to improve the availability of high quality seed – particularly for crops that are not normally handled by commercial seed companies.

Agricultural producers, who are the end-users and whose opinion should be accepted as the most important, consider that the ISSD principles address their needs. The ISSD approach is perceived to put farmers' interests first, and considers the seed sector as a service provider to producers. There is great recognition of the different pathways by which seed reaches producers and the approaches to seek improvement of and linkages between these existing diverse pathways. The understanding that all these pathways have their own merits, including self-supply, farmer-to-farmer exchange and community based multiplication is seen as a realistic starting point for seed sector improvement.

The private seed enterprises recognise the ISSD approach in relation to the principle that seed business is to be supported, and a good balance needs to be sought between public and private roles in the seed sector. The recognition that the seed sector is a service provision sector to farmers and that there are different pathways of seed multiplication and marketing, including informal channels stimulates substantial buy-in from the private sector. The private sector sees room to increase their market share of high quality commercial seed to complement informal seed multiplication channels. An ISSD Tanzania programme is seen as a possible way to increase awareness of the benefits of high quality seed for smallholders, thus increasing the market for their products.

Agricultural researchers recognise that for the less commercial crops, the informal pathways of seed multiplication play an important role in ensuring seed availability, as well as dissemination of newly released varieties. Furthermore, the farmer community is considered an important partner in variety testing and release, especially for the same under-resourced crops the proposed ISSD Tanzania programme is specifically aiming at.

The seed regulatory body, TOSCI, considers Quality Declared Seed to be an important strategy to ensure that larger quantities of high quality seed are available to end-users. TOSCI is currently delegating inspection tasks to the district agricultural offices, as the institution alone cannot fulfil the demand for inspection services. There is also the realisation that there are few crops for which the more formalised seed systems can satisfy producer demand. It is safe to assume that, in the foreseeable future, the Tanzania seed sector will continue to include a selection of seed delivery channels, largely the formal and informal, and that the biggest gains can be achieved by improving the linkages between the two systems, and build on existing solutions such as the QDS system.

The role of ASA in the development of an ISSD Tanzania programme for Tanzania is crucial in the current environment where its monopoly on basic seed production of public varieties had already changed, after long debate. It should be stressed, however, that care has to be taken not to entirely dismiss the role of the public sector in seed production. ASA will continue to have a role to play in Tanzania, where private enterprises tend to be largely interested in areas with high demand which are relatively easy to supply, is recognised, and should be well exploited. Indeed the mandate of ASA is to supply the entire country, particularly in the more remote places where the private sector may not be present or interested in some crops. It must be recognised that ASA is working on a wide range of crops, including those for which private sector interest is limited and thus the opportunities for complementarity with the proposed ISSD Tanzania programme are enormous and must be explored in any intervention.

Overall, it emerged that some of the tenets of the ISSD approach are not entirely new to stakeholders. They shared several examples of seed sector development where some ISSD guiding principles exist, such as participatory variety selection by breeders and farming communities and also the QDS system in which local individuals or farmer groups produce seed under minimal quality control for use within their own community. What doesn't exist is a seed sector development strategy in which different seed systems are considered as complementary and which deliberately seeks to strengthen the diversity in the systems and their interactions.

5. SEED SYSTEM ASSESSMENT

Table 3 presents a generalised seed sector description for Tanzania after analysis of the existing channels through which farmers get access to seed. The assessment identified nine distinct seed systems. The under-resourced crops under consideration largely rely on informal seed systems, where farmers themselves multiply and exchange seed from important local crops and varieties, both in-kind, and in some instances, on a cash basis. In general, the seed systems of the targeted under-resourced crops are more difficult to commercialise than for major cash crops.

At the most basic level, the **farmer-saved** seed system is the major source of seed for producers in Tanzania.

Closely related to the farmer-saved system is the **farmer-to-farmer** system, in which individual farmers exchange and sell farm-saved seed to each other. This system is based on transactions between individual farmers in the same vicinity, with no or limited focus on profit by the seed provider. However, in practice, this seed is not necessarily given out for free but often bartered against other products or in some cases sold. The farmer-to-farmer seed system is important for all crops, but plays an almost exclusively dominant role in food crops that are predominantly cultivated by women, who are also responsible for seed supply.

The **community-based system**, involves groups of producers who multiply seed for their own needs, and possibly sell surplus to the wider community.

An important source of seed for Tanzania producers is the **open market system**, through which seed of most crops is offered in rural markets by merchants at the onset of the season. The source of this seed is unknown and the quality is not guaranteed, but it has the advantage of being offered at a low cost during the time of demand. Very often, the seed on offer is ordinary grain or tubers, which has not undergone any selection process and is dubbed “seed” by the sole virtue of being available at the right time.

Once individuals or farmer groups produce seed in a more specialised manner with the main objective to obtain a profit, they are considered local seed businesses, who are the drivers of the **local seed business system.**

A separate **relief seed system** is identifiable as a channel of seed, although it is erratic in nature and may have some political connotations. Included in the relief seed system was the special case of seed through input voucher. This is a form of subsidy which aims to avoid some of the pitfalls of relief seed.

The main players in the **public seed system** are public bodies such as research institutes, the Agricultural Seed Agency (a para-governmental seed producing company), and agricultural offices, which produce seed up to certified seed level. The seed is then marketed through different outlets, ranging from agrodealers to agents of the Ministry of Agriculture.

Parallel to the public seed system is the **private seed company system** in which private enterprises perform the production and distribution operations. A private seed company distinguishes itself from a local seed business by aiming at a large geographical area for marketing its products. This could extend throughout the whole country depending on the distribution networks of the companies. Private companies depend on ASA for their basic seed requirements for varieties released by public research.

Finally, **closed chains** relate to a system where seed production and marketing is vertically integrated in the value chain, meaning that it is organised in conjunction with arrangements for buying and selling the final bulk product. The closed seed system is not analysed further in this report as it is mostly important for high value cash crops, such as cotton, tobacco, coffee, tea, sugar and fruits for processing.

Table 3: Generalised presentation of seed systems in Tanzania

	Farmer-saved	Farmer-to-farmer	Community-based	Local market	Local Seed Business	Relief	Public	Private seed companies	Closed chains
Crops	Food crops, some cash crops	Food crops, some cash crops	Food and cash crops	Food and cash crops	Food and cash crops	Food crops	Food and cash crops	Cash crops	Plantation crops
Type of cultivar	Landraces, Improved OPVs	Landraces, Improved OPVs	Mainly improved OPVs	Landraces, Improved OPVs	Mainly improved OPVs	Mainly improved OPVs	Improved OPVs, hybrids	Hybrids, some OPVs	Improved material
Seed multiplier	Ordinary farmer	Ordinary farmer	Trained farmer group	Ordinary farmer	Individual seed grower	Often non-trained farmer group	NARS, ASA, contract farmer	Private seed farmer; contract farmer	Contract farmer
Quality control	Self-control	Self-control	Internal farmer group control, TOSCI, local inspector	No control	Self-control, QDS, Certified, TOSCI, local inspector	Germina-tion test	Certified by TOSCI	Certified by TOSCI	Internal quality control
Marketing / distribution	Own storage	Gift, barter, sale	Gift, sale, local markets	Sale on local market	Farmgate sale, sometimes agrodealer	Free distributio n, voucher schemes	FOs, DAOs, Agro-dealers	Direct marketing and through agrodealers	Distribu-tion by end-buyers

The different systems cannot be easily quantified in the zones, as they are highly variable across districts, crops, farmer categories, and even per agricultural season. Nevertheless some perception percentages are provided in Table 4, which provide some relative indication of the importance of different seed systems in the zones (see also Table 5). Estimates of the amount of seed supplied by the different systems is very difficult to determine, as there is overlap between systems, and the division of the seed sector in the different seed systems, or "pathways of seed supply" is not understood well enough to obtain reliable estimates. As such, the estimates provided should be considered indicative.

Table 4: Zonal perception (%) of importance of the different seed systems, empty cells not mentioned

Seed system per zone/ Estimated %	Farmer-saved	Farmer-to-farmer	Community-based	Local Seed Business (incl. QDS)	Open/Local market	Relief	Public	Private companies	Closed chains
Northern Zone	75	20-90	< 50	5	-	<5	10-40	75 of certified	Coffee
Central Zone	75	15	-	10	-	-	-	No data	Tobacco
Western Zone	>90	-	20(sorghum)70 (cassava)	5	High for Maize, sorghum groundnuts	-	-	90 of certified maize	Tobacco
Eastern Zone	70	50	5	12	-	-	8	8.5	Cotton
Lake Zone	60	15-25	4-5	3-15 QDS	-	-	-	50 of maize	Cotton, coffee
Southern Zone	50	15	15	15	-	-	-	5	Cashew
Zanzibar	X	X	X	-	-	-	X	Contract farming	-

As a general outcome of the seed system analysis, it can be concluded that farmer-saved and farmer-to-farmer seed systems are the dominant supply pathways for the prioritised crops. Local seed businesses play a significant and more recently an increasing role in the Tanzania seed sector, as fully informal, through QDS or to a much lesser extent through certified seed production. Seed companies are most dominant in maize seed

production, but also produce seed for other crops on a smaller scale. Vegetable seeds are dominantly supplied through private seed companies.

Table 5: Strength and weaknesses of the different seed systems identified in Tanzania

	Farmer saved	Farmer-to-farmer	Community-based	Open market	Local Seed Business	Relief	Public	Private seed companies
Strengths	· Availability · Affordability · Timely · Local desired varieties · Known quality	· Availability · Affordability · Timely · Local desired varieties · Trust · Builds sense of community solidarity · Known quality	· Entry-point new varieties · Improved production techniques · Purposeful surplus production · Affordability · Builds sense of community solidarity	· Timely · Local availability · Affordability	· Respond to local demand · Affordable · Local availability · Trust · Controlled quality · Business - client oriented · Entry-point new varieties · Farm specialisa-tion opportunity	· Responds to urgent need	· Food security and poverty objective · Could invest in less profitable crops and regions · Good infra-structure	· Quality Controlled · Business efficiency · Agrodealer network · Economies of scale · Technical capacity
Weaknesses	· Impurity of improved varieties · Low volumes (no surplus) · Susceptibility to stress (drought, flooding, pests) · Poor quality · Poor seed production and handling · No access to new varieties	· Impurity of improved varieties · Low volumes (no surplus) · Susceptibility to stress (drought, flooding, pests) · Poor seed production and handling skills · Poor quality · Risks pest-disease spread · Limited variety choice	· Non-sustainable economically · Depends on external support · Visual quality control only · Requires continuous strong leadership / coordination · Poor marketing	· Very poor quality · Source of seeds unknown · Risks pest and disease spread · Quality control absent · Fairly anonymous transaction (no trust) · Poor seed handling	· Not always quality control · Poor packaging and labelling · Only OPVs · Marketing only local · Variable quality	· Non-sustainable · Poor quality · Undermines seed business	· Not client and business oriented · Competes with seed business · No policy to invest in more traditional crops · Depends on government subsidy · Risk of politicisation · Claim monopoly basic seed production public varieties	· Only invest in cash crops · Only in higher potential areas · Preference for hybrid grain crops · Counterfeit seeds

The **farmer-saved** and **farmer-to-farmer** seed systems have strong advantages. These systems ensure the availability of affordable seed at the right time and respond to local demands for new or farmer preferred varieties. In the farmer-saved system, the producers know exactly what they get. To some extent, this is also an advantage of the farmer-to-farmer seed system, since farmers can observe the performance of neighbouring crops before engaging in farmer-to-farmer transactions. These transactions are often triggered by an individual farmer's introduction of a new variety or his/her cultivation of a variety not readily available in the community. However, because farmer-to-farmer seed transactions are triggered by the immediate and urgent need for seed as a result of crop or seed-stock loss, both the quality and very often the landrace or variety, are not known to the buyer. The strengths of affordability, availability and timeliness are so important that it would be erroneous to conclude that these systems exist only because of the lack of an effective formal commercial seed sector. Important weaknesses in these systems relate to poor seed quality maintenance and

variety purity that also gets eroded over time. Another important weakness of the farmer-saved and farmer-to-farmer systems is that seed volumes produced are low, and only aimed for maintenance of the same area, which provides no buffer in case of another producer's crop loss as a result of drought, pest- or disease-related yield loss or seed loss in storage. Furthermore the individual basis of the system does not provide for easy entry points for participatory variety development and improved variety introduction.

Some of these problems are overcome through the **community based** system, in which seed deliberately gets multiplied to satisfy a wider demand. The seed is produced locally, to satisfy the demands of the community, and is highly dependent on trust and responsibility of the producer with regards to quality maintenance. Other than the individual farmer based systems, the community based system provides for an excellent entry-point for variety development and introduction. The community based seed production system also contributes to building and maintaining local solidarity. The downside of the community based system is that it is not profit driven, but based on social responsibility and thus can only be sustained with continuous leadership support and coordination. Also, quality control in communal production is difficult to implement. Finally, the individual incentives for joint production activities are relatively weak.

The **open market system** generates a lot of criticism because of the unreliable quality of the seed offered. It opens room for merchants to take advantage of desperate farmers who have not been able to save their own seed or lost it as a result of pests and diseases. The relationship between a market seller and producers is much less direct than between neighbours or within the community and thus issues of quality control are left to the discretion of the seller. The seed in the open market system is more often than not, simply grain, which has not in any way been selected for seed, and subsequently results in poor production potential. Furthermore the risk of seed-borne disease spread is high. Clients are attracted by low prices, or because it is often the only easily available seed at the time of planting – still a better option than no seed at all. Compared to other systems, there is much less pressure to ensure quality.

In **local seed businesses**, either on an individual basis, or by farmer groups or commercial cooperatives, profit is the main motivation. This provides a stronger incentive to perform well and be sensitive to the needs of seed clients. As the seed business is local, there is a both a business and a social incentive to ensure decent quality. The reputation of the seed producer is the main marketing asset and business survival depends on product quality. A ruined reputation can easily lead to the collapse of the seed business and hurt the local social standing of the producers, who normally reside within the community. Local seed businesses have the ability to improve on their quality control, seek access to new varieties and technology to maintain their business. Because of their local presence they easily understand and respond to local demands for specific varieties and timely availability of seed. Finally local seed businesses provide an opportunity to add value to farming through specialisation. Local seed businesses have a local (often agro-ecology determined) market for adapted new varieties. Their seed can compete favourably: it is usually cheaper because of less rigorous quality testing, lower transport costs, and lower promotion costs since they are already in the local network.

The disadvantages are the variable quality of seed as a result of imperfect seed production skills and facilities, and the packaging and labelling will never be of technically high standard. Local seed businesses also become less suitable once hybrids need to be multiplied, since additional skills and investments are required and scale becomes more important. Local seed businesses do not usually have a deliberate marketing and distribution system and largely rely on farm-gate sales, which reduce the area in which they can make visible the impact of improving the availability of high quality seed.

The **relief system** is recognised as sometimes necessary from a humanitarian point of view. The main weakness is its unreliability and ad hoc nature, and sometimes the political connotations associated with relief. Ad hoc purchases of large quantities of seed sometimes result in poor quality, as it is obtained knowingly or unknowingly through dubious channels in which quality isn't properly verified. It was noted that relief seed is not only distributed in real cases of emergency and appears to be rife when local elections are due. A few NGOs have continued with relief seed programmes on an almost routine basis to communities considered underprivileged. This practice undermines the development of local seed businesses and erodes the willingness of ordinary producers to pay a reasonable price for quality seed due to the distortion in the seed market. Still, relief seed in Tanzania does need to be tested to ensure it has a decent germination rate, after which it is labelled "standard seed[4]". This is an improvement compared to the complete lack of quality control

[4] As foreseen in the Mainland Tanzania seed act.

often seen in the relief seed system of other countries. It would nevertheless be best if relief seed was only purchased from reputable multipliers who produce certified or quality declared seed. This is however difficult as the demand for relief seed is by nature hard to predict, and thus seed entrepreneurs cannot speculate on it.

The **public system** evokes deep sentiments and generates passionate debates on whether it is the role of government bodies to engage in routine seed production. Many sections of the seed sector concede that the public seed production channel is necessary as there are crops and regions that are not considered by the private sector as sufficiently profitable to invest in. The general consensus is that the public sector can be engaged in activities and on crops usually covered by private sector because of profit motivation such as seed production and marketing of certified seed, however, public agencies should not neglect other crops that are of no commercial interest but crucial for food security.

It should be noted that in 2007/2008 only 1.3 per cent of seed used was produced by the public sector, but a significantly larger percentage was distributed by the public sector as subsidized seed (see Box 1). The public sector also collaborates with private multipliers through out-grower contracts to increase the volume of seed it is able to distribute.

The public seed system remains highly criticized, especially by private seed businesses, but also by other seed system actors, because it does not necessarily provide a level playing field for business and performance-based competition. Because ASA does not only engage in early generation seed production, but also in the production of certified seed, it is in direct competition with private seed enterprises. It has a comparative advantage and benefits from unfair competition because it uses public facilities and resources. In addition ASA prioritizes its own seed multiplication targets in terms of basic seed supply over private enterprises. The private seed businesses have complained of the poor and unreliable availability of basic seed of public varieties, as ASA held the production monopoly, at least until very recently. On the flipside, private enterprises should realise that to obtain basic seed, they need to pre-order one or two seasons ahead of time. It could be concluded that improvement is possible in the relation between the public and private system and can only enhance the performance of the seed sector.

The availability of certified seed from ASA does not meet the demand and improvement would be desirable. ASA is perceived to lack the capacity, both in human resources and in infrastructure and efficiency, to fully satisfy the demand. The public system however has the advantage that it has established and diverse distribution channels thanks to the district agricultural offices, farmer associations and agrodealers. That notwithstanding, the public system does not necessarily reach all the remote communities, especially in the zones where it does not have production units.

Variety release in the public system is perceived to be slow as a result of lengthy procedures. There is also not a lot of promotion of new varieties, nor are they made available to the private sector. However, these assertions could be contested with evidence that many national varieties have been released in recent times. Furthermore the variety release requirements for Tanzania are less stringent compared to many other countries. It can be concluded therefore, that disconnect between the public system and the private system after variety release plays a role in the slow diffusion of improved varieties.

The private company system is seen to be economically sustainable, as profit is the key driver and a source of motivation for continuous investment. Larger private seed businesses can obtain economies of scale, as they produce for a much larger market. This encourages investment in mastering production and handling technologies. The transaction costs of rigid quality control are much lower for larger production units. The main weakness is the limited interest, in only few varieties of few crops in few parts of the country. The private sector requires public control systems to ensure that quality standards are met. However, private seed rely on ASA, the sole provider of basic seed to access public varieties. This is not necessarily good for business as ASA does not always deliver the right quality and quantity of desired seed at the right time. Private companies would prefer to be less dependent on ASA but, at the same time, they have not made substantial investments in breeding themselves, let alone in breeding for less attractive crops for a viable seed business.

In Zanzibar, a different form of public system was noted. Here the seed unit of the Ministry of Agriculture does the seed production either on its own farms or through contract growers using foundation seed obtained from ASA on the mainland. The seed is then marketed through agrodealers and the public seed unit at a highly subsidised price, much below the market price for consumption in the case of rice. The main crops covered by

the public system are rice and to a limited extent maize and cowpeas. There is no certification mechanism or quality control agency comparable to TOSCI on the mainland. The major weakness of the public system in Zanzibar is its subsidy element, which has discouraged development of the private sector and is unsustainable in the long run.

6. CROP PRIORITISATION

Priority crops for each zone were selected within the scope of crops defined by the Foundation as eligible for consideration in an ISSD Tanzania programme. It was therefore emphasized to stakeholders that the focus would be largely on under-resourced crops where current interventions in the seed sector have limited focus. At the national level, the referred "under-resourced" crops represent about 50 per cent of the planted area (NBS, 2012).

Table 6: Prioritised crops and data collection districts per zone (in grey) with zonal crop hectarage 2007/2008
Source: NBS, 2012

ha/zone	Central Zone	Northern Zone	Eastern Zone	Southern Zone	Western Zone	Lake Zone	Zanzibar
Sorghum	193660	10149	16577	57633	54213	199613	1922
Pearl millet	129847	968	279	353	1851	20776	1087
Cassava	6929	3738	109567	76896	74229	266543	38663
Sweet potatoes	4467	1713	11679	364	21140	155078	7924
Beans	16133	151088	86900	2207	68707	205622	81
Cowpeas	7661	6556	32976	15824	3172	11777	1494
Chickpeas	5949	6368	133	105	1279	49372	0
Bambara nuts	8782	310	267	12410	8251	7037	26
Pigeon peas	13156	45733	8516	23567	2147	892	1580
Groundnuts	94400	2846	5177	30676	110613	140329	699
Bananas	1950	60581	27741	3047	10347	123697	15913

Table 6 shows the crops prioritised per zone. The hectarage is derived from the National Bureau of Statistics for the 2007/2008 agricultural season. Sweet potato is major crop in all zones and in Zanzibar, and the prioritization pattern appears to suggest that this could be related to the crop being primarily grown for home consumption and to a lesser extent for cash income. Cassava is important in all but the Northern zone, sorghum is also important across all zones except for Zanzibar. Cowpeas, pigeon peas, beans, bananas and groundnuts are major in three out of the six zones and Zanzibar. Pearl millet is major in the Central zone, chickpeas in the Lake zone and Bambara nuts in the Southern zone.

7. SEED VALUE CHAIN ANALYSIS

A seed value chain analysis was done for five or six selected crops during the stakeholder meetings in each zone and Zanzibar. Further analysis was done after field data was collected in the zones to complement the results from the stakeholder meetings. The opinion of smallholder farmers in particular were taken in high consideration during field analyses since they are the ultimate client and the largest informal seed producers of the crops concerned. The seed value chain was assessed at the level of direct operators and of service providers. The assessment looked at their performance and their incentives to perform their operations and deliver services, respectively. In addition, a SWOT analysis was conducted for the prioritised crop in each zone. Below is a synthesis of the results obtained: they follow the different seed value chain steps, to complement the seed sector description based on seed delivery paths (seed systems). The results are summarised as possible entry-points for intervention, and presented according to the structure of the seed value chain. Zonal- and crop-specific results of these assessments, as well as possible entry points for intervention, are presented in the zonal assessment summaries in Annexes 1 to 7.

DIRECT SEED CHAIN OPERATORS

In the ISSD approach, the following steps are identified in the seed chain:

- Plant genetic resource conservation;
- Variety development and screening;
- Early generation seed production;
- Seed multiplication;
- Marketing and distribution.

PLANT GENETIC RESOURCE CONSERVATION

Plant breeding programmes in Tanzania access their genetic material from international research networks (30 per cent), the national gene bank of NPGRC (24 per cent), from public research institutes in developing countries (24 per cent), from local gene banks (12 per cent) and from international gene banks (12 per cent)[5]. The NPGRC has described some 2000 accessions and keeps records of another 5000 accessions collected in Tanzania and kept abroad in international gene banks (Ngwediagi et al, 2009).

During the stakeholder assessment, plant genetic resource conservation did not receive as much attention as other seed value chain steps. Research organizations, most specifically the ARIs and CGIAR institutes, are considered the single most important actors in conserving plant genetic resources, although it depends on the crop; in the informal seed system, the farming community also plays an important role. For instance, for most of the selected crops, with the exception of bananas, many of the cultivars grown by producers are landraces with locally acceptable characteristics. By using and appreciating this existing diversity, the farming community is inadvertently conserving plant genetic resources, and especially unique combinations of traits, which is invaluable for breeders as a source of material in variety development.

The maintenance of this diversity is, however, not automatically guaranteed by producers, and probably even less by the national research organizations. Often the *in situ* maintenance of plant genetic resources by the Tanzanian research institutes is not guaranteed. Besides, the conservation of plant genetic resources by producers is not believed to be deliberate in the first place, but rather the result of local demands for specific traits. For instance, once a new variety fetches a good market price, farmers are not likely to continue producing previous varieties for the sole purpose of conserving of agro-biodiversity. The growth of local seed businesses that specialize in answering local demands could help reduce the rate at which local biodiversity is lost.

Breeding and variety selection for local demands can be encouraged at the level of agricultural research as a strategy to contribute to the conservation of agro-biodiversity. Seed producer groups operating in a community-based seed system or as local seed businesses have a motivation to partner in such initiatives.

[5] More than 100% due to rounding off of the figures.

Local seed businesses especially will have a monetary incentive to participate, as multiplying for local demands provides them with an edge over nationally operating private seed companies.

The main constraint in plant genetic resource management is the gradual loss of biodiversity. Opportunities for intervention emerging from the value chain analysis include:

- Support participatory variety selection in collaboration with local seed businesses and community-based seed producers to respond to local demand;
- Stimulate further recognition of local agro-biodiversity as a source for new varieties;
- Develop a robust and cost effective system of local and central conservation of Tanzanian agro-biodiversity.

VARIETY DEVELOPMENT AND SCREENING

Variety development in Tanzania is largely provided by public research institutes. Indeed, it is only for maize, sorghum and vegetables that the private sector is seen to play a limited role. It must be acknowledged that, for obvious reasons, there is very limited interest from the private sector towards variety development for the chosen priority crops for an ISSD Tanzania programme. Normally, it is only in the case of hybrids that a company has a reasonable chance of recovering their investment in variety development. For composites and other true-to-type varieties, the business case is much harder to justify as the varieties can easily be reproduced informally. For vegetatively propagated and self-pollinating crops, there is hardly any incentive for private entrepreneurs to invest in variety development. This is typically a pre-competitive area where the public sector has a dominant role to play, in close collaboration with seed multipliers and farmers.

For some of the targeted under-resourced crops such as sorghum and chickpeas, the market relies almost entirely on landraces and other local varieties. The popularity of these landraces is proof of their value, and there could be room for improvement in variety selection to enhance quality. The main constraint of unregistered landraces is that no formal seed production can be initiated. This makes it difficult for local seed businesses and impossible for larger private enterprises to produce high quality seed; besides, no early generation seed is produced form a reliable source. Increased opportunities to officially register popular landraces through fast-track procedures could help link the formal system to the informal system for the benefit of farmers: initial progress has actually been made in this regard, with the release of popular local landraces of sorghum as registered varieties.

The lack of an incentive structure especially resources and infrastructure is often mentioned by public breeders as a key constraint, which if improved they would be more inclined to select and release relevant varieties. Monetary incentives for individual breeders in the public system are especially not sufficient to retain skilled staff. However, recognition of performance, increased career opportunities and the improvement of facilities could be alternative incentives to improve the performance of breeders in the public system. Furthermore it was mentioned that incentives should be geared towards the use and success of varieties, rather than their release alone.

Emerging opportunities for intervention are:

- Longer-term public-community-seed business collaboration in variety screening of the selected under-resourced crops (see also plant genetic resource conservation);
- Support participatory variety selection in collaboration with local seed businesses and community-based seed producers to respond to local demand (see also plant genetic resource conservation);
- Fast-track the registration of popular landraces as varieties;
- Performance-based incentive structures for breeders in the public domain;
- Improve facilities and funding for variety selection of under-resourced crops.

EARLY GENERATION SEED PRODUCTION

Early generation seed production is considered to be a weak link in the seed value chain and requires specific attention. Basic is largely unavailable to all types of seed multipliers in all zones: private seed enterprises, local seed businesses and community based producers all indicated that the availability of basic seed was unreliable. This greatly hampers seed business development. For many of the selected crops, no starter

material is available at all. The ASA is the main producer of basic seed, but its capacity and resources limit the scope of its operations. ASA mainly concentrates on grain crops: vegetatively propagated crops such as cassava, sweet potatoes and bananas are hardly or not at all considered.

Considering the resource constraints, it's possible that more strategic choices are required in regards to the balance between the public and private sectors' roles. Gains can be made by relying more on private entrepreneurship for those activities that the private sector is willing to take on, especially certified seed production and the marketing of certified seed of bulk grain crops such as maize, wheat and to a lesser extent rice. The private enterprises would prefer to produce the early generation seed of the varieties in their portfolio themselves, as this gives them greater control over the production chain and reduces their reliance on the performance of outsiders, most notably, ASA.

ASA is nevertheless still required to produce early generation seed for under-resourced crops which the larger private seed companies are not particularly interested in. Should local seed businesses see an opportunity for the commercial production of seed from these under-resourced crops, they would need a reliable source of early generation seed to be able to build and grow their businesses. ASA could, with the assistance of an ISSD Tanzania programme, improve the inclusive and country-wide availability of early generation seed for the crops prioritised in an ISSD programme. This could take the form of pre-empting the demand for early generation seed of priority crops. To do this, ASA would need to assess the demand and produce for a relatively more certain market. The development of a pre-season ordering system could help improve the organization of supply and demand.

Emerging opportunities for intervention are:

- Improving the balance between public and private roles in the seed sector, based on the principle that what the private sector is willing to invest in, the public sector can gradually withdraw from;
- Support the involvement of private seed enterprises in the production of early generation seed;
- Improve the capacity of public institutions to produce early generation seed for under-resourced crops, which better responds to local demands;
- Develop a pre-season order and payment system to allow for a better response to demand;
- Develop the early generation seed production of vegetatively propagated crops such as cassava, sweet potatoes and bananas.

SEED MULTIPLICATION

Seed multiplication as a business is possible for some crops, and difficult for others. Existing local seed businesses demonstrate that there are opportunities to make a profit from local seed production and marketing. For example, in the Central zone, several local seed multipliers who produce maize, pearl millet, groundnuts, sorghum, sunflowers and sweet potatoes were interviewed. Some of them were producing informally, others were producing QDS seed, and a few of them were even producing certified seed – all on an individual basis. This clearly demonstrates that local seed business ventures exist at different levels and scales. These local seed businesses form an important starting point for improving the availability of high quality seed for the under-resourced crops prioritised in an ISSD Tanzania programme.

Drought, however, is the main constraint and the major risk for seed multipliers, therefore supplementary irrigation for local seed businesses is an important need. After a drought, the demand for seed will be often be high, as many producers will not have had the opportunity to save seed from their own farm. If local seed producers had supplementary irrigation, they could avoid crop losses and serve the demands of the community for seed. Another important concern is the unreliability of the market for high quality seed and the limited availability of early generation seed for improved varieties. Seed extension services are considered largely absent but existing seed multipliers need training to improve their technological practices, both during production as well as post-harvest. Seed inspection services are also considered inadequate.

Many opportunities for intervention are emerging at the level of seed multiplication:

- Supporting seed producers' investments in water harvesting or other supplementary irrigation facilities to reduce the risks of their seed enterprise and ensure availability of seed for peak demands after drought;

- Support existing, emerging and new seed producers with seed extension so that they have access to the most appropriate technologies for their circumstances;
- Provide existing, emerging and new seed producers with seed business support, so that they can improve their response to market demand and their seed revenues;
- Support TOSCI in the on-going development and decentralisation of seed crop inspection to district agricultural offices;
- Build on the current QDS system to ensure quality control of all crops for which seed is sold, and allow for marketing of the seed beyond ward boundaries;
- Develop QDS standards, protocols and quality control mechanisms for vegetatively propagated crops;
- Improve the quality of self-supply by seed extension to ordinary farmers.

MARKETING AND DISTRIBUTION

The marketing and distribution of seed in Tanzania is currently considered to be less than perfect. Seed of very dubious quality is regularly sold in local markets, while QDS cannot officially be sold outside of the ward where it has been produced. Consequently, local seed businesses rely on farm-gate sales, which limit their growth. The seed market is unpredictable, which means there is no guaranteed return on investment. Factors such as drought influence the local demand for seed, implying lesser seed sales when conditions are not conducive for cultivation.

Government regulations, coupled with the poor packaging practices of local seed businesses, prohibit cultivating relationships with agrodealers which could stimulate growth. Local seed businesses could potentially access wider marketing and distribution channels by collaborating with larger private seed enterprises, which have the scale and know-how for country-wide operation. However, LSBs would need to significantly improve the way they do business to attract private sector interest towards partnerships, since survival depends on brand quality. Traceable branded QDS seed could provide an alternative to the seed of dubious quality sold in open markets.

Although there are many reported cases of counterfeit “certified” seed being sold by agrodealers and in open markets, the scope of the problem is unknown. The entire seed industry needs to come together to identify cheap, pragmatic and reliable solutions in packaging and traceability to fight this problem. However, it’s worth noting that the most affected seed is hybrid maize, which has fewer immediate implications in relation to an the proposed ISSD Tanzania programme focussing on under-resourced crops.

In regards to marketing information, a market intelligence system would be required at two levels. First, seed producers need to be assisted in pre-ordering their basic seed from a basic seed supplier (currently only ASA). Second, a system that identifies the availability of high quality seed across the country in real-time would be required to allow for cross-country marketing. This should however only be established for seed of reliable quality to avoid facilitating the spread of diseases across the country.

Opportunities for intervention are:

- Support local seed businesses in developing brands for their seed;
- Promote collaboration between local seed businesses and private seed enterprises, through contract farming and other means;
- Pilot marketing of QDS seed in open markets;
- Promote seed fairs during times of peak demand;
- Investigate and pilot opportunities for seed source traceability to fight counterfeit seed;
- Provide seed advisory services to ordinary farmers to create a larger market for quality seed and to promote locally produced quality seed.

SEED CHAIN SERVICE PROVIDERS

The seed sector analysis included the assessment of seed chain service provision in the six zones and Zanzibar. In the assessment of the support services to the seed sector, distinctions were made between the following support services:

- Rural extension (80 per cent public, 20 per cent private and civil society);
- Business management services (public, private and NGOs);
- Variety release (100 per cent public);
- Plant variety protection (100 per cent public);
- Quality assurance in seed production (public);
- Quality assurance in seed commercialization (public and SGS private certified lab);
- Financial services and management (largely private and some donor funded projects);
- Marketing information and promotion (private and public).

Rural extension was considered inadequate in terms of technical support to seed producers. More emphasis could be placed on demonstrating the advantages of using high quality seed to farmers. This would have the benefit of increasing the client base for seed businesses, both locally and nationally. The responsibility for creating awareness of the benefits of high quality seed cannot be placed solely on seed businesses, although they contribute to the demonstrations since they stand to benefit form a larger client base. Seed extension should not be limited to technical support related to production and handling techniques. Emerging seed businesses also require business development support to gain skills and run a profitable business, by understanding and responding to their clients' demands.

In regards to variety release services, there seem to be relatively few constraints. The regulations for variety release are sufficiently clear, aren't prohibitive and the service provision is adequate. Indeed, as indicated earlier under the variety development section, the release of varieties originating from farming communities has been piloted. To mainstream this practice for the under-resourced priority crops identified for an ISSD Tanzania programme, the variety release procedures could be assessed and possibly adapted.

Plant variety protection is not a major issue for the prioritised crops. Private seed businesses are more concerned with their access to basic seed than with plant variety protection, largely because the business they are most interested in is hybrid maize, for which variety selection is irrelevant as long as no other competing company has access to parental lines. For open pollinated varieties, varieties are mainly released by public bodies and are afterwards reproduced by interested seed companies if commercial interest is present.

Private seed businesses sell a major share of their seed to the Government and NGOs, and a large part of the national seed supply is imported. These two factors lead to a business model, which is not driven by demand and local production, therefore requiring plant variety protection. The Plant Variety Protection Bill is in the process of operationalization. Seed companies can register a variety for protection (this comes at a cost) and can subsequently collect royalties through the licences provided. This is yet to be implemented and it is currently unclear how many varieties are likely to be registered for PVP.

Quality assurance in seed production is being decentralised by TOSCI to ensure a stronger presence closer to the multipliers. District agricultural officers are being trained to execute local seed inspections, especially for QDS production. This development is seen as opportune by seed sector actors. An ISSD Tanzania Programme can support TOSCI's efforts to improve the proximity of seed quality control services.

The current quality of informal seed in shops and open markets is a major threat to productivity, even though this seed channel currently serves a purpose. A strategy to replace seed sold in open markets by higher quality seed originating from community-based production or local seed businesses is needed. Quality insurance in seed marketing is largely absent. A strategy by an ISSD Tanzania programme to assess the importance and fight counterfeit seed would be welcome, but this is likely to be more important in maize than in other crops. Quality control and traceability of QDS in marketing channels is urgent and of high importance. Although QDS is appreciated as an intermediate solution compared to fully certified seed, its marketing is currently its weakest point. Promoting wider marketing of QDS requires stringent quality control in the marketing system.

Access to financial services remains a major constraint for seed entrepreneurs. Seed business requires substantial investments in supplementary irrigation, handling and storage facilities. Seed producers have to plan for prolonged seed storage between seasons also in addition to investing in their next crop. This means that cash is necessary to purchase inputs before they have fully sold their seed stocks. This requires credit facilities adapted to their needs and not many financial service providers offer credit services to agriculture-related enterprises because of the perceived high risk and the inability of small producers to have acceptable security for loans. The ISSD Tanzania programme should therefore consider working with financial service providers to develop products that provide seed producers with less stringent conditions.

Opportunities for intervention are:

- Extension-seed producer collaboration to demonstrate the benefits of the use of high quality seed;
- Technical and entrepreneurship training for emerging seed businesses;
- Develop suitable financial products with financial partners to allow seed multipliers to invest in seed farming, handling and storage equipment and infrastructure as well as in seasonal production costs;
- Develop quality control systems in seed marketing channels;
- Develop real-time electronic seed availability systems (see above under seed marketing and distribution).

SUMMARY INTERVENTIONS FOR ZONES AND CROPS

The main proposed interventions for the different crops in the different zones, based on the seed value chain analysis, are presented in table 7. It has to be understood that these are the interventions proposed by stakeholders, they do not necessarily provide the 'design' of an ISSD Tanzania programme – though they could be used as a starting point to determine which intervention would make sense for which crop in which zone. The current synthesis also already provides a rough menu of options that could be considered.

Table 7: Summary of proposed interventions for different commodities in different zones and in Zanzibar

Zone/crops	Northern	Central	Western	Eastern	Lake	Southern	Zanzibar
Pigeon peas	No actions specified			Pest and disease control and production training; EGS access; Seed marketing; Extension incentives	Entrepreneurial seed production capacity development; Business administration (record keeping etc.); Quality seed use promotion; Integrated Cop management and Integrated pest management training; Special attention for access to seed of women crops; Seed extension services; Farmer managed seed and variety demos; Training farmers through FFS; Emphasis on the use of district bylaws on quality seed production and marketing;	Decentralization of TOSCI and ASA; SVCD services; SACCOS support; Production training and storage;	Seed policy needed; Private sector participation required; Subsidy framework to be revisited; Capacity development extension services and seed FFS (on agribusiness); Germplasm conservation; Farmer Groups formation and extension; Quality control system needed; EGS to be made available by research;
Cowpeas		No actions specified		QDS regulation use; FFS training on seed; Village stockists; seed extension			
Sorghum	No actions specified	Seed quality control; seed storage; varieties based on demand	Seed marketing; Financial services; seed production training; variety development	QDS marketing; Demand-driven variety development; FFS production training; Extension training		Decentralization and policy enforcement; SVCD support; SACCOS; Seed production training	
Common beans	Seed production training; Quality control services; Seed marketing		Variety development; Seed production training; Quality control and seed extension services;				
Groundnuts	Early generation Seed access; Disease clean starting material	Variety demos; QDS production training	Seed production training; Financial services; SVC planning			Seed packaging; Seed storage; Radio programmes; Resistance to aflatoxin and rosette virus	
Bananas							
Chickpeas							
Pearl millet		Demand-driven variety development; QDS production training					
Bambara nuts						Support for NGO seed production; Quality and good price combination; variety development	
Sweet potatoes	No actions specified	Irrigation in dry season; Business capacity development and training;	Seed production and irrigation training; Variety development; FFS extension services	Irrigation and seed production training; Pest and disease control		Seed marketing; SVC support; Drought resistance; EGS access and FFS seed training; Seed extension	
Cassava		Variety demos; Marketing and use promotion;	Group formation and seed production training; Seed extension and financial services; Variety development	Maintenance of local varieties; Irrigation in dry season; Vegetative material certification		Demos and seed promotion'; Seed marketing links; Training groups on rapid multiplication	

8. ANALYSIS OF THE SEED SECTOR POLICY AND LEGAL FRAMEWORK

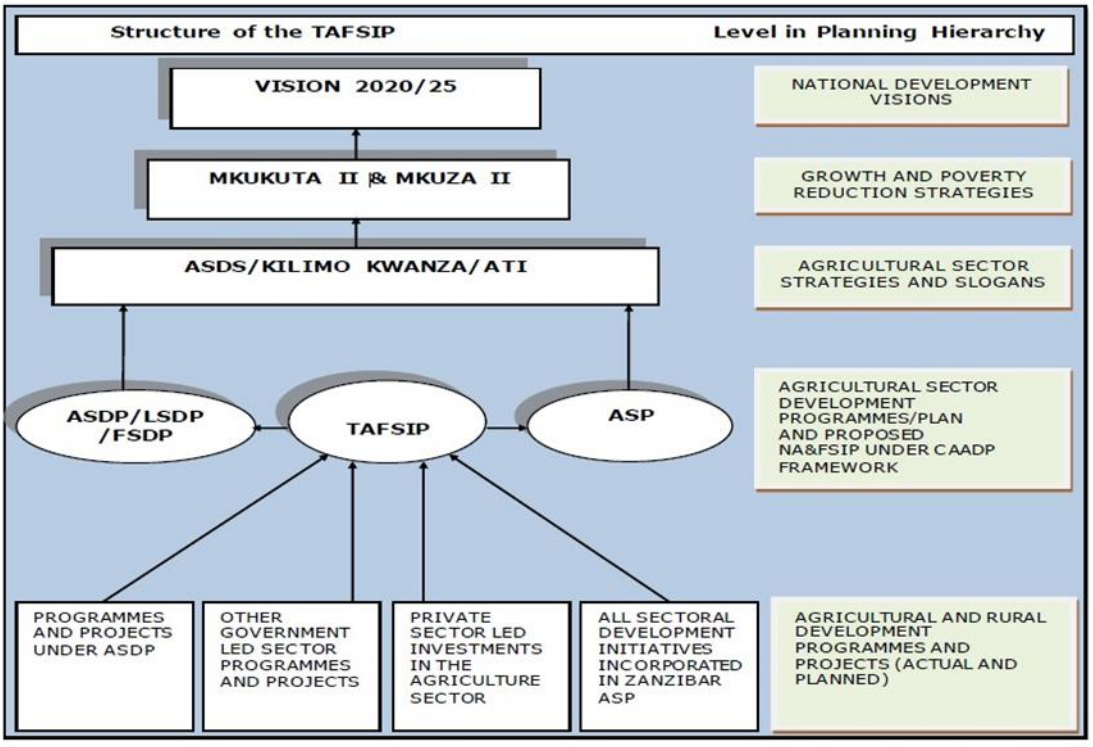
Tanzania's economy depends to a large extent on agriculture. Therefore, the country has formulated several legal instruments to guide agricultural development. The National Agricultural Policy was adopted in 2013, superseding the Agricultural, and Livestock Policy of 1997, to regulate all activities in the agricultural sector. Seed, as an important input in agriculture, was not left out. The Agricultural and Livestock Policy of 1997 mandated the encouragement and facilitation of national and local seed production, conditioning and marketing.

NATIONAL AGRICULTURAL POLICY FRAMEWORK

The CAADP compact led the Tanzania government to formulate the Tanzania Agriculture and Food Security Investment Plan (TAFSIP, November 2011), which is essentially an enhanced version of the Agricultural Sector Development Programme (ASDP 2006-13) in Tanzania Mainland and the Agriculture Sector Plan (ASP) in Tanzania Zanzibar. While expanding ASDP's scope and projected cost, TAFSIP retained ASDP's/ASP's overall state-led agricultural development model, focusing on inputs and productivity increase rather than markets and value chains. The goal of the TAFSIP is to contribute to national economic growth, household income and food security, in line with the national and sectorial development aspirations stipulated in the Tanzania Vision 2025, MKUKUTA II (Poverty Reduction Strategy) and NAP 2013 (National Agricultural Policy) for Tanzania Mainland and MKUZA II and ASP for Tanzania Zanzibar. The position of TAFSIP in the national planning hierarchy is given in Figure 5. Examples of identified programmes to be implemented under Thematic Area 2 of TAFSIP are: National self-sufficiency in production and supply of improved seed; Sustainable natural resource management and Smallholder catch-up with commercial productivity level. The Livestock Sector Development Programme (LSDP) and Fisheries Sector Development Programme (FSDP) are similar sector-wide plans.

In 2008, a Tanzanian private-sector-led agricultural strategy known as Kilimo Kwanza (KK) was launched. From mid-2009 the ruling elite embraced Kilimo Kwanza as the government's vision for agricultural transformation (Cooksey, 2013).

Figure 5: Structure of the Tanzania Agriculture and Food Security Investment Plan
Source: URT, 2011



Consequently Tanzania's has six strategic plans/programmes being implemented towards transforming the agriculture sector: ASDP, LSDP, and FSDP, ASP, Kilimo Kwanza and TAFSIP (see Figure 5). In 2013 a new National Agricultural Policy (URT, 2013) was developed to transform a crop sector and it is building on ASDP, ASP and TAFSIP and other policy initiatives (e.g. SAGCOT, Feed the Future Programme and Bread Basket Initiative). The implementation of ASDP and ASP builds on existing institutional structures within a decentralization process that ensures farmers' involvement in policy and planning

The current NAP 2013, which is not very elaborate on seed sector development, could be the basis for a national seed policy, as its states access to quality seed as one of the major challenges. The NAP 2013 also states that existing laws and regulations will be enforced to safeguard farmers from the supply of substandard inputs such as seed, promote the involvement of private sector in pre-basic and basic seed multiplication, as well as in multiplication and distribution of inputs.

SEED SECTOR POLICY AND LEGAL FRAMEWORK

The development of the seed industry in Tanzania started in the late 60s with a study carried out in 1969. This study identified key components required to establish a formal seed system, including research focussed on breeding improved varieties, seed production, seed processing, seed certification and seed dissemination networks. Correspondingly, the policy framework was put in place to effectively implement the formal seed system. Thus, the formal seed sub-sector in Tanzania was launched in 1973 with the following actions:

1. The enactment of the Seed Act No. 29 of 1973;
2. Formation of the Tanzania Seed Company Limited (TANSEED), a public seed company responsible for seed production, processing and marketing;
3. Formation of the Tanzania Official Seed Certification Agency (TOSCA), with the mandate for seed certification;
4. Establishment of Four Government Foundation Seed farms.

In 1989, the Government of the United Republic of Tanzania launched the National Seed Industry Development Programme. The programme was in line with the World Economic Reform agenda which emphasized moving from a State controlled economy to a market economy. In the early 90s, the Tanzania seed sector was liberalized and private seed companies had the opportunity to enter the seed business in Tanzania; and thus the sector has a mix of public and private players who are active in crop improvement, production and distribution of seed pertaining to various agricultural crops.

The Agricultural and Livestock policy of 1997 mandated the encouragement and facilitation of national and local seed production, conditioning and marketing. The role of indigenous knowledge in seed management was also emphasised. After its inception in 1997, the production of quality declared seeds (QDS) at the farm level was initiated in 1998 based on FAO guidelines and supported by DANIDA. The liberalization of output markets was followed by revisions to the Seed Act to harmonize it with the new policy approach.

Tanzania has a strong legal regime that regulates seed variety release, seed certification, and quarantine and phytosanitary measures. The laws include: (a) the Seed Act (No. (1) 18 of 2003), which superseded the Seed (Regulation of standards) Act of 1973, read together with the Seeds Regulations of 2007 which governs seed production and trade related issues; (b) the Plant Protection Act of 1997, read together with the Plant Protection Regulations of 1998, which governs plant quarantine or phytosanitary issues. These legal instruments are in place to support and regulate the development of the seed industry and to ensure production and supply of quality seeds to farmers. The Minister of Agriculture Food Security and Cooperatives (MoAFSC) administers these instruments and is thus the main regulator of Tanzania's seed sector.

The Seeds Act (1/18/2003) established a National Seeds Committee (NSC), which is the stakeholders' forum responsible for advising the Government on all matters relating to the development of the seed industry in Tanzania. For the purpose of effectively implementing the NSC, two sub-committees known as the National Performance Trial – Technical Committee (NPT-TC) and the National Variety Release Committee (NVRC) were established. These sub-committees are responsible for testing, evaluating and recommending candidate varieties for release to the NSC. However, seed traders (seed companies), agrodealers and farmers are under-represented in these committees, which has negative implications for lobbying towards favourable policies at this level.

The Seed Act also recognizes the Tanzania Official Seed Certification Institute (TOSCI) which was established as an independent institution and the sole seed certification agency enforcing regulations on importation, exportation, production, processing, distribution and sale of seed. As an institute, TOSCI is mandated to implement seed quality control measures and ensure that all seed sold and/or marketed to farmers meets the minimum standards prescribed by the Seeds Regulations. The law provides for a compulsory seed certification, laboratory seed testing, variety evaluation and registration under the control of the TOSCI. TOSCI is responsible for Distinctness, Uniformity and Stability (DUS) testing and the National Performance Trials (NPT), which are necessary tests for variety release and registration. Under the system, locally bred varieties are tested for three years/seasons before being released for commercialization. However, varieties released in other Eastern African countries whose seed systems are harmonized with that of Tanzania are verified for only one season before being registered. The seed legislation also recognizes other regional harmonized seed systems, including the East African and QDS regional systems.

The Seed Act (18/2003) recognizes QDS and encourages seed production at the village level. Under the QDS system, a village community selects farmers to produce seeds of various crops to be sold to other farmers at affordable prices. The programme provides training to various farmers in different districts to enable them produce QDS and supply to their fellow farmers in an attempt to palliate seed shortages. The QDS system approach appears encouraging as it has resulted in lower seed prices for farmers. The system has become part of the SADC seed agreement since 2013. There are guidelines for Control of Quality Declared Seeds production (SADC, 2007).

Tanzania participated in the harmonisation of seed regulations in the East Africa Community (EAC) region in 1999 under the initiatives led by the Association for Strengthening of Agricultural Research in Eastern and Central Africa (ASARECA). The harmonised seed regulations developed are operational in Tanzania and allow the introduction of a variety released in another member state to be fast-tracked.

The National Agricultural Policy 2013 has recognized that plant breeding is faced with challenges related to: inadequate knowledge of intellectual property rights; low participation of local and foreign bodies in seed production and breeding; and limited involvement of the private sector in the multiplication of breeders and foundation seed. Therefore the policy provides statements that support the facilitation of local and international bodies' participation in breeding and seed production, and promote private sector participation in the multiplication of pre-basic and basic seed.

Other National level legislations relevant to the seed sector are:

- The Executive Agencies Act No 30 of 1997. Executive Agencies Act [Cap.245 R.E. 2002], which facilitated establishment of the Agricultural Seed Agency in June 2006 as a semi-autonomous MAFSC;
- The Protection of New Plant Varieties (Plant Breeders' Rights) Act, No 22 of 2002, which encourages breeders' exemption and farmers' privileges;
- The Plant Breeders Right Regulations 2008 that ensures compliancy to UPOV;
- The new Plant Breeders' Rights Act of 2013;
- The Environmental Management Act of 2004, which provides the legal authority for the Ministry of Environment to regulate GMOs;
- National Biotechnology Policy 2010, which refers to conservation and exchange of plant genetic resources.

Tanzania also has ratified, or is in the process of ratifying, some of the international conventions that are relevant to its seed sector. Some of those include:

- Convention on Biodiversity (CBD): National Biodiversity Strategy and Action Plan 2001 (ratified in 1996);
- Cartagena Protocol on Biosafety (ratified in 2003);
- FAO International Treaty on Plant Genetic Resources and Farmers' Rights 2001 (ratified in 2004);
- SADC seed harmonization since 2013;
- International Convention for the Protection of New Varieties of Plants UPOV Convention (1961), as revised at Geneva (1972, 1978 and 1991) (process initiated);
- International Seed Testing Association (only private SGS lab accredited).

The Protection of New Plant Varieties Act (No 22 of 2002 with its regulations developed in 2008), which governs the Tanzania *sui generis* system on the protection of breeders' rights, was established to provide

protection of new plant varieties in order to promote plant breeding activities that will stimulate, facilitate and improve agricultural research in the country through the grant and regulations of a plant breeder's rights and the establishment of a plant breeder's rights registry, which is entrusted with the obligations of granting plant breeders' rights. The Act was recently reviewed to be more compliant to UPOV 1991 and called Plant Breeder's Rights Act 2013. Also, a process of passing an Act of PBR in Zanzibar is in progress.

There are currently about 65 registered seed companies operating in Tanzania. Section 15 of the Seed Act 2003 requires that all these companies be registered as seed dealers with the Director responsible for Agriculture within the MAFSC. On the other hand, Section 17 of the Seed Act 2003 gives power to the Director to cancel the certificate of registration of seed dealer of any company, should it be uncompliant with any conditions that a registered seed dealer is subjected to. Seed companies have their own association called the Tanzania Seed Trade Association (TASTA), which was established in 2002. This association serves as the voice of seed companies with the Government. Currently, 41 seed companies out of 65 are members of TASTA.

In 2006, the government established the Agriculture Seed Agency (ASA) as a semi-autonomous body under the Ministry of Agriculture, Food Security and Cooperatives. ASA's function is to produce, process, and market both basic and certified seeds; to promote private sector participation in seed production; to promote the use of improved seeds, and to strengthen collaboration with research institutes on matters related to availability of new crop varieties. However, ASA, being a government agency has the sole mandate to provide all foundation seed for varieties bred from public institutions; hence it faces a conflict of interest.

In Zanzibar there is no similar seed policy or regulatory framework. The Ministry of Agriculture, Livestock and Environment (MALE) enforces the Plant Protection Act, 1997, which regulates the control of seed imports into the islands, quarantine and subsequent destruction of pest infested seed or plant material. This potentially provides some protection for vegetative crops such as cassava against diseases. Zanzibar has also recently granted the establishment of a Variety Release Committee with representation under MALE and is also developing its Plant Breeders' Rights Act, which in the draft has embraced UPOV 1991.

INFORMAL SEED SYSTEM CHALLENGES

The 2003 Seed Act and 2007 regulations recognize three categories of quality seed:

- Certified seed: certified by a recognized certification agency or by the Chief Quality Controller.
- Quality Declared seed: seed produced by a registered smallholder or group of farmers which conforms to the specific standards for crop species, subject to quality control measures as foreseen in the Act and its regulations. Legislation requires that QDS has to be marketed within the community.
- Standard seed: emergency seed authorized for use by the Minister of Agriculture.

It is observed that, much as QDS is recognized by the legal instruments, regulation restricts its marketing within the ward where it was produced and it has to be multiplied from formally registered varieties. These requirements hinder seed multipliers who aim to respond to an increasing local demand for quality seed and develop viable local seed businesses.

The recognition of only three categories of quality seed means that the informal seed system, which tends to account for over 80 per cent of the seed used in the country, is neither officially recognized nor supported under policy and regulatory frameworks. This means that, for example, some seed value chain operations such as plant genetic resource management in relation with community seed management, are not recognized or supported by regulatory frameworks.

The Plant Breeders Rights Act of 2003 recognizes the importance of the informal seed systems and therefore ensures that farmers have the right to save seeds of a protected variety as long as it is grown in their own holdings (farms). The Act also does not discriminate against farmers in the definition of a breeder, meaning that a farmer can also develop and protect a new variety. This is a mismatch with the Seed Act of 2003, which does not mention anything about informal seed systems. Although the Plant Breeders Act does not specify other forms of rights tailored to farmers, the government has initiated the process to enact a law on access and use of plant genetic resources where all matters related to farmers rights will be captured.

The provisions of UPOV 1991, disregard the contribution of small-scale farmers, marginalize their varieties, and adversely impact their interests and livelihoods as they severely restrict farmers from engaging in their customary practices of freely sharing, exchanging and selling seed/propagating material. A major concern for local farmers is that adoption of the new UPOV rules will strictly restrain their ability to reuse seed from their own crops, as they have done throughout history. This exerts pressure on farmers' seed rights. Farmers depend on the farmer-managed seed systems (informal seed sector) and the customary practices of freely saving, using, exchanging and selling farm-saved seeds and other propagating material (see Box 2). An analysis was made of the current state of affairs. The African Union (AU) provided an outline of the farmers' rights, which include the right to save, use, and exchange seed produced on farms, and to use protected varieties in the development of new farmer varieties. The AU provides criteria for IPRs with regard to; (i) Legislation on Farmers' Rights and community rights related to crop genetic resources; (ii) Legislation on conservation and sustainable use of crop genetic resources; (iii) Traditional knowledge legislation; and, (iv) Bio-prospecting legislation with access and benefit sharing provisions. Such legislation is not yet in place in Tanzania, but is partially foreseen in the National Biodiversity Strategy and Action Plan (GOT, 2011).

Box 2 Tanzanian Civil Society Statement on Farmers' Rights 22 March 2013

"The implications of acceding to UPOV 1991 for the farmers of Tanzania, who are largely smallholder farmers and women farmers, are wide-ranging and far-reaching. Our farmers are dependent on the farmer-managed seed systems (informal seed sector) and the customary practices of freely saving, using, exchanging and selling farm-saved seeds and other propagating material. These systems allow farmers to limit the cost of production by preserving independence from the commercial seed sector while the unfettered exchange of seeds/propagating materials contributes to the development of crop diversity and locally appropriate seeds that are more resilient to climate change, pest and disease. Farmer-managed seed systems have therefore contributed greatly to conserving, improving and making available agricultural biodiversity, which is the basis of our food security. We do not think that acceding to UPOV 1991, which is tilted heavily in favour of the commercial breeders to the detriment of small-scale farmers, is a suitable option for Tanzania and our agricultural situation. The provisions of UPOV 1991, now also in the Zanzibar Draft Bill and in the recently adopted Plant Breeders Rights Act 2012, disregards the contribution of small-scale farmers, marginalizes their varieties, and adversely impacts on their interests and livelihoods as it, severely restricts farmers from engaging in their customary practices of freely sharing, exchanging and selling seed/propagating material."

SEED POLICY AND REGULATORY FRAMEWORK CHALLENGES

The above mentioned issues result in a number of clear challenges which are being addressed in the National Agricultural Policy, but still require more details for their operationalization in terms of their implications for the seed sector.

Overall challenges are:

- The discussion between the state-led or market vision on agricultural development (TAFSIP/ASDP versus Kilimo Kwanza/SAGCOT);
- The focus on smallholder farmers as the main engine of agricultural and rural development versus large-scale farming and its corresponding structures and institutions; and;
- The interaction between the public and private sector, as in the cases of seed value chain development, EGS production, breeding and plant variety protection, as well as quality control.

Based on this, it is apparent that Tanzania requires a clear and inclusive seed policy which addresses the above mentioned issues, as well as others mentioned during the zonal workshops and field data collection, such as:

- Variety release procedures and involvement of the demand side in this;
- Seed extension and promotion of quality seed use, requires some specialization in public extension, working with private extension (agrodealers and seed companies and farmer organizations), as well as seed market information services;
- Possibilities for decentralization of quality control services, also through public-private partnerships;

- Red tape to start QDS local seed business (registration with TOSCI) and other local obstacles (e.g. involvement of agrodealers allowed to sell QDS);
- How to deal with the subsidies/vouchers etc. in order to stimulate use of quality seed (Input Subsidy Programme: National Agricultural Input Voucher System (NAIVS) and Credit systems);
- How to make Plant Variety Protection work in practice, in order to make it work as an incentive for breeders to release more and better adapted varieties;
- How to deal with plant genetic resource management and how to register and protect local varieties, relation with community seed management;
- How to involve private sector and farmer associations in EGS production, seed quality control and breeding, as foreseen in the NAP 2013; and,
- What can be done about financial services for emerging local seed businesses?
- What are the possibilities for developing quality control procedures for vegetatively propagated crops?
- What appropriate quality control measures are to be put in place in seed distribution channels to curb the problem of fake seed?

In general, the seed law in Tanzania provides environments for achieving the aspiring goals of production and supply of quality seed. The legal instruments in place allow for the existence of a pluralistic formal (public and private sector) system and an intermediary system, which produces and distributes QDS. In this context, the existing frameworks show an intention to support a pluralistic seed sector development, which is one of the basic tenets of an ISSD approach. However it is obvious that the informal seed system is not adequately taken care of by these policies. There is a need for a more inclusive policy process that is cognizant of the informal seed system and its contribution to the agricultural sector.

The seed policy, which is to be developed in the context of TAFSIP and the National Agricultural Policy (2013), will guide seed sector development, and its development provides an opportunity for the current programme.

9. SWOT ANALYSIS PER PRIORITY CROP

The seed value chains were analysed for each chosen priority crop, using a SWOT. Based on the SWOT, a number of opportunities have been identified for each crop identified in each zone. Based on the analysis per crop, some observations are made per crop group (grains, vegetatively propagated crops and pulses) at the end of the chapter.

PIGEON PEAS

Pigeon peas are a priority crop in the Northern, Eastern and Southern zones. The most important strength is that there is a sizeable export market for pigeon peas from Tanzania, especially in India. Tanzania has a market advantage as it can harvest early to fetch a good price. Pigeon pea production and trade are well established and a steady reliable market exists. Seed producer groups exist, and seed is readily available through informal channels. Seed inspectors are now present at the district level and additional opportunities for seed quality control are offered by NGOs through projects. However, the pigeon pea seed sector is project driven, rather than a self-sustaining established business. The farmers groups involved have limited seed technology and business capacity, while extension staff lacks the relevant seed knowledge. As a result, storage losses due to pest infestation are substantial. Access to improved varieties and early generation seed is poor and seed producers do not have access to credit to improve their seed business.

Strengths	Weaknesses
• Climatic conditions which favour early production leading to good markets for the produce, hence seed demand and markets • Availability of seed producing groups and networks and other informal seed suppliers • Inspectors and other services at district level and by NGOs and projects	• Seed system dependent on research projects and programmes and not the market • Limited seed experience and capacity of the extension staff • Limited capacity of seed producing farmer groups • Limited access to varieties and EGS in many zones • Storage and pest infestation problems • Difficult loan conditions set by formal and intermediary financial service providers
Opportunities	**Threats**
• Experienced farmers prepared to learn more about pigeon pea seed production and its business • Projects and programmes supporting seed sector exist (e.g. AKF and DADP'S)	• Political interference in seed supply, but limited priority compared to other legumes • Inadequate enforcement of seed production regulations • Dependency on rain for seed production • Limited capacity of NARI on PP variety testing and release

Suggested intervention opportunities are:

- Seed producer credit to invest in supplementary irrigation;
- Technical and seed business training for existing and emerging seed multipliers;
- Promotion of QDS and certified seed production of pigeon pea, supervised by local seed inspectors;
- Introduction of improved seed storage technology for seed multipliers and ordinary farmers;
- Participatory variety selection to introduce new materials and register popular landraces;
- Early generation seed production by advanced seed multipliers.

COWPEAS

Cowpeas are a priority crop in the Eastern and Central zones and Zanzibar. It must be noted that in Zanzibar cowpeas are grown for their leaves, as a vegetable, rather than for the grain. The aggregated SWOT for cowpeas is presented below. The same opportunities for intervention as for pigeon peas were generally identified.

Strengths	Weaknesses
• Easy availability of suitable cowpea varieties and seed at low prices • Availability of facilities especially at research agricultural institutions, ASA, TOSCI	• Farmers are not aware of the cowpea seed market • Farmers have limited knowledge on new varieties • Poor seed distribution channels in rural areas and villages • Poor seed policy framework to support the cowpea's seed chain (Zanzibar) • Inadequate human resources to the support the cowpea seed chain
Opportunities	**Threats**
• Availability of improved varieties at ARI Ilonga and ASA • Low interest of the private sector in cowpea seed production • Availability of cowpea germplasm • Significant source of household income for a local seed business	• No policy support to farmers in the informal seed system • Incapacity of ASA to produce enough seed to fulfil needs • Insect pest and diseases (rust) and notorious weeds (*Alectra vogelii*)

Suggested intervention opportunities are:

- Support seed producers to cope with drought, for example by facilitating their capacity to provide supplementary irrigation;
- Technical and seed business training for existing and emerging seed multipliers;
- Promotion of QDS and certified seed production, supervised by local seed inspectors;
- Promote a linkage between seed producers and distributors/agrodealers;
- Introduction of improved seed storage technology for seed multipliers and ordinary farmers;
- Participatory variety selection to introduce new materials and register popular landraces;
- Early generation seed production by advanced seed multipliers.

SORGHUM

Sorghum is a major crop in all the zones under focus, except Zanzibar. It is essential to differentiate between sorghum production intended for breweries and sorghum production for food security and local brew production.

Strengths	Weaknesses
• The crop is indigenous (varieties and knowledge) • Some farmers have experience in local seed multiplication • Seed producer groups and their network available (WAMBERU- 'Wazalishaji Mbegu Ruangwa'). • Source of income gain (for farmers) from selling sorghum seed • Availability of potential market such as breweries leading to high demand for white sorghum • Local government has trained human resource to support extension services in sorghum seed production • Sorghum improved varieties have high yield potential	• No reliable market for food sorghum demoralizing farmers • Inadequate knowledge of sorghum seed multiplication • Inferior varieties of sorghum for food security (not as good as brewing varieties) due to pest/bird attacks, not easy to dehull, bad taste of local brew, poor storage • TOSCI does not accept the informal seed system, as well delays in inspecting seed ASA and Zonal Research Centres. • Inability of ASA to produce enough starter seed. • Few on-farm demonstrations to promote varieties • Low delivery of public extension services. • Farmers have low knowledge in documented record keeping on sorghum seed production • Farmers have poor entrepreneurial skills for sorghum seed production and marketing
Opportunities	**Threats**
• Presence of district council which provide extension services and presence of research institute in the zone with sorghum programmes and experienced staff • Agrodealers could provide sorghum extension services • Sorghum has high market demand in brewing industries (TBL and SBL in Mwanza) and WFP • Presence of programmes/projects aiming at obtaining	• Sorghum market dominated by brewing varieties • Outbreak of disease and pests especially Quelea quelea • Introduced improved varieties are susceptible to bird damage • Agrodealers sell adulterated sorghum seed • Compromise on strictly following seed production regulations (Control to neighbours in maintaining

new suitable sorghum varieties • The government provides subsidized sorghum seed (Macia) to farmers • Presence of local mass media for promotion purposes and awareness creation.	required isolation distance)

Opportunities for intervention are:

- Support further development of the brewery market for sorghum;
- Develop multi-purpose varieties with traits that are suitable for the brewery market and acceptable for food and local brew;
- Develop better bird (*Quelea quelea*) control methods or varieties less prone to attack;
- Train public and NGO extension staff to provide seed sector support;
- Improve technical and business support to seed multipliers;
- Re-introduce and promote the QDS seed production of sorghum, linked to desired varieties;
- Promote QDS marketing through stockists;
- Promote saving and credit schemes aimed at seed producers;
- Improve the availability of early generation seed.

COMMON BEANS

Three zones (North, West and Lake) have common beans as a priority crop. An important strength for beans is the existence of specialized bean seed multipliers, albeit largely informal.

Strengths	Weaknesses
• Willingness of farmers to engage in bean seed multiplication • Availability of farmer associations involved in bean grain production • Several improved varieties available from research organizations	• Difficult regulations to access TOSCI services • Absence of projects/programmes with a seed multiplication component. • Inadequate extension services • Poorly resourced bean research • Access to financial services for bean seed production and marketing • Limited capacity in bean seed production • Insufficient knowledge to differentiate between seed and grain
Opportunities	**Threats**
• Availability of agrodealers and seed market • Presence of Public Rural Extension systems • Presence of Agricultural Research and Agricultural Training Institutes at Tumbi • Presence of financial services (Banks, SACCOS, VICOBA)	• Insect pests and diseases • Legislative environment

Opportunities for intervention are:

- Improve local seed quality control by district level inspectors;
- Improve the availability of basic seed;
- Develop technical and business training for seed multipliers;
- Introduce farmer field schools for beans, which, amongst other topics, show the benefits of the use of clean seed.

GROUNDNUTS

Groundnut was selected in the Western, Southern and Central zones.

Strengths	Weaknesses
• Some farmer experience in local bean seed production • Good number of groundnut famers groups • Local Government Authority has good collaboration with NARI • DAICO office has good number of extension staff and works with reliable NGO`s which deals with groundnut farmer groups	• No specialized extension services for groundnut. • Inability of seed producers to meet the requirements of financial institutions • Inadequate farmer knowledge on groundnut seed multiplication technologies • Low price of produced improved groundnut seed • Lack of information on market and price • Poor storage facilities for produced improved groundnut seed • Lack of proper control to ensure no fake seed in the market • No groundnut EGS production in the zone
Opportunities	**Threats**
• Presence of Zonal Research Centre • Presence of Agricultural extension services • Good number of improved groundnut varieties for seed multiplication (Pendo, Mnanje 09, Mangaka 09) • Collaborate with NARI on alternative solutions for groundnut pests and diseases • Many NGOs supporting farmer groups in seed multiplication	• Climate change (for example unreliable rainfall, flood and drought) • Seed packaging which is in big packets limiting demand. • Pest infestation (rats problem)

Opportunities for intervention are:

- Train groundnut seed producers on seed technology and seed business;
- Develop small seed packages as a strategy for seed marketing;
- Screen germplasm for new variety release;
- Support the professionalization of the groundnut value chain in general to increase the demand for seed;
- Promote the production of certified seed and QDS by local seed businesses;
- Allow for the production early generation seed by advanced local seed businesses;
- Support ground nut seed producers and ordinary producers in developing appropriate seed storage practices;
- Demonstrate the advantages of high quality groundnut seed to ordinary producers.

BANANAS

Bananas are a priority crop in the Lake zone, the Northern zone and Zanzibar. Intervening to improve the availability of clean banana suckers is important in the wake of the on-going banana wilt disease and bunchy top virus epidemic, and the imminent threat of the recent detection of the new strain of Panama disease in Mozambique late last year.

Strengths	Weaknesses
• High demand for clean planting material • Presence of some research on bananas • Presence of improved germplasm	• Farmers slow to adopt improved varieties • Limited modern propagation facilities to rapidly produce adequate quality planting materials. • Inadequate knowledge on seed multiplication and conservation of planting materials among farmers • Weak knowledge and facilities for micro propagation (tissue culture and others) • Inadequate varieties tolerant to diseases and pests • Limited access to financial services for banana seed production and distribution • Inadequate knowledge of seed business • Lack of seed policy and regulation including quality control to support the banana seed chain • Inadequate research facilities and human resources to the support the banana seed chain • Inadequate dissemination of banana seed information among chain actors
Opportunities	**Threats**
• New business opportunity for rapid multiplication • Availability of improved germplasm is the base of multiplication and dissemination • Goodwill of the public sectors in developing bananas	• Outbreak of new diseases (BXW, Bunchy top virus, Fusarium wilt), Insect pest (Weevils, nematodes) • Climate change • Changing soil fertility

Opportunities for intervention are:

- Ensure the availability of a range of varieties in the two zones and Zanzibar;
- Provide local multipliers with access to clean material from tissue culture;
- Learn from experiences in Uganda, Rwanda and Burundi with regard to fighting banana wilt;
- Introduce macro-propagation technology with local seed multipliers or tree nurseries;
- Introduce a system of nursery certification.

CHICKPEAS

Chickpeas are a common legume cultivated and selected as a priority crop only in the Lake zone.

Strengths	Weaknesses
• Some farmers' groups already exist in the village/ward • There is a ready market for chickpeas • Willingness to buy good quality seed	• Inadequate extension and seed inspection services • Lack of an organized chickpea value chain • Farmers selling their produce as individuals and not as a group • Insufficient knowledge on seed production, storage and marketing
Opportunities	**Threats**
• Group training and capacity building for farmers • Formation of new businesses and seed value addition • Creating and maintaining formal linkages such as networks alliances and partnerships	• Poor support for extension personnel • Inadequate supply of good quality starter seed at affordable prices • Distant sourcing of quality inputs

PEARL MILLET

Pearl millet is a priority crop in both the Lake zone and the Central zone. Both these areas produce significant quantities of this crop for consumption, largely because of its hardiness which makes it adaptable to the semi-arid nature of some areas in the two zones.

Strengths	Weaknesses
• Many farmers involved in pearl millet seed production. • High demand for good quality seed • Seed not contaminated by diseases or crossed with wild Pennisetum	• No agrodealers selling pearl millet seed • Farmers hesitant to adopt varieties of which the performance has not been evaluated in demonstration plots • Knowledge on pearl millet seed production
Opportunities	**Threats**
• Available contacts with international germplasm collections • Female millet farmer associations interested in seed multiplication	• Inadequate supply of improved varieties

Opportunities identified are:

- Introduce and evaluate more improved varieties;
- Promote the production of certified seeds and QDS.

BAMBARA NUTS

Bambara nut cultivation is predominant in the Southern zone where it is an important food crop.

Strengths	Weaknesses
• Good demand for Bambara nut seed, no alternative supply • Existence of farmers' groups dealing with Bambara nut seed multiplication • 4 new Bambara nut varieties (NALBAM recently released by NARI) and access to starter seed • Existence of actors NARI and NGOs dealing with Bambara nut farmer groups	• Relatively low price of produced improved Bambara nut seed • Limited training on Bambara nut seed multiplication • Inadequate knowledge of post-harvest technologies for Bambara nuts
Opportunities	**Threats**
• NARI has alternative solutions for Bambara nut pests and diseases • Emerging farmers' groups in Bambara nut seed multiplication • Experience of DADPs project supporting seed multiplication	• Climate change and variability • Presence of Bambara nut pests and diseases • Economic crisis affecting demand for produce and hence seed

Opportunities identified are:

- Promote preparation and utilization of Bambara nut recipes;
- Collaboration with NARI on new improved Bambara nut production technologies;
- Invite NGO's to promote Bambara nut seed production;
- To avail inputs, especially seed, at affordable price;
- Further evaluation of new improved germplasm of Bambara nuts;
- Bambara nut product development.

SWEET POTATOES

Sweet potatoes are a major crop in all zones and Zanzibar. They appear to be an important secondary crop across all target zones, this could be related to their role as a major food security crop. The main challenge and opportunity for seed business is to make germplasm survive the dry seasons.

Strengths	Weaknesses
• Sweet potatoes can be produced as QDS and informally • Faces limited competition from formal systems and malpractices • Radio programmes support the marketing • Clean sweet potato planting material gives higher yields • New good sweet potato varieties available (OFSP and others) • Inspection services available at district QDS)	• Geographical QDS restrictions (ward) • Access to starter material is limited • Requires irrigation in the dry season • Poor training/extension on seed multiplication • Limited support by research (due to lack of funds) • Limited entrepreneurial and business management skills for seed production • Variety promotion services not well developed
Opportunities	**Threats**
• SP vines have potentially a good market also from outside district • Rapid propagation methods expected • Public extension services not yet involved, NGO extension in this field to be better used • Interested farmer groups available • Availability of new varieties and clean planting material	• Without bylaws threatened by livestock grazing in dry season • Pests and diseases in both seasons and loss of sanitary purity • Multiplication rate at start of season too low for demand

Opportunities identified are:

- Improve the technical and business skill of sweet potato vine producers;
- Improve access to credit for vine producers;
- Collaborate with established vine producers in the selection and introduction of new varieties desired in the different communities;
- Demonstrate the value of clean planting material to ordinary sweet potato growers;
- Help vine producers obtain access to supplementary irrigation facilities;
- Develop and promote simple vine maintenance technology for ordinary producers.

CASSAVA

Cassava is a food crop of great significance for household food security, but also as a source of income for smallholders across the country. Cassava is a priority crop in all selected zones and Zanzibar, except in the Northern zone. Making a business out of cassava cuttings is challenging but there are successful examples which can provide insight into how it can work.

Strengths	Weaknesses
• Stable demand for planting material • Less prone to seed business malpractices • Both QDS and Informal seed systems dominate • Existence of planting materials sharing practices (farmer-to-farmer) based on trust • Existence of seed cassava farmer groups (e.g. DADP groups) • Some farmers have experience in local seed multiplication • Presence of extension personnel in all wards	• Cassava seed cuttings have a limited shelf life and their use must be synchronized with seasonal activities • High disease pressure, no guarantee to deliver quality seeds • Cassava seeds need bulk handling • Failing to meet the demand on cassava cuttings • Lack of preservation technologies (knowledge) for cassava cuttings • Inability to meet the requirements of financial service providers • Inadequate knowledge on seed multiplication • Inadequate extension services • Lack of enforcements of quality laws and by-laws protecting crops • Weak linkage between producers and users (farmers) of planting materials • They seldom renew seed stock from outside sources • Limited knowledge on cassava planting material multiplication • The few available local multipliers are not formally recognized • Limited capacity to cultivate large fields for planting materials multiplication • District seed inspectors rarely receive refresher course
Opportunities	**Threats**
• Can generate two incomes: cuttings and tubers • Research on propagation methods • Cassava seed handling including bulk handling • Train cassava seed multipliers • Untapped local market for cassava cuttings and cassava tubers • Presence of laws and by-laws demarcating cassava seed land from livestock grazing area • Presence of disease-resistant cassava varieties at Zonal Research Centres • Presence of local multipliers of planting materials • Willingness of farmers to participate in planting material multiplication	• Pests and diseases are among the major threats of cassava seed production • Competition from other seed businesses • Changing and unreliable climate pattern • Possibility of total crop failure in case of disease outbreak • Natural disasters e.g. floods and drought • Change in policies addressing seed issues • Economic crisis • Political instability

Opportunities identified are:

- Increase the number of individuals and groups multiplying cassava cuttings as a side-business by providing training on seed technology and business;
- Train ordinary producers on seed quality maintenance;
- Selection and promotion of new cassava varieties from landraces and improved candidate varieties;
- Improve seed quality control systems for cassava cutting orchards;
- Demonstrate the value of regular replacement of cassava planting material to ordinary farmers.

SPECIFIC CONSIDERATIONS PER CROP GROUP

VEGETATIVELY PROPAGATED CROPS

Vegetatively propagated crops such as cassava and sweet potatoes are of high importance for national food security in Tanzania. Sweet potatoes are a priority crop in all zones and Zanzibar, and cassava in all but the Northern zone.

Soil and seed borne diseases are a major threat to vegetatively propagated crops. Banana wilt, sweet potato virus disease and cassava mosaic are examples of devastating diseases, which can jeopardise the food security and income of millions in Tanzania. These diseases can only be managed by the use of clean planting material in combination with good crop management practices. This means that the availability of clean planting material is of additional importance as a pre-requisite for disease control. It cannot, however, be used in isolation if seed users don't apply the required good crop husbandry practices. This has implications for agricultural advisory services, which have to demonstrate the need for, and advantages of, healthy planting material in combination with good crop husbandry.

Planting materials for vegetatively propagated crops are highly perishable, and thus require multiple plots or nurseries where planting material can be harvested and marketed piece-meal. For sweet potatoes and cassava, this means a need for mother gardens, which would serve as the source of planting material at the onset of the season. Those producers who have access to a source of water can specialise in making planting material available at the right time, and make business out of seed. Such specialised farmers could greatly benefit from learning seed technology, as well as seed business practices. The perishability and bulkiness of the planting materials for vegetatively propagated crops means that distribution costs are an important constraint for national scale private seed enterprises. This is an advantage for local seed businesses since they cater specifically to clients in their proximity. The low multiplication rate of vegetatively propagated crops implies that the production of early generation seed by one out of only a few producers is a major challenge. Decentralisation of early generation seed production is desirable to ensure access to early generation seed locally.

Because production of planting material is best done locally, and because of the presence of high disease pressure, quality control systems need to be field-based. Observing the health status of the crop that yields planting material in the field is the main component of seed quality control for vegetatively propagated crops. Laboratory testing of samples can be considered as a further supporting quality control method. Quality standards that could be used during field inspections are however poorly developed for the vegetatively propagated crops. Development of protocols and standards to support the production of certified and QDS planting materials is not yet completed.

LEGUMES

Legumes are of interest as a dual purpose crop thanks to their added value to household diets (as a protein source) and as an income earning opportunity.

The seed sector for legumes is characterised by a relatively poor business case for seed companies. Farmers rely on self-supply and their neighbours for a large part of their seed needs. However, the desire for new varieties, in combination with the loss of seed stocks because of drought, storage pests and consumption of seed in periods of food shortage means that there is a local demand for seed. It is observed that the market demands a specific quality of produce, thus there are opportunities for local seed business development with specialised multipliers producing and marketing seed of desired varieties. Where business opportunities for specialised seed production are less prominent, seed fairs and improved self-supply would be the main instruments for improving the availability of higher quality seed.

However, variety development is slow and there is strong reliance on landraces. Formal seed multiplication of these landraces is not possible since they are not officially recognised, meaning that no early generation seed is being produced. Collaboration between breeders, growers and traders is crucial in to ensure that the right varieties are being registered and brought into seed multiplication.

SMALL GRAIN CROPS

Sorghum is the main grain crop considered for an ISSD Tanzania Programme. Pearl millet was selected in the Lake Zone and the Central zone, which both produce and consume substantial quantities. Sorghum is grown for several purposes: home consumption, long-term storage, local brew and, increasingly, for national and international beer breweries. The hybrids that are being promoted for commercial beer brewing are however poorly appreciated for local brew and domestic use as food. The breeders and the seed sector should consider the different uses of sorghum in variety selection and seed multiplication and commercialisation. Currently hybrids of varieties suitable for local brew production and domestic food use are not being actively promoted.

A major constraint and threat to sorghum is bird attacks (*quelea quelea*), which are highly destructive and increase risks for seed growers and bulk sorghum producers. Local varieties are said to be less prone to bird attacks.

10. PROGRAMME

INSTITUTIONAL CHALLENGES

The participatory seed sector assessment provides sufficient evidence of the potential for an ISSD Tanzania programme to improve the sector's performance in terms of enhancing farmers' access to quality seeds and, in turn, lead to improved productivity, food security and income. The four proposed intervention areas can clearly contribute to these outcomes. It also shows that both formal and informal seed systems are crucial and have important roles in the Tanzanian seed sector. However, the analysis revealed that the informal seed system is by far the dominant one as it accounts for close to 95 per cent of seed used by farmers in all the zones and Zanzibar.

In addition, there are various institutional challenges, which could affect the performance of the sector. Several challenges centred on relations, interactions and perception between the actors and across the seed systems are evident and will have to be addressed as an integral part of the ISSD Tanzania programme. It is worth noting that the ISSD guiding principles provide the framework to address these challenges. This is because it provides a pluralistic way to strengthen the seed sector by building on the diversity of the existing seed systems and by strengthening the relations and interactions, particularly between the public and private sectors. It also works towards strengthening the policy and regulatory enabling environment that supports the core flourishing of the informal and formal seed systems.

The assessment also established that there are challenges emerging from mistrust and erroneous perceptions of the roles and importance of different actors and informal and formal seed systems. Weak linkages and poor interactions between actors and across the systems were revealed, and some challenges are also associated with the lack of policy and regulatory environment to support informal seed system. The matrix below summarises the various mistrusts and erroneous perceptions encountered among the different stakeholders.

Table 8: Trust relations between seed sector stakeholder categories

No trust because	Farmers	Seed companies and agrodealers	Public sector (Research, ASA, TOSCI)
Farmers	Have a poor united voice	Provide fake seed, and too expensive seed	Are not available when you need them, not listening to farmers
Seed companies and agrodealers	Farmers are ignorant about "seed"	Unfair competition between companies	Poor service delivery, and too much red tape
Public sector (Research, ASA, TOSCI)	Farmers are not doing what they are supposed to do (i.e. use improved seed)	Make profit at all costs and only want to produce hybrid seed	Poor coordination within the public sector

Interventions developed as part of the ISSD Tanzania programme should therefore put special emphasis on multi-stakeholder facilitation to work towards overcoming the mistrust and lack of appreciation between the components of seed systems. The programme should also facilitate policy dialogue that is geared towards considering support for pluralism in the seed sector.

An example of multi-stakeholder processes could be the collaborative identification of evidence and lessons for change and possible policy changes. These consultations could span from district to zonal and national levels and in this way create a wider base for a shared vision in which different interventions are complementary. For instance, how would the proposed ISSD Tanzania programmeoperate in relation to programmes such as AGRA-PASS and AGRA-SSTP? Etc.

EMERGING INSTITUTIONAL FRAMEWORK

Different mechanisms need to be built at the zonal and national levels, which will contribute to sustainability and ownership on the basis of trust and mutual learning.

District Level Implementation Partnership

Two central building blocks of the proposed ISSD Tanzania programme at the local level are community seed management and local seed business development. Both require strong involvement from smallholder farmers and their organizations in terms of driving the demand for seed in the various seed value chains and systems, and also as active seed producers and marketers.

The zonal assessments were concentrated in a number of well-chosen districts, which represent the priority crops of each zone and provide an agro-ecological representation of each zone. The selection of districts is not the final one for the programme, it will need to be reviewed according to the following criteria: (i) Relevance for the confirmed zonal priority crops for the programme; (ii) Representation of the agro-ecological zone for this crop, relevant for the potential market of seed and scaling out options; (iii) Quality of the existing stakeholders, notably the farmers and their organizations involved in seed production; (iv) Accessibility in terms of seed service delivery and seed marketing.

Once districts are confirmed, a local network involving farmer organizations, local government, local extension staff, local private sector (agrodealers) and locally active NGOs in seed sector development will need to be built.

Zonal Implementation Teams

The Zonal Agricultural Research and Development Institutes (ZARDIs) are mandated to lead zonal research and zonal development activities, such as local seed value chain development and early generation seed production. This assessment, which included a profiling of the zonal ARDI, established that they should have the capacity to host ISSD programme teams in nearly all the zones, except perhaps in the Western zone and in Zanzibar where they would require some strengthening, especially with respect to infrastructure and relevant facilities. With the exception of ZARI in Zanzibar and ARI Tumbi in the Western zone, all the other ARDIs have a good number of qualified and engaged scientists. What's more, all the ARDIs have experience working with multiple stakeholders and diverse institutions such as NGOs, private sector and farmer associations. They also have extensive experience managing research and development programmes, are keen to be part of an ISSD Tanzania programme and are able to serve as nodes in programme implementation. Hosted by the ZARDIs, a zonal team of at least one agribusiness expert and a seed production expert will be formed and be complemented by ZARDI staff if necessary. The ZITs will account to the zonal taskforce, but collaborate very closely with ZARDIs and work in partnership at the district level to implement programme activities on seed management and local seed business development which will require zonal seed value chain development.

Zonal Taskforce

The zonal taskforces are clearly structured zonal groups, generally composed of: (i) ZARDI Director or his/her seed sector relevant representative; (ii) Regional Agricultural Advisor (RAA) of the host region as a LGA representative; (iii) NGO/Farmer organization representing seed producing and demanding smallholder farmers directly or indirectly; and (iv) private sector seed sector representative, agrodealer network representative or seed company involved in contracting smallholders for seed production in the region. The zonal taskforce will be responsible for regular supervision of the Zonal Implementation Team. The taskforce is expected to operate independently from research or the public sector in general. The Zonal Taskforce will act as secretariat to the zonal platform. A first step in the formation of the zonal teams was made during the March 21, 2014 workshop in Dar es Salaam.

Zonal Platform

The zonal platform is a multi-stakeholder team composed of all District representatives involved in operational projects, representatives of other seed projects, and other relevant stakeholders. The platform will act as a legislative body or general assembly type of the zonal programme, and will review the work plan and progress

report of the Zonal Implementation Teams on an annual or semi-annual basis, under the supervision of the zonal taskforce. The platform will also be instrumental in analysing seed sector evidence made available, which could be endorsed for seed policy change. An analysis will be made on how the proposed platform relates or could possibly be integrated in existing zonal platforms, which have a multi-stakeholder character, such as the Zonal Technical Committee and the ZARDEF Coordination and Implementation Committee.

National Taskforce

A national taskforce will be formed with one representative from each of the zonal taskforces (for a total of seven people). The national taskforce will have a balanced membership of public, private, farmer organizations and NGO representatives. It will oversee the programme as a whole at the national level and operate as secretariat to the National Seed Platform.

National Seed (ISSD) Platform

The national platform will bring together all relevant national level seed sector stakeholders. The national platform will also involve other relevant national representatives for major seed sector development projects, as well as an additional number of people from SUA, MuCCoBS, MAFSC.

Supporting Organizations

At the national level, an overall institutional arrangement managed by ASARECA that brings together institutions to play specific supportive roles largely providing technical backstopping and relevant training is proposed. Sokoine University of Agriculture (SUA) is to serve as a node that will provide technical backstopping in cross-cutting areas where they have expertise such as policy and regulatory frameworks and gender, and also provide middle-carer training to professionals. SUA has the experience and capacity to play this role. The Moshi University College of Cooperatives and Business Studies (MUCCoBS) is proposed to lead in the provision of business development services and training farmers, local seed business actors in entrepreneurship. MUCCOBS, with its decentralised regional centres spread all over the country and with adequate staff skilled in business development services and entrepreneurship, has the capacity to provide these inputs. KIT will provide technical assistance and training for trainers and facilitators on subjects relevant to taking an integrated approach to seed sector development, while ASARECA's role will be overall implementation and management, with overall supervision by BMGF.

11. INTERVENTION GAP ANALYSIS

INTERNATIONAL SEED SECTOR SUPPORT PROGRAMMES IN TANZANIA

The seed sector in Tanzania is supported through a number of international programmes (see Annex 8). The most important ones are: (i) the AGRA programmes, PASS (BMGF supported) and SSTP (USAID New alliance supported), which focus on the formal seed systems and private sector development; (ii) Feed the Future (USAID 2013-2017) in the Southern Highlands; (iii) FAO programmes; (iv) CCIAR programmes (CRPs and CG Institute programmes), which heavily lean on the development and promotion of new varieties; (v) East-Africa Productivity Programme (WB supported): Centre of Excellence on rice variety development and seed production, as well as promotion of new cassava varieties based on research from the Centre of Excellence in Uganda; (vi) ASARECA programmes on sorghum and legume intensification and pearl millet interventions.

The mentioned programmes largely focus on the public sector and concentrate on the formal and intermediate seed systems in all zones except Zanzibar. The FAO-Links, now closed, was an exception since it focused on community seed fairs. Interventions carried out by international programmes mainly focus on maize and sorghum, but also touch on other commodities, variety development and EGS multiplication through public institutes or seed companies, and also do some work on seed marketing and promotion of its use. Services provided relate to variety development, seed extension and promotion and capacity development of seed sector actors. References are made to Kilimo Kwanza as the policy framework, which leans towards private sector development.

NATIONAL SEED SECTOR SUPPORT PROGRAMMES

The Agricultural Sector Development Programme (ASDP) on the mainland and Agricultural Services Support Programme (ASSP) in Zanzibar, which have both ended, strongly contributed to informal and intermediate (QDS) seed system development through the District Agricultural development Programmes and the District Agricultural Sector Investment Plans (DADP and DASIP). Support was provided for seed production of locally important crops and therefore the main emphasis was on seed multiplication. The services provided by these programmes were direct seed (production and promotion) extension and capacity development of extension programmes. Some of these service providers are NGOs, but most are provided by the public sector (see Annex 9).

A number of programmes have focused on cassava and sweet potato multiplication, as well as on bananas. QDS multiplication was in particular found in these commodities, but marketing was generally not part of the programmes, as materials were brought-in by the programmes.

LOCAL (ZONAL AND DISTRICT) SEED SECTOR SUPPORT PROGRAMMES

Typical interventions at the zonal and district level in the seed sector are led by NGOs in the informal or QDS-based seed systems; some private sector interventions were mentioned, notably for marketing. Most activities focus on production and farmer-to-farmer exchanges, with some also concentrating on marketing QDS material. The local initiatives, to a large extent, focus on vegetatively propagated commodities, as well as on traditional cereals and pulses. The district level programmes often refer to lack of support from TOSCI and ASA, as well as research organizations, further underlining the existence of a major opportunity for Integrated Seed Sector Development at the local level (See Annex 10).

CONCLUSIVE REMARKS

Existing programmes at the international level put general emphasis on variety development and seed multiplication in the formal sector. There is an opportunity to work with these programmes to increase the intermediate and informal seed system access to different varieties. This would largely take place at the district level, with the support of District Development Plans, largely implemented by NGOs. The policy environment in which these local initiatives can flourish needs attention notably in terms of access to quality starter seed (and the role of ASA) ,as well as the QDS quality control services (as coordinated by TOSCI).

12. CONCLUSIONS FOR INTERVENTIONS BY AN ISSD TANZANIA PROGRAMME

ISSD TANZANIA PROGRAMME

Based on the following reasons, which have been outlined in previous sections, a sector capacity strengthening project based on the ISSD principles is recommended (and has been endorsed during the National ISSD workshop on March 21, 2014). Capacity development refers to integrated capacity development, from performance tools enhancement to individual and organizational capacity development, to institutional strengthening and change.

The main reasons are:

- Access to quality seed by smallholders in Tanzania remains stagnant and needs attention;
- Support to the seed sector in Tanzania is largely provided to only one seed system (the formal seed system);
- There is strong support and ownership at the zonal level for the formulation of a programme based on the principle of building on pluralist seed sector for enhanced access to quality seed;
- All actors strongly support the move towards a multi-stakeholder approach in the seed sector strongly based on private sector and farmer roles.

The project will have different phases:

- Inception phase, during which ownership will be built through the development of the taskforces and platforms. District level partnerships should also be established at this time;
- 1st phase, during which the first three areas for action will be emphasized;
- 2nd phase, during which the results will be scaled out (to more districts) and scaled up (through the evidence-based policy change component).

During the inception phase, the following main questions will be answered:

- Can the selected districts be confirmed in terms of the presented criteria?
- Can the zonal crops be conformed in terms of market potential or of farmers' needs and want?
- Can the most important local seed value chains be quantified and assessed in terms of need for change?
- What is the profile of the identified communities involved in seed production?
- What does community seed management look like and what are the options for local seed business development?
- What kind of market is there for local seed production, based on quantities and prices, and how does QDS production fit into this picture? Also, what types of services and agrodealers are already established?

STEPS TO BE FOLLOWED

A possible ISSD programme in Tanzania will address four thematic areas, which though interrelated could be addressed during different phases. In Table 12, the main commodities for community seed management, as well as their potential for Local Seed Business Development have been listed based on zonal data collection. Some suggestions for seed value chain development and evidence-based policy development are equally emerging.

The following steps can be followed for each of the main thematic areas:

Community seed management:

A first step will be the identification of the communities, farmers and associations involved in community seed management. Some of them may be interested and might qualify for local seed business development. Others will qualify for enhanced management of the distribution of existing and new varieties, supported by a capacitated seed extension system. This process will also lead to the confirmation of the priority crops that need to be considered for community seed management.

Local seed business development:

Based on the previous identification of actors involved in community seed management, and based on an inventory of farmers and associations involved in commercial seed production (either directly or under contract from seed companies), the needs of local seed business will be assessed. This will lead to a capacity development programme based on ISSD principles, which takes into account seed entrepreneurship, market-orientation and seed value chain development. During this process, some of the priority crops might change.

Zonal seed value chain development:

This component will start somewhat later and will build on demands which will have transpired from the first two components in terms of early generation seed, varieties, seed promotion and seed quality assurance services.

Evidence-based policy development:

Based on lessons learnt through the various mechanisms and during the three first thematic areas, a process of policy development will be supported. This could result in contributions to the National Seed Policy to be developed, as well as to contributions to the national legal context of the seed sector.

Table 9: Summary of opportunities for the four proposed key areas of intervention

Seed system per zone	Community-based seed systems	Local seed businesses, QDS and relief seed systems	Seed value chain	Policy Issues
Northern Zone	Bananas, Sweet potatoes,	Common beans, Pigeon peas, Sorghum,	Variety demand (e.g. pigeon peas)	Quality control, disconnect between variety release and seed demand
Central Zone	Pearl millet, Sorghum, Cassava,	Sweet potatoes, Groundnuts,	Limited markets, Research challenge, Seed Service providers.	QDS development:
Western Zone	Cassava, Sorghum,	Common beans, Sweet potatoes, Groundnuts	Research challenge, No seed farms	Quality inspection to be improved,
Eastern Zone	Cassava,	Pigeon peas, Sweet potatoes, Cowpeas, Sorghum,	Demand for locally adapted varieties, Access to EGS	QDS development,
Lake Zone	Cassava, bananas, sorghum, Pearl millet	Chickpea, Common beans, Sweet potato,	No formal seed, Need for EGS,	QDS inspection, District bylaw enforcement
Southern Zone	Pigeon peas, cassava, sorghum	Sweet potatoes, Bambara nuts, Groundnuts,	New varieties, EGS,	QDS inspection, decentralization
Zanzibar	Cassava, Sweet potatoes, bananas,	Rice, Cowpeas,	Quality control in vegetatively propagated crops needed, EGS production	High public sector involvement, Seed policy needed,

POSSIBLE PARTNERSHIPS

During the National seed sector stakeholder workshop in January 2014, the participating organizations were asked what they would be able to contribute to the four mentioned thematic areas. This resulted in a wide variety of suggestions, which illustrate their interest and willingness to partner with a possible project in Tanzania based on ISSD guiding principles.

Stakeholders with an interest in collaborating in a possible ISSD Programme in Tanzania

The following table lists which organizations are interested in collaborating on each of the four selected themes for the ISSD Tanzania Programme.

Table 10: Potential Partners for Community Seed Management

Organization	Proposed collaboration
ARI – Maruku	Training on seed production – seed quality control for cassava, sweet potato and banana.
DRD – CZ	Training on seed production – seed quality control for cassava, sweet potato and banana.
SARI	Train farmers and other stakeholders on seed production aspects in the field. Create awareness of improved varieties and available seeds (varieties) for production.
ARI – Maruku	Introducing PVS to farmers on new improved varieties. Seed quality control for grain legume and sorghum.
Invited participant	Upgrade bean production to market orientated CSM; offer training; observe quality.
ARI Tumbi	Provide farmer capacity building; group formation.
Department of Agriculture	Train farmers and other stakeholders on seed production. Provision of seeds of improved varieties.
Ministry of Agriculture (zonal)	Train farmers and other stakeholders on seed production and business skills. Provision of seeds of improved varieties Help in seed quality management; initiate training on QDS seed production.
SARI/HORT TENGERU	Formation of farmer research groups for seed production (beans). Timely delivery seed delivery (beans, bananas, sweet potatoes, sorghum, pigeon peas).
ARI – Naliendele	Formation of farmer research groups for seed multiplication contracts (sesame, groundnuts, sorghum, pigeon peas, Bambara nuts).
ARI – Mlingano	Formation of farmer research groups for seed multiplication contracts (pigeon peas, cassava).
SRI-Kibaha	Train farmers and extension workers on seed multiplication of cassava and sweet potatoes; share experience in community seed management. Help in seed quality management – including disease control.
MUCCoBS	Promote entrepreneurship and market; capacity building for farmers. Seed distribution.
MVIWATA	Identification of CSM groups; facilitate concept-writing and provision of appropriate/relevant documents.
AMINATA SEED Co.	Training farmer groups on quality seed production.
Kilimanjaro RS	Extension services – educating farmers on quality seed management.
RS-Kigoma	Provision of extension services to community – on community seed management.
No identity provided but looks like an NGO	Training through groups on management of seeds supply and linkages. Research on community management.

Research organizations in particular are interested in partnering in community seed management support activities, as are some regional extension offices and possibly some NGOs.

Table 11: Potential Partners for Local Seed Business Development

Organization	Proposed contribution
MUCCoBS	Promote entrepreneurship and market; research on seed marketing; seed distribution.
K'JARO RS	Promote QDS seed production & use, especially legumes.
RS-Kigoma	Organize and train local seed business operators in QDS.
Department of Agriculture	Initiate training on QDS seed production.
MAFC	Support QDS producers through training on seed production techniques and business skills.
SARI/HORT TENGERU	QDS training for farmer groups on producing good quality seed. Training on seed production (beans). Timely delivery seed delivery (beans).
ARI Ukiruguru	Provide capacity building. Local seed business for sorghum; chickpeas; sweet potatoes (QDS).
MVIWATA	Facilitate market orientated CSM training.
AMINATA Seed Company	Produce basic, certified seed for cowpeas and cassava. Train farmers and other stakeholders. Create awareness of improved varieties.
Serengeti Breweries Limited	Can partner in local business development companies with their farmers to provide market for quality seed.
TANSEED International	Training of small businesses on quality seed using private sector techniques.

Some research organizations, but most notably regional offices, universities and a few private seed companies could provide support to develop local seed business and quality declared seed production, especially for the business development part.

Table 12: Potential Partners for Zonal Seed Value Chain Development

Organization	Proposed collaboration
ARIs	Pearl millet seed multiplication; participatory research in seed production through training by observation; seed value chain development through facilitation of linkages between seed producers, suppliers, and farmers that need seed. Linking several value chain actors in formal and informal seed systems. Variety development and demonstration; seed production using farmer groups, prison farmers and national seed service.
SRI-Kibaha	Seed value chain development of cassava and sweet potatoes; provide pre-basic seed; seed quality management; seed production methods of cassava and sweet potatoes.
ARI-MLINGANO	Pigeon peas and cassava.
MoA- ZARI	Generate improved varieties; support in multiplication of basic seeds (VPCs).
Sokoine University of Agriculture	Studies to develop pro-poor value chains in Tanzania.
MUCCoBS	Training in business management skills and financial management.
TOSCI	To encourage the link between the informal and formal seed system in seed quality issues.
ASA	Production of foundation seed for seed growers; Production and dissemination of certified seed.
IITA-Tanzania	Germplasm development for cassava, banana, and cowpeas.
TANSEED International Limited	Training of stakeholders on the factors for development of sustainable seed value chains.

Different stakeholders identified opportunities to get involved in improving the seed value chain for various commodities, notably in terms of stakeholder interactions in the chain, as well as the improvement of access to quality starter seed for certified and QDS seed production.

Table 13: Potential Partners for Evidence-based policy change in the seed sector

Organization	Proposed collaboration
Sokoine University of Agriculture	Conduct evidence research to influence policy change on the seed sector in Tanzania.
MUCCOBS	Advocacy on policy focusing on quality seed marketing and supply.
MAFC	To review seed regulation to accommodate ISSD issues.
Ministry of Agriculture Zanzibar	Participate fully in making a contribution toward towards seed policy framework, Seed Act and Seed policy.
MVIWATA	Facilitate farmers' engagement in seed policy monitoring, discussions and feedback.
IITA-Tanzania	Develop seed certification standards for cassava.
TOSCI	To incorporate issues observed in the informal seed system into the seed policy/regulation.
DRD-CZ	Policy change advice on coverage of QDS market.

Sokoine University and MuCCoBS both indicated their interest in contributing to the development of evidence based seed policies, as did other public institutions and the farmer organization MVIWATA.

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ANNEX 1: NORTHERN ZONE SYNTHESIS

ZONAL BRIEF

The Northern zone is made up of three regions, Arusha, Kilimanjaro and Manyara Region. Lushoto and Amani in Muheza area in Tanga Region are also part of the Northern Zone. Arusha Region is comprised of 6 districts, Kilimanjaro Region 7 districts and Manyara Region 5 districts. The zone therefore serves a total of 20 districts characterized into 17 Farming Systems. The zone is characterized by several agro-ecological sub-zones with elevation varying from 400-1930 m.a.s.l. and annual rainfall ranging from 150 mm to 1500 mm. The zone has a population of 5,456,430 people according to 2012 Tanzania population and housing census. It covers an area of 101,228 sq. km (about 10,122,800 ha).

The zone has three major rainfall zones: High rainfall zone, which receives about 1,200 - 1,500 mm of rainfall per year. Most areas in the high rainfall zone rise to an altitude of 1,500 meters above sea level (masl). Moderate rainfall zone has rainfall ranging from 800 to 1,200 mm per annum, with moderately reliable distribution and amount. Moderate rainfall areas are located between 900 and 1,500 masl. The major crops grown in this zone are banana in association with coffee, and maize intercropped with beans or pigeon peas. Farmers in this zone also grow monocropped maize in the lowland plains. The livestock-keeping system in the zone is semi-intensive. The low rainfall zone receives rainfall ranging from 500 to 800 mm per year with very erratic distribution. Low rainfall areas are always in the lowland plains below 900 masl. The major cropping systems in the zone are monocropped maize, monocropped beans, and maize in association with beans. Extensive livestock-keeping prevails in the zone, which is the most important area for livestock production in northern Tanzania.

TABLE 1.1: CROP AREA (HA) IN 2007/2008 SEASONS (MASIKA AND VULI)
Source: NBS, 2012

Maize	Paddy	Sorghum	Pearl millet	Finger millet	Wheat					Category	Total
494181	8311	10149	968	4657	15107					Cereals	**533373**
Cassava	Sweet potato	Irish potatoe	Bananas								
3738	1713	2613	60581							VP crops	**68645**
Mungbean	Beans	Cowpeas	Green gram	Chickpeas	Bambara nut	Field peas	Pigeon peas	Groundnuts	Soyabeans		
2007	151088	6556	6416	6368	310	761	45733	2846	266	Legumes	**222351**
Sunflower	Simsim										
47812	2175									Oil crops	**49987**

During the stakeholder workshop in the zone four crops, which are common beans, pigeon peas, sorghum and bananas were undisputed selected as priority crops. The fifth priority crop was voted among others, which had similar scores. Sweet potatoes convincingly turned out to be of importance for the zone rather than cassava and finger millet.

Further data collection survey was done in three districts of Babati, Moshi rural and Same.

TABLE 1.2: DATA ON CROPS PRIORITIZED FOR ISSD TANZANIA IN THE NORTHERN ZONE

	Beans (Babati district)	Pigeon Peas (Babati district)	Banana (Rural Moshi district)	Common Beans (Rural Moshi district)	Sorghum (Same district)	Sweet Potatoes (Same district)	Data Sources
Acreage of the crop / year	8200 Ha	26150 Ha	26900 Acres	7000 Acres	1500 acres	400 acres	DAICO
Certified seed (tonnes / year)	Nil	4,500	Nil	Nil	800	n/a	DAICO
QDS seed (tonnes / year)	1600	Nil	Nil	Nil	None	n/a	DAICO

DESCRIPTION OF CROP AND SEED VALUE CHAIN ISSUES

Common Beans: Farmers in Rural Moshi and Babati plant 95% and 35% of their land with beans, which results in 90% and 50% contribution to their income respectively. Farmers rely on farm-saved seed or seed from their neighbours or from the local market. Beans are selected for market criteria such as colour and size and stored very dry with ash to maintain quality. Seed is renewed once every 6-10 seasons and only known source is the extensionist. Farmers suggest they get involved ion Farmer Field Schools and get access to improved varieties through demo plots, varieties that are pest and disease resistant, drought tolerant and market well. In many years have shortage of seed, then they will buy the seed from neighbours or sometimes they also sell.

Pigeon Peas: Farmers in Babati plant 40% of their land with pigeon peas, which contributes to 35% of their income. Farmers (men) keep the seed themselves and select for market characteristics such as size and colour. Farmers rarely replace the seed, in which case they would have to approach the extensionist. Sometimes the seed is sold, but normally exchanged if needed, but mostly they have the seed. Interest exists in getting higher yielding varieties with disease/pest resistance, drought tolerance, which are early maturing.

Bananas: Farmers in Rural Moshi have 90% of their land planted with bananas, which provides them with 90% of the income. Women maintain the planting material and aim at using high yielding and early maturity planting material. After three years they use ready acquired suckers for replanting. These can come from: Tengeru Research Institute, Mission or church, schools and progressive farmers. Farmers would like to see demonstration plots of banana seed/suckers, Farmer field school (FFS) and nursery plots. They do not sell or buy banana suckers, because of the traditional belief of the people in this area that they are not supposed to provide banana suckers for sale.

Sorghum: A farmer group in Same grows sorghum on 20% of their land, for 20% of their income. Men and women maintain the farm-saved seed and select for maturity of seed, thickness of seed, yield potentiality of seed, size of seed. The seed is only rarely replaced; they know one source of good seed, which is Farm Inputs Promotions (FIPS). They also get seed from the agricultural office, but if this is late they sometimes have to buy seed, they rarely sell. Farmers would like to see that education is provided to their groups, and they be trained on own farm seed multiplication.

Sweet Potatoes: Farmers in Same plant 10% of their land with sweet potato, but they do not sell any, all is for home consumption. They know that seed can be obtained through self-supply, neighbours, Research institute (HORTI-Tengeru) and agro-dealer, in practice women maintain the planting material through continuous watering and weeding. They know that new planting material, which they have not used, can be obtained from FIPS-Africa and from neighbours from other villages. The Government has no culture of supplying sweet potato seeds, nor the agrodealers. They suggest having farms for seed multiplication be established at village level or ward level.

NORTHERN ZONE SEED SYSTEMS

Farmer-saved, farmer-to-farmer and community-based seed systems

The inform seed systems in the zone were found to be strong in availing seed at the right time; cost effectiveness; meeting seed demands; involving own land; involving available family labour; having high market demand; affordability; acceptability of varieties to communities. However some weaknesses include lack of quality assurance; low productivity; limited variety options; farmer having low knowledge on seed value chain (methods of production); prone to diseases and pests attacks; lacking systematic introduction of new genetic materials; limited business potential; localized system; not reliable.

Local seed business and relief seed systems

The strength of intermediary seed systems in the zone was found in self-reliance; adaptability of the varieties; timely availability of seeds in the proximity; affordability; capacities building (agronomic practices) ; availability of seed experts; seed multiplication companies; assured quality of seed; readiness of farmers to accept improved seed supplies. Some of the weaknesses include potential for unsold and inadequate stock; potential of recycling seed for long time (injection of new seed is a problems); postharvest management pests; the seed value chain is not reliable throughout; potential for fake seed distribution.

TABLE 1.3: SEED SYSTEMS IN THE NORTHERN ZONE

Seed Systems	Farmer saved seed system	Farmer to farmer	Community based seed system	Local seed business	Relief seed system	Public system	Private seed companies
Percentage of seed supply	75%	Maize (20); sorghum (15); pigeon peas (50); bananas (80); finger millet (90); beans (40)	>50%	5%	<5%	10 (SP); 40 (PP)	75% of certified seed
Crops	All, except few cash crops	OPV maize, beans, sorghum, finger millet, pigeon peas, bananas	All crops except cassava and industrial crops: finger millet	OPVs of maize, common beans, sesame; sorghum, safflower, sunflowers, pigeon peas, wheat; tomatoes, Moringa;	Maize, sorghum, rice, cassava	Sweet potatoes, pigeon peas	Maize, beans, sorghum, sunflowers, sesame
Varieties	Landraces, local varieties, OPV's	Maize-OPV; pigeon peas; beans; sorghum; bananas; finger millet (local and improved)	OPV and other unknown varieties of local origin	Modern varieties – OPV	Modern, OPVs	Modern and local varieties	OPV and hybrid
Seed purchase frequency	<20% Sweet potatoes & sorghum-rarely beans-13% pigeon peas-14% bananas-33%	Sweet potatoes-rarely when new materials available 10-15% beans-13% pigeon peas-14% bananas-33%	Once in three years, 33% 20-33%3-5 years	2.5 - 5% 10 %	<5%. Restricted to specific areas, including the pastoralist areas in the Northern zone	20% pigeon peas; 2% sweet potatoes 10% sweet potatoes; 50% pigeon peas	?? After 2 years: 50%
Seed multiplication	Farmers	Farmers	Local communities	Individual/Groups: Magereza, JKT; Churches	Seed companies both public and private	Researchers, ASA, private	Seed companies
Seed marketing	n/a	Farmers	Local communities	Individual /groups through word of mouths and extension services	Relief agents, government	Private, researchers, NGOs	Seed companies
Quality control	Trust	Visual observation; trust	None or self-control	TOSCI/Districts agriculture seed inspectors and researchers, farmers seed producers (QDS)	Certified seeds e.g. TOSCI	TOSCI	TOSCI

FARMER GROUP DISCUSSION

During the discussions with Farmer Focus Groups, a number of issues were brought forward which are mainly focusing on: **access to varieties** (including availability of improved seeds/planting materials, establishment of stockist for some crops in some districts; breeding for disease and pests resistance, palatable varieties & less flatulence/gas and high yield of varieties; timely seed availability during the growing season; uniformity of seed product; and increase supply of high quality seeds); **capacity development and extension** (conduct training of farmers on crop management/good farming practices, quality seeds and seed storage, establish Farmer Field Centre); **seed production** (e.g. Increasing seed production by individuals; establish plots for seeds multiplication with close supervision, monitoring and management).

In general, the source of seed for most of the farmers is from informal sources. It was evident that the farmers trusted source of seed is own savings, research stations and somehow district agriculture offices. Access to seed remains a critical challenge for most farmers, this is because, they face difficulties in obtaining seed in time and among the common issues is the need to establish demonstration plots of improved and local varieties. Much as sorghum and sweet potato were chosen as priority crops, they seem to be not so common as a small percentage of the farmer's land (less than 25%) is used to cultivate those crops.

ZONAL SEED MULTIPLICATION

The seed multiplier are face with challenges of access to starter seed (shortage of basic seeds from ASA; shortage of certified banana seed); **access to services** (limited capital to expand seed business and limited number of experts in some crops e.g. sorghum); **production constraints** (emerging crop diseases and pests, soils fertility decline, unpredictable weather, poor traditional irrigation infrastructure,, low Education to farmers on seed multiplication). Another challenge is on **marketing seed** (unstable/fluctuating market prices, free provision of seed, lack of seed stockist for some crops in some district e.g. certified common beans; and low demand for that seed).

TABLE 1.4: DESCRIPTION OF SEED MULTIPLIERS AND MARKETERS IN THE NORTHERN ZONE

Name	Since	Type	Crops	Quantity	Type of seed	Source of starter seed	Clients
Common Bean: Bashnet QDS Group	2002 –	Group	Bean, Maize, sunflower	1600 kgs (2012)	QDS	ASA	Farmers (within and outside district)
Farmer at Managa Village	1998	Individual	Bean, Maize, Sunflower,	200 kgs	Informal	Neighbours	Farmers (others)
SARI -Researcher	2009	National institution	Bean, Maize, pigeon peas and sunflower	200 kgs	Formal	SARI, Breeder seeds	Framers and ASA
Krishna Seed Company	2007	Individual (family)	Bean, Maize, sunflower, Sesame	4500 kgs	Formal Certified	ASA	Agro-dealers, -Farmers
Farmer at Riroda village	2001	Individual	Bean, Maize, sunflower	200 kgs	Informal	Neighbours	Farmers (others)
ZENOBIA Seed Company	1998	Individual (family)	Bean, Maize, Sunflower + Sesame	10,000 kgs	Formal Certified	ASA	-Agro-dealers -Farmers
Community Based (MKOKIO)	2011	Community based seed system	Banana	550 sackers	Informal	Tengeru Research Institute	Farmer to Farmer
Informal, individual farmer (Gasper A.Mushi)	1980	Individual	Banana	200-300 sackers	Informal	Nearby primary school and to the church	Neighbour farmers
Community Based (Local market)	1980s	Community based seed system	Common beans	2500 kg	Informal	Local market	Farmer to Farmer
Individual farmers	1980s	Individual farmers (farmer-to-farmer)	Common bean	15000-20000 kgs	Informal	Local market	Neighbour farmers
Selian Agricultural Research Institute	2009	Research Institute	Sorghum Finger Millet	4 tonnes	Certified	ICRISAT	FIPS; Farmers; DAICO NGOs
SUBA- Agrovet and Trading Company dealer	2003	Group based enterprise	Sorghum	110	Certified	ASA	Farmers; DAICO; ASA
SENGASU- AGROVET	2000	Individual	Sorghum	500	Certified	SEEDCO; SUBA, Small Agro dealers; Local Farmers;	Farmers
Juma Bakari	2012	Individual	Sorghum	40 kgs	Informal	District Agriculture Office FIPS-Africa	Farmers
Idd Athuman Hoza	2011	Individual based	Sweet potatoes	4500 cuttings	informal	HORTI-Tengeru	Farmers
Mary Elifuraha	2013	Individual based	Sweet potatoes	1500 cuttings	informal	HORTI-Tengeru	Framers
HORTI-TENGERU	1991	Institute	Sweet potatoes	200,000 cuttings	certified		Farmers; FIPS; DAICOs

ZONAL SEED SERVICE PROVIDERS

Assessment of the service providers in the seed sector revealed that there were more providers (both public and private) offering financial and extension services; compared to research and quality control (seed inspection). The key constraints identified were: Shortage of basic seeds from Agricultural Seed Agency (ASA); resulting into shortage of certified seed; inadequate access to loans by the farmers; weather variability which causes poor loan repayments; and absence of appropriate irrigation facilities in farming systems especially in the rural areas. Others factors identified were: lack of enough sensitization on seed value chain/multiplication; unavailability of seed when required by the farmers; and genetic erosion of land races. At the marketing level, the key issues were: decreased supply due to low seed production; existence of fake seed in the market; limited availability of quality seed since multipliers only produce seed varieties agreed by farmers.

Capacity building constraints such as inadequate farming business skills for seed multipliers to ensure smooth loan repayments; sustainable seed production; and farming entrepreneurship especially in seed multiplication and marketing were also noted. Trainings on seed value chain at village level and funds to build capacity of extension agents are not available. There are a number of opportunities which can act as entry points for improvement of service provision in the seed sector within the Northern zone. Such opportunities include: engagement with the private sector in public private partnership system so as to strengthen farmer seed production; existence of organized farmer groups that can be mobilized for seed production; and capacity building of farmers on high quality seed production.

TABLE 1.5: ZONAL SEED SERVICE PROVIDERS

Name of service provider	Service provided	Focus crops in seed	Seed System Focus	Seed chain component
District Seed Inspectors	Quality assurance Training to farmers	Beans, maize, rice, pigeon peas, sunflowers	Intermediate QDS & Formal certified	Multiplication
PRIDE –RFW	Financial support Provision of loans to farmers	Rice, wheat, sunflowers, beans, pigeon peas, sesame and sunflower oil crops	Intermediate QDS & Informal (farmer to farmer saved)	Multiplication
Village Community BankVICOBA; Riroda village	Provision of loans to farmers	Rice, wheat, sunflower, beans, pigeon peas, sesame and sunflower oil crops	Informal and Intermediate	Multiplication
Village Extension Officer; Managa village	Extension services	Beans, maize, sunflower, pigeon peas	Informal	Multiplication
District Agricultural Irrigation & Cooperative officer (DAICO)	Training to farmers through extension services Sensitization of seed multiplication to farmers' seeds (Field days/farmers' show etc.)	Beans, maize, rice, pigeon peas, sunflowers, sesame	Intermediate QDS & Formal certified	Multiplication
TFA	Selling of seeds to farmers	Rice, wheat, sunflowers, beans, pigeon peas	Formal certified	Multiplication
KAI AGROVET (Agro dealer)	Selling of seeds to farmers	Rice, wheat, sunflower, beans, pigeon peas, sesame and sunflower oil crops	Formal certified seeds	Multiplication
Ward Extensionists Riroda Ward	Advising of farmers on good agronomic practices Selling of seeds to farmers	Beans, pigeon peas, and sunflower oil crops	Informal	Multiplication
DAICO	Linking between farmers and extension officers	No focus crop, just all crops grown in the district including common beans and bananas	Informal and formal	Variety development, multiplication and marketing
USAWA(Umoja wa SACCOS za Wakulima Moshi)	Credit	No focus crop but mostly credits are accepted to farmers producing Common Beans, and other crops	Informal and intermediate	Marketing
SEED INSPECTOR department at DAICO office	Seed inspection	No focus crop , all crops grown in the district including Common Beans	Informal and formal	Multiplication and marketing
Business Management Consultancy Limited (BUMACO RUFIDP (Rural Financial Development Programme	Credit; To mobilize for forming financial institution (SACCOS); Linking with other financial institutions (CRDB,BRAC,FINCA)	Bananas	Informal and intermediate	Marketing
Kilimanjaro Agriculture Training Institute	Research	Paddy but research to other crops like bananas and common beans are done in collaboration with other institutes including SARI	Informal and formal	Multiplication and marketing

SEED INSPECTOR department at DAICO office	Seed inspection	No focus crop, just all crops grown in the district including bananas	Informal and formal	Multiplication and marketing
BUMACO RUFIDP	Credit; To mobilize for forming financial institution (SACCOS); Linking with other financial institutions (CRDB,BRAC,FINCA)	Bananas	Informal and intermediate	Marketing
Kilimanjaro Agriculture Training Institute	Research and training	Paddy, research on bananas and common beans with other institutes including SARI	Informal and formal	Multiplication and marketing
USAWA (Umoja wa SACCOS za Wakulima Moshi)	Credit	No focus crop but mostly credits are accepted to farmers producing bananas	Informal and intermediate	Marketing
BUMACO RUFIDP	Credit; To mobilize for forming financial institution (SACCOS); Linking with other financial institutions (CRDB,BRAC,FINCA)	Bananas	Informal and intermediate	Marketing

ZONAL SEED SECTOR PROJECTS

A total of 10 seed projects/programmes in the zone were identified. Assessment of the seed projects and programmes indicates that; most of the projects and or programmes are involved in, multiplication, variety development and marketing. Half of the projects/programmes (50%) are currently engaged in the formal (certified) seed sector; 40% are engaged in the informal sector. Only 1 project/programme was involved in the intermediate sector. There are no projects focusing on Plant genetic resources. Most projects are supporting different seed value chain activities across the different priority crops; with the exception of sweet potatoes. There are no projects or programmes that focus on sweet potatoes. To a greater extent, the districts within the zone directly support some of the programmes, for example, PADEP, ASDP-DADIPS and DADP, and focus mainly on sorghum and bananas. In addition, the district plays a big role in supporting programmes related to seed multiplication and marketing, as well as seed services.

TABLE 1.6: ZONAL SEED SECTOR PROJECTS IN THE NORTHERN ZONE

Name	Duration	Type	Seed system	Crops	Seed chain component	Services provided	Policy targets	Intervention area
Africa Rising-IITA	2003	International project	Formal	Beans	Multiplication	Extension services –transport; Training to farmers	KILIMO KWANZA-To increase agricultural productivity and household livelihoods and conserving the environment for the next generation	Babati, Karatu, Arumeru
AGRA	2014	International project	Formal	Maize, beans and Pigeon peas	Multiplication		KILIMO KWANZA-promotes rapid sustainable growth on smallholders farmers& support the govt effort-'including smart efforts'-subsidies programme that improve farmers access to seeds & fertilizers	Babati, Arumeru, Karatu
BUMACO-RUFIP	2006	Private enterprise	informal	Bananas	Multiplication of sackers and marketing of banana	Training for seed Dissemination; Quality and less resistance diseases banana seed variety. Marketing of bananas	Food security and income increasing to farmers	Locality only in some parts of Moshi District council
PADEP	2005-2011	Government-Public	informal	Bananas	Multiplication	Training on banana diseases control; Rehabilitation of traditional canals; Sensitization on certified seeds	Food security and increasing income Nutrition	National /district
ASDP-DADIPS	2006	Government-public	informal	Bananas Beans	Multiplication and marketing	Rehabilitation of traditional canals; Sensitization of certified seeds	i.Food security and increasing income ii.Nutrition	National
VECO-TANZANIA	2013	NGOs	informal	Horticultural crops Beans Paddy	EGS, multiplication and marketing	Training on good agricultural practices Dissemination of improved seed in horticultural crops Market linkage	Food security and increasing income Nutrition	District-Moshi District council
Sorghum for Multiple Use (SMU)- SARI-ICRISAT	2010	Public and NGO	Certified	Sorghum	Variety development	Promotion of developed varieties Extension services	Food Security Timely availability of seed to farmers	National
Sorghum and Legume Integration (SLI) (ASARECA)d	2011	Public and NGO	Certified	Sorghum Cow Peas Green Grams	Variety development	Promotion of developed varieties Extension services	Food Security Timely availability of seed to farmers	National

Voucher Subsidies Programme	2008	Public	Certified	Sorghum Sunflowers Paddy rice Maize	Marketing	Timely availability of seeds	Food Security Policy	National and District
DADP	2006	Public	2	Sorghum	Marketing	Late delivery of government funds i.e., timely availability of seed	Food Security policy Promotion of Sorghum	National and District

SUGGESTED INTERVENTIONS FOR PRIORITY CROPS

TABLE 1.7: SUGGESTED INTERVENTIONS FOR PRIORITY CROPS

Bananas	Justification
Acquire certified seed nearby research institute at Tengeru Arusha although they mostly use informal seed	To acquire resistance/tolerant varieties and high yield varieties
Uproot entire plant ,burning Sanitation of equipment by heating/sterilizing by using jik Irrigation: The use of traditional canal	To fight against banana diseases e.g. Panama and Xanthomonas Lack of improved source of irrigation systems and irrigation scheme
Use of local market agents	To provide reliable and stable price ; and due to lack of collection centres
Learning or copying good farming practices from progressive farmers	To facilitate dissemination and promotion of improved farming practices. To cope with a challenge of few extension workers.
Common beans	**Justification**
Uproot entire plant ,depositing bean plant, burning Buy tolerant /resistant varieties buying and spraying of insecticide/pesticide) The use of traditional irrigation canals Provide training to farmers at village level	To control emergence of various common beans diseases To address the unavailability of improved irrigation scheme Training provides opportunity to build the capacity of farmers
Selling their bean seed through local buyer or agents Learn and use of progressive farmers Market oriented research	Weak bargaining power and storage facilities after harvest Due to few extension workers This is necessary to meet market demands
Empower district seed inspectors to intervene	This will greatly minimise the recurrence of fake seed or low quality seed
Strengthen research systems Improvement in multiplication of basic seed Strengthen linkages with various partners Introduction of Farmer Field Schools	This is because, everything concerning with seed starts with research Inadequate production of basic seed For financial support and technical backstopping To address the problems faced by farmers
Government should put more commitment to towards seed development, rather depending on donors	To increase on availability of seed, but also, dealing with the consequences of Food Security is costly

GAP ANALYSIS AND SOME MAIN CONCLUSIONS

Gap analysis of the on-going interventions in the seed sector indicates that most of the projects/programmes in the zone are currently engaged in the formal and informal sectors. Only 1 project (DADP) is focussing on intermediate (QDS) seed sector; clearly indicating a need for projects/programmes supporting multiplication & marketing; and provision of seed services in the zone. The main crops targeted under the informal seed sector were beans and bananas; while beans, pigeon pea and sorghum are being targeted under the formal (certified) seed sector. Throughout the zone, there were no projects and or programmes that focused on providing or initiating an enabling environment through policy recommendation or any other means of policy in the three seed systems. This is a potential area that an ISSD Tanzania programme can look into so as to facilitate the development of supporting seed sector policies in the zone.

TABLE 1.8: SUMMARY OF SEED INTERVENTION IN THE ZONE, IDENTIFIED ON THE BASIS OF THE STAKEHOLDER INTERVIEWS, TO ALLOW FOR A GAP ANALYSIS

Cluster of seed systems	Seed multiplication and marketing		Seed services		Enabling environment
	Project/programme	Crops	Project/programme	Crops	
Informal seed systems	BUMACORUFIP PADEP ASDPDADIPS VECOTANZANIA	Bananas Bananas Bananas and beans Beans	BUMACORUFIP PADEP ASDPDADIPS VECOTANZANIA	Bananas Bananas Bananas and beans Beans	
Intermediary seed systems	DADP	Sorghum	DADP	Sorghum	
Formal seed systems	Africa Rising –IITA AGRA Sorghum for Multiple Use (SMU) SARI/ICRISAT Sorghum and Legume Integration (SLI) Voucher Subsidy	Beans Beans and Pigeon Peas Sorghum and legumes	Africa Rising –IITA AGRA Sorghum for Multiple Use (SMU) SARIICRISAT Sorghum and Legume Integration (SLI)	Beans Beans and Pigeon Peas Sorghum and legumes	

ANNEX 2: CENTRAL ZONE SYNTHESIS

ZONAL BRIEF

The Central zone of Tanzania consists of two regions namely Singida and Dodoma. Singida is one of the poorest regions in Tanzania and is comprised of 5 districts of Iramba, Ikungi, Manyoni, Mkalama and Singida districts. Dodoma is comprised of 7 districts of Bahi, Chamwino, Chemba, Dodoma, Kondoa, Kongwa and Mpwapwa. Dodoma region has surface area of 41,311 km2, which of which 3,193,910 ha (77.3%) is suitable for crop and livestock production. The arable land is 1,816,910 ha (4450 of the total land in the region. The average cultivatable land is about 760,000 ha per annum used for both food and cash crops, approximately 18.4% of the total land. The climate in the region in semi-arid, with average rainfall ranging from 400-500 mm per annum with between 40 and 50 effective rain days, making the area unsuitable for high water demand crops. The total population in Dodoma is estimated to be 2,083,588 with Dodoma district being the most populated and Bahi the least populated. Singida region has a total surface area of 49,438 km2 out of which 95.5 km2 (0.19%) is covered by water bodies. The region forms part of the semi-arid central zone of Tanzania which experiences low rainfall and short rainy seasons which are often erratic with fairly wide spread drought. Total rainfall ranges from 500 mm to 800mm per annum with high geographical, seasonal and annual variation. The population in Singida region is estimated to be 1,370,637, mostly concentrated at Singida and sparsely populated at Mkalama

TABLE 2.1: CROP AREA (HA) IN 2007/2008 SEASONS (MASIKA AND VULI)
Source: NBS, 2012

Maize	Paddy	Sorghum	Pearl millet	Finger millet	Wheat					Category	Total
488918	15884	193660	129847	16535	73					Cereals	**844917**
Cassava	Sweet potato	Irish potatoe	Bananas								
6929	4467	0	1950							VP crops	**13346**
Mungbean	Beans	Cowpeas	Green gram	Chickpeas	Bambara nut	Field peas	Pigeon peas	Groundnuts	Soyabeans		
58	16133	7661	2332	5949	8782	527	13156	94400	58	Legumes	**149056**
Sunflower	Simsim										
182539	32115									Oil crops	**214654**

The main food and cash crops in the Central zone are generally those, which are tolerant to drought. The key food crops include sorghum (Pato, Marcia, Wahi and Hakika varieties), pearl millet (Okoa and Shibe varieties), cassava (Mumba, Hombolo 90/05 and Kiroba varieties), leguminous crops (cowpeas, chickpeas), maize (TMV, Staha, Kilimo varieties), and paddy rice (TXD 88, SARO, Super/India, Dakawa 85 varieties). Cash crops include groundnuts (Nyota, Pendo and Johari varieties), sunflowers (record variety), sesame (Naliendele 92 and Ziada 94 varieties), grapes (Makutoporat red, Syrah and Chenin blanc varieties) and cashewnuts.

The Central Zone seed sector representatives at Dodoma identified pearl millet, groundnut, sweet potatoes, sorghum, cassava as being important for informal and intermediary seed system support:. Subsequently, districts for data collection were selected on the basis of the importance and extent of cultivation of these crops and included: Kondoa, Singida Rural and Iramba.

The table below presents data from the central zone on the cultivated area for each of these crops and the estimate of seed production from the formal sector. Acreage of the crops identified by stakeholders as key ranges from 212,576 Ha for pearl millet to 8,301 Ha for cassava. No certified seed is available for these crops in the Central zone. However, QDS seed is produced and available for only sorghum and pearl millet and ranges from 1.5 tons/year for pearl millet to 17 tons/year for sorghum. Sorghum and millet occupy the highest acreage of farmers' fields (40-60%) although it does not follow that this is translated to the income they obtain from these crops. Groundnuts, however, generate the highest income from agricultural production of the selected priority crops.

TABLE 2.2: DATA ON CROPS PRIORITIZED FOR AN ISSD TANZANIA PROGRAMME IN THE CENTRAL ZONE

	Pearl millet	Groundnut	Sweet potato	Sorghum	Cassava
Acreage of the crop / year *(normal fields, not seed)*	212,576 Ha	15,982 Ha	31,331 Ha	30,065Ha	8,301Ha
Certified seed produced per year (tonnes / year)	0	0	0	0	0
QDS seed produced per year (tonnes / year)	1.5	0	0	17 tons	0

DESCRIPTION OF CROP AND SEED VALUE CHAIN ISSUES

Pearl millet: Farmers from Kondoa and Singida Rural grow pearl millet on 60% of their land, and estimate that 7.5% of their income could come from the crop. Farmer saved seed is the main source of seed, as other sources are not trusted and selection is based on the largest panicles for seed based on size, well matured and no diseases. Seed is not renewed each season, but every often when performance of the crop declines, seed is obtained from trusted sources mainly research. However, a large portion of the seed is also obtained from neighbours and is generally free because of existing social relations and the value attached to the crop. Farmers could improve the system through training on seed selection and proper storage, exposure to improved varieties through demonstrations. Availability of improved seeds in the nearby sources (seed agent/supplier) is also crucial particularly if QDS seed production could be undertaken in nearby villages.

Groundnuts: This is a commercial crop and farmers in Kondoa grow groundnuts on 10% of their land, which contributes to about 30% of their income. Seed is farmer-saved and is not renewed. Mature and larger grains are the basis for selection of next season's seed. They sometimes acquire seed from neighbours, for which they would have to pay, as groundnuts are high value. Farmers could improve the system through learning about new higher yielding varieties.

Sweet potatoes: The crop is grown on 37.5% of farmland, which contributes about 45% to income in Singida Rural and Iramba. In Singida cuttings are renewed yearly from outside sources due to lack of water during the dry season to maintain the vines insitu. However, at Iramba, there is sufficient water to maintain vines for longer and thus there is no seed renewal. Vines for seed are selected based on internode length, size of the vine and history of disease pressure. The system for sweet potatoes could be improved through diffusion of improved varieties to farmers, demonstrations of improved varieties, timely delivery of improved seed at onset of rains, training in seed production and maintaining these varieties with irrigation or dams on local seed farms.

Sorghum: Iramba district is the most important area for sorghum in the Central zone and at least 40% of the land is dedicated to the crop, resulting in 30% contribution to household income. Seed is obtained from their own farm, but also from neighbours and agrodealers. Self-supply of seed is prominent from saved seed although every often disasters occur and farmers need to buy a new seed stock. In the latter scenario, the seed comes from agrodealers or the district office, and in some cases obtain from nearby sources. There is a demand to improve the local variety (Mkombituna) and have demonstrations of improved varieties to enhance exposure to farmers of the available improved varieties, as well as training on seed production and storage.

Cassava: The crop is estimated to cover 15% of each farmers land and contributes nearly 20% of household income. Cassava cuttings are selected based on maturity and history of disease. Seed is not renewed, but interest exists to test new varieties. The cost of cassava cuttings tends to be high due the related high cost of managing cuttings during the dry season. There is also low supply and availability of cuttings and thus the demand-supply market forces rule.

CENTRAL ZONE SEED SYSTEMS

Farmer-saved and farmer-to-farmer seed systems

The farmer-saved and farmer-to-farmer systems seed are highly important channels by which farmers satisfy the majority of their seed needs. The farmer saved seed system is the major source of seed for farmers in central zone, contributing about 63% of seeds while the farmer-to-farmer seed system contributes about 10%, cumulatively meeting 73% of the seed needs. These systems are largely based on local transactions between individual farmers, and thus driven by demand and social relationship and not so much by profit. However, this seed is not necessarily for free and is often bartered against other products or sold at a price, which is determined by the nature of the social relationships. Farmers have some basic knowledge of seed quality and do some selection of the best seed at their level, which is crucial given that there is no outside source of new seed.

The main strengths of these systems is timely availability of seed, affordability and reliability of required seeds due to inbuilt strong self control systems, the systems are well known and geographically adaptable, and extension services are available to seed producers to improve seed quality. However a few weaknesses exist including poor storage facilities and techniques; No quality assurance; No renewal and replacement of seed-unless there is natural disasters; None assurance of seed quality; likelihood of transmitting disease and weed seeds with the crop seed, No guarantee of getting the amount and variety needed; Rely only in good relationship; Poor storage facilities and techniques unfair exchange in community seed trade, seed producers are not market oriented, seed regulation limits seed market expansion and no defined market for the seed.

Local seed business system

Local seed businesses (LSB) are generally operated by individuals and farmer groups for profit and mainly for production of quality declared seed. The LSB in the Central zone are estimated to contribute about 10% of the seed requirement. The distribution of seeds is through farmer groups, individuals, an organisation called DASPA, local open market (known as Gulio), market centres and an NGO known as TAWLAE.

The strength in this system include timely availability and affordability, nearby source; low cost; source of income; assurance of quantity of seed; seed producers have access to extension service in terms of seed inspection especially for QDS, there is capacity building and seed producers networking is enhanced. The weaknesses pointed out for this system include potential for adulteration, lack of market information, market reliability, poor packaging and lack of post harvest handling technologies. However a few weaknesses exist including poor storage facilities and techniques; limited source of water for insitu storage of vines (Sweet potatoes); potential for adulteration, lack of market information and inadequate entrepreneurships skills among LSB. There is also a high demand for demonstration plots to show the performance of improved varieties before they can adopt them.

TABLE 2.3: SEED SYSTEMS IN THE CENTRAL ZONE

Main questions	Farmer saved	Farmer to Farmer	Local Seed Business	Commercial seed system
Percentage of seed supply	75%	15%	10%	No data
Crops	Sorghum; Pearl millet; Groundnuts	Sorghum; Pearl millet; Groundnuts	Sweet potatoes; Cassava; Sorghum	No data
Varieties	Sorghum-landraces + local varieties Pearl millet- landraces + local varieties Groundnuts-local varieties	Sorghum-landraces + local varieties+ modern varieties Pearl millet- landraces + local varieties + modern varieties Groundnuts-local varieties	Sorghum-landraces + local varieties+ modern varieties Cassava-Local varieties Sweet potatoes-local varieties	No data
Seed purchase frequency	No regular renewal for landraces, unless there are natural disasters e.g. floods, drought. Some varieties are renewed every two to three seasons. The choice of variety selected for renewal depends on the performance	Renewal is done once in four to five seasons depending on farmers need. Improved varieties are renewed every two to three seasons. The choice of variety selected for renewal depends on the performance	Every season for sweet potatoes and cassava. Varieties renewed every two to three seasons. The choice of variety selected for renewal depends on the performance	No data
Seed multiplication	Farmers	Farmers	Farmers	No data
Seed marketing	n/a	Farmer's themselves	Farmers; Neighbours; Extension officers; NGOs	No data
Quality control	Self-control	Self-control	Self-control QDS inspection especially for sorghum	TOSCI

FARMER GROUP DISCUSSION

The farmer saved seed system is the major source of seed for farmers in the central zone, contributing about 63% of seeds in the whole seed sector while the farmer-to-farmer seed system contributes about 10% and the community based seed system contributes about 5%. In total the three sub systems within the broader informal system contribute about 78% of total seed utilized in the zone. The rest of the seed comes from the formal system mainly for crops like maize. For the ranking of priority crops for the potential ISSD programme, sorghum, cassava, sweet potato, groundnuts and pearl millet emerged as key.

Major constraints encountered in seed multiplication and marketing.

The key issues that arise related to seed are access to seed specifically availability of improved seeds in the nearby sources (seed agent/supplier); availability of improved seeds nearby; Timely delivery of improved seed when the season is starting. There are also issues with seed production and marketing and its desirable that millet and sorghum QDS producers be in every village; strengthening of seed market linkages (forward and backward linkages); regular visit of extension officers; establishment of seed farms in their vicinity; farmers' training on seed production; and establishment of seed producer groups in the community. The systems could be more efficient if the demand for TOSCI to open an office in the zone were addressed.

DESCRIPTION OF SEED MULTIPLIERS AND MARKETERS IN THE CENTRAL ZONE

There are 12 seed multipliers and marketers in the Central zone, mainly individual and one public player. The majority of them focus on the intermediate seed system (QDS, local seed business) and their main clients are the farmers in the community they are based. Their source of seed is either own material or from the public research system. The major production constraints include drought, no seed services, pests and diseases, groundnut sprouting; poor irrigation facilities; difficult to get isolation distance (limited land), shortage of labour force, and limited farm implements. Multipliers also face some marketing constraints including unreliable market, mistrust from neighbouring farmers; no stable market; fake suppliers (expired seeds), unreliable weather, high taxes and no financial support.

However, opportunities to enhance production, processing and marketing that could be exploited include more training for multipliers on seed technology; close supervision by seed inspectors; training on seed production and postharvest facilities; increase capacity to meet the demand; improve (local) varieties; improve storage facilities; support to improve irrigation facilities; quality control to provide good quality seeds; more extension services for seed production; adoption of seed processing equipment (threshing machines); market linkages; timely delivery of starter seed and promotion activities to link seed producers and farmers

TABLE 2.4: DESCRIPTION OF SEED MULTIPLIERS AND MARKETERS IN THE CENTRAL ZONE

Name multiplier / marketer	Operating since	Individual or group based enterprise	Crops	How much seed produced per crop last year?	Type of seed multiplied (informal, QDS, certified)	Source of starter seed	Main clients
Msafiri majidi-kondoa	2000	Individual	Pearl millet	9 bags	Informal	Own material	Neighbours/farmers
Pirima Rymond-Kondoa	2000	Individual	Groundnuts	16 bags unshelled seed	Informal	Own material	Neighbouring farmers
NDORO R. NDORO-Kondoa	2000	Individual	Pearl millet	9 bags. Seed disqualified not meeting standard	QDS	ASA	Farmers DED
SHAIRAN JUMA-Kondoa	2011	Individual	Groundnuts	21 bags of unshelled seed	QDS	District council	Neighbouring farmers and DED
Estomih Mringo (marketer)-Kondoa	2002	Individual	Groundnuts Pearl millet	Data not available	Certified	N/A	Farmers Institutions
Michael Alloyce –Singida Rural	2009	Individual	Pearl millet; Sorghum Sunflowers	640 kg pearl millet	QDS	ARI-Ukiriguru	Farmers; Researchers (ARIs) Institutions-School
Madai Njou-Singida Rural	2000	Individual	Pearl millet (komeshandege)	150 kg	Informal	Neighbour-Salum Madowola	Farmer
Rigobeth Mughira-Singida Rural	1984	Individual	Sweet potatoes (kerewe, mbuguni, mwasora, mwarusha)	30,000 cuttings	Informal	Neighbouring village	Farmers
Yohana Zephania (marketer)-Iramba	2003	Individual	Sorghum; Sunflowers; Maize; Vegetables	200 kg	QDS Certified	n/a	Farmers Institutions-School
Adam Kingu-Iramba	1993	Individual	Sweet potatoes (Serena, haha, shantinti, zuberi)	1000 vines	Informal	Neighbours	Farmers
Baraza Msafiri-Iramba	2010	Individual	Sorghum-Mkorongo	1800 kg	Informal	Mkulu	Farmers
Godfrey Makala-Iramba	2008	Individual	Sorghum Sunflowers	400 kg	QDS	DED-Kilimo	Farmers
Ushola-Iramba	2009	Public	Cassava	10 acres not harvested yet	Informal	Hombolo-ARI	Farmers

ZONAL SEED SERVICE PROVIDERS

There were 8 seed service providers identified in the Central zone, mostly government agencies providing services related to seed inspection, seed supply, seed market linkages, subsidies and farmer training on seed production and entrepreneurship. Their focus cuts across the farmer-farmer and local seed business seed systems. The government agencies involved in seed services, however, tend to distort the seed system as they provide subsidies on seed and fertilizers through an input support fund.

The main constraints encountered in service provision are related to limited capacity and extension services particularly limited funds for farmers training, unpredictable weather that constrains service provision; limited qualified partners-suppliers; limited entrepreneurship skills among farmers as they don't see opportunities in seed business; and high level of dependence among partners –suppliers and farmers (low sustainability). The majority of input suppliers are based in town while farmers are in villages thus there is no nearby source for good seed. Besides, some farmers do not follow instructions for seed production including isolation distances from other farms coupled with irregular supervision. There is an inherent poor response of farmers in adopting improved varieties although this is also related to the untimely delivery of the seed.

Several opportunities emerge that could be exploited to increase the efficiency of the zonal seed service provision. These could include regular visit by TOSCI during the season. Access to seed could be enhanced through promotion activities to get positive response from farmers; make available improved seed for neglected crops; provide subsidies on the storage chemicals; better transportation to remote areas; more collaborative research; priority of the seed sector in government programmes; develop mechanisms to ensure sustainability of QDS production; more involvement of private sector in seed production of neglected crops; and more support to farmers in commercial seed producing groups. However, training is also key particularly farmer participatory on-farm trials for the seeds distributed; training on the use of fertilizer (inorganic fertilizer); and training of trainers who are community based. Using of community change agents in influencing new technology was also identified as one mechanism to enhance uptake of improved seed.

TABLE 2.5: ZONAL SEED SERVICE PROVIDERS

Name of service provider	Service provided	Focus crop	Seed System	Seed chain component
District seed inspector Kondoa; Iramba; Singida rural	Market linkage (backward and forward), Seed producer registration, Field inspection, Farmers training on agronomic practices, seed production, seed handling and entrepreneurships. Linking farmers to seed testing	Sunflowers; Maize Sorghum; Pigeon peas Cowpeas; Rice	Farmer-to-farmer; Local Seed Business	Multiplication and marketing
DRD central Zone-Kondoa Iramba	Collaborative research, Training, Seed supply, Market linkage	Sorghum; Sweet potatoes Finger millet; Cowpeas	Farmer-to-farmer;	Early generation seed; Multiplication and marketing
DED-Agricultural Department-Kondoa; Iramba; Singida rural	Coordination and supervision of extension services at district level, Provide market linkages, Training of farmers on seed production (agronomic practices), Seed supervision, Seed producers registration	Sunflowers; Pigeon peas Maize; Cowpeas; Sorghum Simsim; Pearl millet; Finger millet	Farmer-to-farmer; Local Seed Business	Multiplication and marketing
Input Support Fund-Kondoa	Subsidy on seeds and fertilizers	Maize	Farmer-to-farmer; Local Seed Business	Marketing
RLDC-Singida Rural (Iramba), Kondoa	Support farmers to obtain quality basic seeds, Training on seed production-QDS and Entrepreneurs skills, Provide seed market linkages, Support seed field Inspections, Training to extension officers and other partners	Sunflowers	Farmer-to-farmer;	Multiplication and marketing
Farm Concern-Iramba	Seed market linkage (forward and backward), Training on usage of improved seed and entrepreneurship skills	Sunflowers; Sorghum Pear millet; Maize	Farmer-to-farmer; Local Seed Business	Marketing
FIPs-Singida Rural	Seed marketing linkage, Extension services, Training on seed production using demonstration plots, Entrepreneurship skills-packaging	Maize; Sorghum Pearl millet; Sunflowers Cassava; Cowpeas; Sweet potatoes; Vegetables	Farmer-to-farmer; Local Seed Business	Marketing
World Vision-Iramba	Training on modern farming, Sensitization of modern farm technology, Formation of commercial producers group, Formation of saving and credit group	Sunflowers	Farmer-to-farmer; Local Seed Business	Multiplication and marketing

ZONAL SEED SECTOR PROJECTS

There are 8 seed sector players with projects and programmes in the Central zone, which range from public to private and supported by either the government or development agencies. The Harnessing Opportunities for Sorghums and Millets in Eastern Africa (HOPE) project was the most widespread in the zone although it's restricted to sorghum and finger millet. The ASARECA sorghum and pearl millet projects also contributed to the informal seed sector. Most of the projects and or programmes are involved in training of farmers on seed production and community level seed inspection and intensification of seed production systems. At least all of the identified crops are covered by one project although most of the programmes have come to and end in 2013 except for the government programme ASPS-DADIPS.

TABLE 2.6: ZONAL SEED SECTOR PROJECTS IN THE CENTRAL ZONE

Name	Duration	Type	Seed system	Crops	Seed chain component	Services provided	Policy targets	Intervention area
ASPS-(DADIPs)	2000-todate 2007-Kondoa 2006-Singida	Public	QDS	Maize Pearl millet Sorghum Sunflowers Pigeon Peas	Multiplication, Marketing	Training of farmers and seed inspectors on seed production Expand the targeted group and crops covered Regulate procedures in financial aspects	Affordability and availability of quality seed Food security and accessibility of seed Capacity building of farmers	National
QDS project in Kondoa	2009-2013	Public	ODS	Maize, Pearl millet, Sorghum, Sunflowers, Pigeon Peas	Multiplication, Marketing	Training seed inspectors and farmers	Facilitate dissemination and market linkage.	District
Harnessing Opportunities for Sorghums and Millets in Eastern Africa (HOPE) project-ICRISAT	2009-2013	Public	QDS	Sorghum, Finger millet	Early generation seed Multiplication, Marketing	Scaling up marketing of quality seed; Increase coverage area; Inclusion of Pearl millet in project mandate crops	Affordability, accessibility of quality seed, and market linkage; Food security; Striga control; Harmonisation of seed policy in East Africa	International
Sorghum and Legume Intensification project-ASARECA	2011-2013	Public	QDS	Sorghum, Cowpeas, Green gram	Multiplication		Soil water management Striga management Soil fertility improvement	International
Pearl millet innovations project-ASARECA	2011-2013	Public	QDS	Pearl millet, Cowpeas	Multiplication	Increase coverage area	Soil water management Soil fertility improvement	International
OFSP Seed multiplication project	2014 to date	Public	QDS	Sweet potatoes	Multiplication	n/a	Improve nutritional status Improve income generation	National
Striga control project	2012 to date	Public	QDS	Sorghum	Marketing	To increase coverage of the group and area.	Striga control	International
NACO (Namburi company)	2013 to date	Private	QDS	Sorghum and Pearl millet	Multiplication, Marketing	Further training of seed production. To increase coverage area and number of farmer	Market oriented contracted seed producers	National

TABLE 2.7: SUGGESTED INTERVENTIONS FOR PRIORITY CROPS

Pearl millet	Justification
Introduce and evaluate more improved varieties. Promote production of certified seeds and QDS.	Regarding climatic change, pearl millet needs to be improved for food security- it's the most drought tolerant crop (where sorghum fails, pearl millet performs). There is limited availability of certified and QDS producing farms.
Groundnuts	**Justification**
Introduce and demonstrate more improved varieties. Promote production of certified seeds and QDS.	Majority of farmers are not aware of available improved varieties and they are limited in accessibility.
Cassava	**Justification**
Promotion on use of improved varieties. Strengthening the seed and cassava products market linkages.	Cassava is the only crop that can be found green during dry season in central zone (drought tolerant). It's a food security and food safety net crop during hunger. Regarding climate change, the crop needs promotion and marketing.
Sorghum	**Justification**
Capacity building on seed quality control and storage techniques. Introduce and evaluate more improved varieties.	It has been observed that quality assurance and storage pest to be a major problem in handling seed. The crops in recent times has become market driven which offers numerous opportunities for commercialization of sorghum agro-enterprises.
Sweet potatoes	**Justification**
Improve irrigation facilities. Capacity building on seed multiplication techniques and entrepreneurship.	It has been observed that, storage of vines is the most constraining factor on availability of seeds. It's a cash and food crop, thus many opportunities exist for commercialization.

GAP ANALYSIS AND SOME MAIN CONCLUSIONS

The dominant crops in the Central zone are subsistence based – millet, sorghum, groundnuts and maize, thus there is a high dependence on informal types of seed systems. The seed sector in the zone is supported through a number of projects and programmes with most heavily leaning on the development and promotion of new varieties. The programmes mainly concentrate on the intermediate seed system. The Agricultural Sector Development Programme (ASDP) strongly contribute to informal and intermediate (QDS) seed system development through the District Agricultural development Programmes and the District Agricultural Development Investment Plans (DADIPs). Support is provided for seed production of locally important crops and hence the main emphasis is on seed multiplication. The services provided by these programmes are direct seed (production and promotion) extension and capacity development of extension programmes. The district level programmes often lack the support by regulatory agencies to spur the sustained growth of QDS. There exists room for an Integrated Seed Sector Programme to intervene and ensure all the seed players are functional to make the system more efficient.

TABLE 2.8: SUMMARY OF SEED INTERVENTION IN THE ZONE, IDENTIFIED ON THE BASIS OF THE STAKEHOLDER INTERVIEWS, TO ALLOW FOR A GAP ANALYSIS

Cluster of seed systems	Seed multiplication and marketing		Seed services		Enabling environment (rules, regulations, policies and strategies)	
	Project / programme	Crops	Project / programme	Crops	Project / programme	Crops
Informal seed systems	n/a	n/a	n/a	n/a	n/a	n/a
Intermediary seed systems	• ASDP • QDS Project in Kondoa • Harnessing Opportunities for Sorghums and Millets in Eastern Africa (HOPE) project • Sorghum and Legume Intensification project • Pearl millet – Legume innovations project • OFSP Seed multiplication project • Striga control project	Sorghum Pearl millet Sweet potatoes	ASDPs (DADIPs)	Sorghum Pearl millet	• Harnessing Opportunities for Sorghums and Millets in Eastern Africa (HOPE) project	Sorghum
Formal seed systems	n/a	n/a	n/a		n/a	n/a

ANNEX 3: WESTERN ZONE SYNTHESIS

ZONAL BRIEF

The Western zone is made up of two regions: Kigoma and Tabora. Kigoma region is comprised of 8 districts and a total population of 2,127,930 people. THE DISTRICTS ARE Buhigwe, Kakonko, Kasulu, Kibondo, Kigoma and Uvinza. Tabora region consists of 7 districts and a population of 2,291,623 people. The districts in Tabora include Igunga, Kaliua, nzega, Sikonge, Tabora, Urambo and Uyui. The zone has a total of 4,419,553 people on 121,217 square Kilometres of land. Further, the Zone has a diversity of agro-ecological sub-zones dominated by wide sandy plains and rift valley scarps, with elevation varying from 800 -1500 m.a.s.l. and unimodal rainfall ranging from 800-1000mm. The crop growing season runs November to April.

Agriculture is almost entirely driven by smallholder farmers and is characterized by limited access to and participation in input and output markets, extension services; access to knowledge, information and financial services. Frequent droughts and unreliable rainfall patterns aggravate food and livelihood insecurity. During the multi-stakeholder workshop in Tabora, the Western zone seed sector representatives selected the following crops as being important for informal and intermediary seed system support: Cassava, Groundnuts, sweet potatoes, sorghum and beans were the undisputed priority crops. The choice of these five crops determined the focus for the field data collection.

TABLE 3.1: CROP AREA (HA) IN 2007/2008 SEASONS (MASIKA AND VULI)
Source: NBS, 2012

Maize	Paddy	Sorghum	Pearl millet	Finger millet	Wheat					Category	Total
387087	105047	54213	1851	1361	86					Cereals	**549645**
Cassava	Sweet potato	Irish potatoe	Bananas								
74229	21140	195	10347							VP crops	**105911**
Mungbean	Beans	Cowpeas	Green gram	Chickpeas	Bambara nut	Field peas	Pigeon peas	Groundnuts	Soyabeans		
2648	68707	3172	3254	1279	8251	115	2147	110613	80	Legumes	**200266**
Sunflower	Simsim										
15626	1420									Oil crops	**17046**

The details of the crops and relative importance are as in Table 3.1. For the field data collection 4 districts (Urambo and Igunga in Tabora, and Kibondo in Kigoma) were chosen to study the seed sector of the chosen crops further. Table 3.2 presents data from the Western zone on the cultivated area for each of these crops and the estimate of seed production from the formal sector.

TABLE 3.2: DATA ON CROPS PRIORITIZED FOR THE ISSD TANZANIA PROGRAMME IN THE WESTERN ZONE

District/ Item	Crop 1	Crop 2	Crop 3	Crop 4	Crop 5	Data source
IGUNGA	Sorghum	Sweet potatoes	Groundnuts	Cassava	Beans	
Acreage of the crop / year *(normal fields, not seed)* (ha)	14,659	1657.2	6569	8493	n/a	DAICO`s OFFICE
Production (tonnes)	21,988.5	1657.2	14,451.8	15,479	NIL	DAICO`s OFFICE
Yield/ha	1.5	1	2.2	1.8	NIL	DAICO`s OFFICE
KIBONDO	Cassava	Groundnuts	Sweet potatoes	Sorghum	Beans	
Acreage of the crop / year (ha) (normal fields, not seed)	10,009	1325	181	4209	11093	DAICO`s OFFICE
Production (tonnes)	38833.9	1642.95	407.93	11685.41	12091	DAICO`s OFFICE

Yield/ha	3.9	1.42	2.25	2.75	1.09	DAICO`s OFFICE
URAMBO	Cassava	Groundnuts	Sweet potatoes	Sorghum	Beans	
Acreage of the crop / year (ha) (normal fields, not seed)	18920	16334	11230	2712	13150	DAICO`s OFFICE
Production (tonnes)	43760	21452	23173	1845	11085	DAICO`s OFFICE
Yield/ha	2.3	1.3	2.1	0.7	0.9	DAICO`s OFFICE

DESCRIPTION OF CROP AND SEED VALUE CHAIN ISSUES

Cassava: Farmers in Kibondo and Urambo grow 90% and 25% of their land with cassava, which contributes 90 and 75% to their income. Planting material is self-saved and through the group and neighbours and is replaced once in three cycles (one cycle can be up to two years). Quality material is obtained from ARI-Tumbi and District Council. Farmers would like research to come to them with improved varieties and be trained in cassava multiplication (in the dry season), In drought years they buy sticks from group members, but they also sell.

Sorghum: Farmers in Igunga grow 30% of their land with sorghum (used to be more), which gives them 10% of their income. Men select good heads for seed, and select again at planting time. They use "inherited" local varieties as these resit the birds. They would be interested to have access to new varieties and to training on seed multiplication. Seed can be obtained through exchange with other goods.

Sweet potatoes: Farmers in Igunda grow the crop on 10% of the land, contributing to 7% of the income. Women select healthy planting material with short internodes and keep these under humid conditions. They often change the material. Four years ago they got orange fleshed sweet potato from ARI-Tumbi, but these were lost in the dry season. If needed they pay for the cuttings, as it caused by the high costs of maintaining cuttings in the dry season.

Beans: A Farmer Research Group in Kibondo grows beans on 25% of the land and raises as such 50% of their income. They get seed from their farm and from the local market. They use chemicals and ash to store the seed. They check germination through soaking in water, which is done by women. Every 3-4 seasons the seed is renewed. In 2008-2010 the group got some new varieties from ARI-Tumbi. They do pay if they need quality seed, but would like to have access to new varieties.

Groundnuts: Farmers in Urambo plant 60% of their land with groundnuts, resulting in 50% share of their income. Men and women maintain their own seed, looking at well filled pods. They avoid using threshed groundnuts for seed. They have different local varieties, but no access to new varieties, but would be interested to test these. They do buy seed from fellow farmers, as might be needed due to the weather.

WESTERN ZONE SEED SYSTEMS

Farmer-saved, community-based and local market based seed systems

The main strength identified were: cost-effectiveness; reliability and readily available; meet farmers preference e.g. taste and colour etc.; adaptability to local climatic conditions e.g. cassava and sweet potatoes; accessibility of the seeds; usually lower price and relatively low cost; more demand-driven; availability of seeds in the local market; quantity is high, seed is plenty; and low price due to high competition. The system also has some weaknesses noted: promotion of ISSD guiding principles will require educating farmers to produce quality seed; researchers to collaborate with farmers in producing seed which meet farmer's needs, wants and demands; need for strengthening the link between farmers, research and extension on seed issues; capacity building for farmers is needed; farmer group formation is required; the local market needs to be connected to breeders; and local market need seed quality control (certification).

Local seed business seed system

Mainly operated by individuals and farmer groups for profit and mainly for production of quality declared seed, local seed businesses are estimated to contribute about 09% of the seed requirement. Affordability and availability of quality seed; sustainability in market; and low priced seeds are some of the strength of this system, while low frequency by which farmers replace varieties: depends on availability of new varieties in the market; climate and weather changes; and, disease and pest outbreaks, was the main constraint of the system.

TABLE 3.3: SEED SYSTEMS IN THE WESTERN ZONE

Seed systems	Farmer saved seed system	Community-based seed system	Open/local market seed system	Local business seed (QDS) system	Commercial seed system
Percentage of seed supply	> 90% Overlap with community based?	70% for cassava; 20% for sorghum	Very high for: maize, sorghum and groundnuts	5%	Maize 90% (of the seed of the agrodealers, not of all the seed) Vegetables 100%
Crops	Cassava, sweet potato, cowpeas, beans, ground-nuts, sorghum, bulrush millet	cassava, sweet potatoes, Irish potatoes, sorghum	Beans, groundnuts, paddy, sorghum, finger millet, simsim, green gram, chickpeas	Maize, sorghum, beans, groundnuts, paddy etc.	Maize, and vegetables. Rice is also in the formal system but only by ASA (public)
Varieties	Local varieties	Landraces and local varieties	Sorghum (Modern varieties: Tegemeo, Macia, Serena, Pato); Sorhum (local varieties: Ukura)	Open pollinated varieties	Modern and exotic varieties
Seed purchase frequency	1-10% So every ten years; Seed replaced more often variety	2-3 years for sorghum. 3 yrs. for cassava without disease outbreak. Depends on market	Sorghum (yearly from the market); Paddy (yearly); Maize (yearly nowadays) Paddy (not often)	Maize every 3 seasons; groundnut (4); paddy (3); Sorghum and beans more than 5 years; Variety after 5 seasons	For maize after 3yers for composites and every season for hybrids; Vegetables every season
Seed multiplication	Farmers both male and female	Farmers	Farmers	ASA/TANSeed	Commercial companies e.g. contracted farmers/institutions and companies
Seed marketing	Farmers both male and female	Farmers	Local businessmen	Local QDS producer	Multinational seed companies and national seed companies
Quality control	Farmers experience	Selection, isolation distance, rogueing by communities	Reputation	TOSCI	TPRI, TOSCI and LGA seed inspectors

FARMER GROUP DISCUSSION

The main relationship among farmers was through neighbours and self-help groups. The importance of the crops varied significantly, with % land for the crop ranging from 10% (sweet potatoes) to 90% (cassava). Similarly, the crop contribution to income followed the same trend 7% (sweet potatoes) to 90% (cassava). The main source of seed is self-supply from previous seasons. Quality of the seed was maintained through

practicing good agronomic practices like variety separation, and this activity was by both men and women. Quality of purchased seed was mainly gauged by inspecting the physical characteristics of the seeds for damage and size attributes. Change of seeds was mainly infrequent, with only sweet potatoes being changed almost every season depending on availability. ARI-Tumbi research institute was the main source of trusted and improved seed, mainly because of lack of alternatives. The proposed interventions were mainly on improving access to quality seeds, building local capacity in seed multiplication and introduction of stress tolerant varieties.

Issues raised by farmers:

For better access to services the following were recommended: Research services be decentralized; Improvement of extension services (FFS for cassava); Easing credit acquisition condition; Developing capacity for Western zone in development of new cassava varieties; Training on seed multiplication; Participatory research/breeding be done on farmer`s field; Availability of field and storage pesticides; Training on soil fertility managements to improve bean production. Introduction of bitter cassava varieties to discourage theft; Breeding for bird resistant sorghum seeds/Seeds that can scare birds; need for a specific seed multiplication groups/ companies; and more availability of quality seeds were recommended as avenues for accessing better seed varieties.

Major constraints encountered in seed multiplication and marketing.

Many farmers do not want to pay for the sweet potato and cassava cuttings; lack of reliable market for sorghum grains; insufficient capital, lack of modern farm tools and Water during dry seasons, and lack of training in cassava seed multiplication, are some of the constraints recorded. Further, pests and diseases; lack of cutting preservation skills; low rainfall; destruction of wild animals; conflicts between farmers and livestock keepers; expensive agricultural inputs (pesticides and fertilizers), susceptibility of local varieties to diseases and inadequate extension services were also noted. However, a number of opportunities were also highlighted. Cassava cuttings and groundnut seed businesses are profitable and yet to be taken up; demand for for training on cassava seeds multiplication; rain water harvesting for seed multiplication; demarcation between grazing area and area for crop production is high. Stakeholders recommended that any sustainable seed system should carry the many strong points of the informal seed system and integrate it with the good attributes of the formal system.

DESCRIPTION OF SEED MULTIPLIERS AND MARKETERS INTHE WESTERN ZONE

A total of 19 mainly local business and individual seed multipliers and marketers were identified in the Western zone. The informal system is the main source of seed, with most of the farmers relying on self-supply and from neighbours. The main constraints encountered included: Conflict management (Kibondo Big Power Group); Meagre funds from the government; Inadequate extension staffs; Lack of modern farm tools; Lack of preservation skills; Difficult accessibility of fields ; Lack of groundnut breeders. Many farmers do not want to pay for the cuttings; Lack of cutting preservation skills; Rigidity of farmers in accepting knowledge; Conflicts between farmers and livestock keepers; High prices on seed; and Poor transport facilities. Other challenges included: the need for farmer sensitisation to change their attitude; transport for extension officers; employment of more extension officers; enforcement of laws/by laws to reduce conflicts between farmers and livestock keepers; Enough funds needed to facilitate researchers' service; Need for financial services to farmers to get capital; limited crop specialization; Capacity building on ARI-Tumbi staff to be updated. A number of opportunities were also noted, including: demand of cassava cuttings; Started 2012 selling sorghum seeds as a result subsidy from Suba Agro; and the need for seeds that are not preferred by bird.

TABLE 3.4: DESCRIPTION OF SEED MULTIPLIERS AND MARKETERS IN THE WESTERN ZONE

Name multiplier / marketer	Operating since	Individual or group based enterprise	Crops	How much seed produced per crop last year?	Type of seed multiplied (informal, QDS, certified)	Source of starter seed	Main clients?
Kennedy Salulandari (KIBONDO BIG POWER)	2006	Both, individual and in a group.	Cassava	125,000 of cassava cuttings	Informal	GTZ	Urambo district cancel, Farmer groups
Christopher Chubwa (KIEMA)	2006	Both, individual and as a group	Cassava	405,000 cuttings	Informal	ARI-Tumbi Kibondo District Council	Kibondo district counsel and Individual farmers
Juma Suleman Makindija	2011	Individual	Cassava	200,000	Informal	Neighbour village (Kasisi)	Neighbouring farmers
Said Mohamed Mbalamla	1995	Individual	Cassava	10,000	Informal	Neighbour	Neighbour
Nuhu Hamis Mpanda	2009	Individual	Cassava	400,000	Informal	From neighbours	Farmers in his village and from other district
Kadada S Mohamed	2013	Individual	Cassava	21000	Informal	DAICO's office	Fellow farmers
Sylivester Yatuba	1988	Both	Sorghum	240 kg	Informal	Agricultural Office	-Neighbours -Local brew processor
Peter Kashinje	2000-2007	As a Group	Sorghum, Maize	NIL	Informal	DAICO`s Office	Fellow farmers
Robert Stephano Kitenya	2000	Both	Sorghum	120 kg	Informal	DAICO`s Office	DAICO`s Office and fellow farmers
Emmanuel Mino	1993	Individual	Sweet potatoes	300,000	Informal	Own	Neighbours
Rebeca James	2010	Individual	Sweet potatoes	110,000	Informal	Neighbour	Neighbours
Sanagu Mahindi	2011	Individual	Sweet potatoes	100,000	Informal	Neighbour	Neighbours
Peter Kashinje	2006	Individual & group	Sweet potatoes	250,000	Informal	DAICO's office	Neighbours
Adlophina Luzila	2008	Individual	Beans	30 kgs	Informal	ARI- Tumbi	Neighbouring farmers
Lucy Kopolo	2013	Individual	Beans	50 kg	Informal	local market	Neighbouring farmers
Dickson Samwel	2010	Individual	Beans	50 kg	Informal	Local market	Neighbouring farmers
Juma Japhari Juma	2005	Individual	Groundnuts	612 kg of groundnuts (unshelled)	Informal	DAICO`s Office Inherited	Fellow farmers
Musigwa Kigaraba	1991	Individual	Groundnut	25 bags @ of 40kg	Informal	Inherited	Fellow farmers
Kadada S. Mohamed	2000	Individual	Groundnut	240 kg (unshelled)	Informal	Neighbour	Fellow farmers

ZONAL SEED SERVICE PROVIDERS

A total of 10 service providers, mainly government and NGOs were identified in the zone. The main services provided were seed inspection, seed supply, seed market linkages, subsidies and farmer training on seed production and entrepreneurship. In terms of the seed component, they mainly concentrate on multiplication of seed in the farmer-farmer and local seed business seed systems. The main constraints encountered included conflicts between farmers and service providers, poor facilitation and access to financial services to farmers to get capital, limited entrepreneurship skills among service providers; and an inbuilt poor response of farmers in adopting improved varieties. Among the opportunities, priority of the seed sector in government programmes; develop mechanisms to ensure sustainability of QDS production; more involvement of private sector in seed production of neglected crops; and more support to farmers in commercial seed producing groups were noted.

TABLE 3.5: ZONAL SEED SERVICE PROVIDERS

Name of service provider	Service provided	Focus crop	Focus on which seed systems	Seed chain component
James Mnyiri	Extension services	Cassava and beans	Informal local seed business	Multiplication
Filiposipa R.Kusimula	Extension services	Field crops and horticultural crops	Informal	n/a
ARI-Tumbi	Seed provision (research)	Cassava	Informal	Multiplication
Kibondo District Council	Seed provision and extension	Cassava	Informal	Multiplication
SARD –Sc	Seed provision	Cassava	Informal	Multiplication
Kibondo Environmental Management Association (KIEMA).	Seed provision	Cassava	Informal	Multiplication
KIBONDO BIG POWER GROUP	Seed provision	Cassava	Informal	Multiplication
Florentine Msafiri Mkenda	Extension services	All	Informal	Multiplication
Nyalusi Yohana	Extension	All	Informal	Multiplication
Urambo District Council (DAICO)	Extension Seed provision	All Cassava	Informal	Multiplication
Ngesi Agrovet.	Stockist	Sorghum, maize, paddy, green gram, sesame	Formal certified	Marketing
Suzana Shija	Stockist	Sorghum, maize , horticultural crops	Formal certified	Marketing
John K. Mngofi	Extension services	Sorghum, cassava	Informal	Multiplication
Igunga District Office (DAICO`s Office)	Seed provision and extension services	Sorghum, maize, sweet potatoes	Informal	Multiplication
Athumani Mgunya	Extension	All	Informal	Multiplication
Tumbi Agricultural Research Institute	Provision of Improved seeds training	Sweet potatoes	Informal	multiplication
Simon Lumali (Ward Agriculture Extension Officer)	Extension service	All	Informal	Marketing
Tumbi Agricultural Research Institute	Training Seeds provision Fertilizers	Beans	Informal	Multiplications
Florentin Msafiri Mkenda	Extension services	Field crops	Informal	Multiplication
Nyalusi Yohana	Extension services	Field crops	Informal	Multiplication
ARI –Tumbi	Seed provision	Groundnuts, cassava	Informal	Multiplication

ZONAL SEED SECTOR PROJECTS

There are virtually no programmes or projects dealing in seed components for most of the target crops in the landscaping programme. The few projects (BIT and SARD-SC) are mainly concentrated on banana and cassava, respectively. Even then, the two programmes are focussing mainly on training services and crop (banana and cassava) specific extension services. DADPS, a government initiative focussed on broad aspects of agricultural productivity and has wound up. There have been minimum efforts in commercializing the seed sector in the region. The details of the few projects are presented in the table below.

TABLE 3.6: ZONAL SEED SECTOR PROJECTS

Name	Duration	Type	Seed system	Crops	Seed chain component	Services [provided	Policy targets	Intervention area
BTC Banana Project	2009-2013	Public	Informal	Bananas	Variety development Multiplication	Marketing and processing	Financial regulation at LGA`s	Awareness creation
SARD-Sc (IITA) Cassava	2013 - 2016	Public	Intermediate	Cassava	Multiplication Marketing and processing	Mechanization	Seed Multiplication should be decentralized	Linkage between project management-extension and beneficiaries.
DADPS	2008-2013	Public	Informal	Cassava	Multiplications	1.Funds availability 2.Availability of multiplication centres at ward level 3.Introduction of sweet varieties 4.Improvements of extension services 5.Farmers training in Cassava processing	Laws protecting farms from livestock grazing	Localities, district and zone
DADPS	2008 – 2013	Public	Intermediate	Sorghum	Multiplication	Timely disbursement of funds.	NIL	District level
Seed multiplication project	1995-2000	NGO (religious based).	informal	Sorghum	Multiplication	Farmers training on seed multiplication Farmers mobilization and awareness creation	NIL	District level
DADPS (District Agricultural Development Plans)	2007 - 2008	Public	Informal	Sweet potatoes	Multiplication	Timeliness in fund disbursement Training in multiplication Transparency in project management	-	District, zonal

TABLE 3.7: SUGGESTED INTERVENTIONS FOR PRIORITY CROPS IN THE WESTERN ZONE

Sweet potatoes	Justification
Variety development: Introduction of improved sweet potato varieties Increase research services to farmers	Existing varieties have low yields, susceptible to diseases and pests attack. Currently, there is no reliable source of high quality sweet potato seeds Research seeds are the best trusted as there is no outside source of high quality seeds
Production: Rain water harvesting for maintenance of seeds during dry seasons Farmers training in seed multiplication and sweet potato processing	Lack of reliable water sources for sweet potato seed maintenance during dry seasons Lack of knowledge in sweet potato seed multiplication Non- availability of high quality sweet potato seeds Expanding market for sweet potato products Improvement of sweet potato storage
Services: Improvement of extension services (number of workers, refresher courses and transport) Ease accessibility of capital to farmers	There is inadequate number of extension agents; Lack of transport for extension workers; Need for updating knowledge for extension workers (with new technologies); Poverty of most farmers and difficult conditions to farmers in accessing capital from financial institutions
Sorghum	Justification
Variety Development: Capacity building to ARI-Tumbi staffs especially on sorghum breeding and seed multiplication of superior varieties.	For easy access of planting materials in the zone and provision of adequate extension services on the target crop
Production: Training farmers and extensionists on seed multiplication	To build farmers capacity and meet the demand
Marketing: Link farmers with brewing companies	To expand market for sorghum
Services: Mobilize the formation of members based microfinance institutions	For easy accessibility to loans.
Cassava	Justification
Variety development: Capacity building to ARI-Tumbi staffs especially on cassava breeding and seed multiplication; Introduction of improved cassava varieties	Absence of cassava breeders in the zone For easy access of planting materials in the zone and provision of adequate extension services. Existing varieties are bitter, poor yielding and susceptible to pests and diseases
Production: Promote/encourage the formation of more farmers groups on seed Multiplication Training on seed multiplication (cuttings), preservation (cuttings) and Processing of cassava tubers. Farmers training in cassava seed multiplication, agronomic practices and processing	To meet the market demand. To meet the market demand and value addition of the produce Lack of knowledge in cassava seeds multiplications Increase availability of cassava planting materials Increase farmers income from sales of cassava seeds Low farmers knowledge in cassava agronomic practices
Services: Mobilize the formation of members-based micro finance institutions Improvements of extension services (transport, number of extension agents) Ease farmers accessibility to capitals	For easy accessibility to loans. There is inadequate numbers of extension agents Lack of transport facilities Difficult lending conditions of financial institutions
Groundnuts	Justification
Varieties: Capacity building to ARI-Tumbi staffs especially in g/nut breeding and seed multiplication	For easy access of planting materials in the zone and provision of adequate extension services.

Production: Training of farmers and extension officers on g/nut seed multiplication	To meet farmers needs on groundnut seeds
Services: Mobilize the formation of members based microfinance institutions	For easy accessibility to loans.
Policies: Lobbying the government to take more interest in groundnut production	More support from the government
Beans	**Justification**
Varieties: Introduction of improved and high quality bean varieties Building capacity of ARI-Tumbi scientists in bean breeding	Present varieties have low in yields and are susceptible to pests and diseases Absence of bean breeders at ARI- Tumbi Absence of outside source of high quality seeds for farmers
Production: Farmers' training in seed multiplication, improved agronomy and soil fertility management	Farmers lack knowledge in seed multiplication, good agronomic practices and soil fertility management
Services: Improve of extension services (number of agents, refresher courses, transport) Capital availability to farmers Ease availability of TOSCI services to bean seed multipliers	Inadequate numbers of extension workers available Lack of regular training to extension agents Lack of transport facilities for visiting farmers Financial institutions' difficult lending conditions (to farmers) Difficult accessibility of TOSCI services to seed multipliers

SUMMARY OF PROPOSED SEED INTERVENTION IN THE ZONE ON THE BASIS OF GAP ANALYSIS

1. National and Western zone specific seed laws and byelaws should be put in place and operationalized within the framework of the legal environment.
2. To curb the rampant fake and law quality seed, incentives among actors to report such incidences should be instituted.
3. Approaches and avenues for full liberalization of seed production, certification, and trade should be pursued to improve the seed sector in the region.
4. Capacity building of all actors across the whole value chains should be undertaken, especially for crops whose current interventions are minimal.
5. Seed availability could be increased through credited finance guarantees.

TABLE 3.8: SUMMARY OF SEED INTERVENTION IN THE ZONE, IDENTIFIED ON THE BASIS OF THE STAKEHOLDER INTERVIEWS, TO ALLOW FOR A GAP ANALYSIS

Cluster of seed systems	Seed multiplication and marketing		Seed services		Enabling environment (rules, regulations, policies and strategies)	
Informal seed systems	SARD-Sc (Kibondo) BTC- Banana Project (Kibondo)	Cassava Bananas	SARD-Sc: Seed provision BTC- Seed provision	Cassava Bananas	SARD-Sc: Seed provision BTC- Seed provision	Cassava Bananas
Intermediary seed systems	n/a	n/a	n/a	n/a	n/a	n/a
Formal seed systems	n/a	n/a	n/a	n/a	n/a	n/a

ANNEX 4: ZANZIBAR SYNTHESIS

ZONAL BRIEF

Zanzibar is an integral part of the United Republic of Tanzania, comprised of two main islands – Unguja and Pemba, covering 2,643 km^2, with a population of 1,302,301 in 2010. Based on the 2010 Household Budget Survey, 44.41% and 13.04% of the population are living below basic needs poverty and food poverty line respectively.

Agriculture is the dominant economic activity, which accounts for 21 % of the GDP, provides 75% of the foreign exchange earnings and 70 % of the population depends on it for their livelihood. The main food crops include rice, cassava, bananas, sweet potatoes, yams, legumes (cowpeas, green gram and pigeon peas), fruits and vegetables. Table 4.1 shows area planted to the main food crops in 2007/2008 cropping seasons.

Table 4.1: CROP AREA (HA) IN 2007/2008 SEASONS (MASIKA AND VULI)
Source: NBS, 2012

Maize	Paddy	Sorghum	Pearl millet	Finger millet	Wheat					Category	Total
4055	26600	1922	1087	18	22					Cereals	**33704**
Cassava	Sweet potato	Irish potatoe	Bananas								
38663	7924	47	15913							VP crops	**62547**
Mungbean	Beans	Cowpeas	Green gram	Chickpeas	Bambara nut	Field peas	Pigeon peas	Groundnuts	Soyabeans		
0	81	1494	609	0	26	0	1580	699	0	Legumes	**4489**
Sunflower	Simsim										
0	0									Oil crops	**0**

The seed sector is poorly developed with no seed policy and regulations in place to lead and support its development. Unlike the mainland, Zanzibar does not have seed policy and regulatory frameworks. Rather, the Ministry of Agriculture, Livestock and Environment (MALE) enforces the Plant Protection Act, 1997, for regulation and control of seed imports, quarantine and destruction of pest-infested seed. This potentially provides some protection for vegetative crops such as cassava against viral and other diseases. Zanzibar was also recently granted the establishment of a Variety Release Committee with representation under MALE.

The availability of improved seeds is very low. For example, the annual cowpea and maize seed demand is about 10 tonnes each but the supply is only 3tonnes and 2 tonnes, respectively. The informal seed system is the main source of seed for most crops, except rice where farmers get most of the seed from the public through a subsidy. In addition, there are no mechanisms or agency like TOSCI for seed certification and seed quality control. Quality seed for grains is brought from the mainland either by agro-dealers to be sold farmers or in case of rice, by the ministry of agriculture's seed unit as starter seed purchased from ASA and used to multiply seed by contract growers and the seed unit itself. For vegetative propagated crops (cassava, sweetpotato and bananas), there is no adequate information on the actual requirement and supply of the improved planting materials however, the situation might be worse. Farmers are desperately going for whatever is available to meet their requirement for planting materials.

Unlike in the mainland, there are hardly any projects and programmes related to seed sector or agricultural development. Similarly, the presence of NGOs is quite limited compared to mainland, therefore the efforts can also be directed towards strengthening the public extension services to support in the seed sector development. The informal seed system is the main source of seed for farmers on most crops, except rice where farmers get most of the seed from the intermediary system comprised of the public with contract growers which provides subsidised seed.

Table 4.2 shows the acreage for each of the crops prioritized for the ISSD Tanzania in the two islands. There were no estimates for quantities of seed produced other than the 250 tonnes of seed for rice, obtained from

the ministry of agriculture seed unit. The seed is intermediate between formal and informal but is not the full QDS seed as it is defined on the mainland. The chosen crops are grown in virtually all the districts

TABLE 4.2: DATA ON CROPS PRIORITIZED FOR THE ISSD TANZANIA PROGRAMME IN PEMBA AND UNGUJA
Source: Ministry of agriculture & natural resources

	TOTAL AREA UNDER THE PRIORITY CROPS (2013) Ha				
	Rice	Cassava	Sweet potatoes	Bananas	Cowpeas
UNGUJA	21,000	40,000	13,000	-	600
PEMBA	8,049	9,240	1,994	2,811	761
Total Zanzibar	29,049	49,240	14,994	2,811	1,361
QDS seed produced per year (tonnes / year)	250 tonnes				

DESCRIPTION OF CROP AND SEED VALUE CHAIN ISSUES

Cassava: Cassava is grown for home consumption and sale. On average, it occupies 65% of the farm. The crop meets about half of their household food needs and contributes to about 45% of their farm income farm from sales largely to the mainland. Seed is from self-supply or neighbours. Once every 3 years, or as a function of decline in yield and taste, they exchange their stock with fresh cuttings, usually obtained from research station. Cuttings are only occasionally paid for when exchanged between neighbours. They are also purchased only from a reliable source usually for seed stock renewal. Both men and women farmers are involved in the selection of cuttings from healthy looking plants. Informal multipliers exist and their fields are in some cases get inspected by agricultural extension officers.. However, farmers trust their own seed best, followed by research, local multiplier and neighbour. Farmers see the establishment of mother gardens, improved seed inspection, community variety selection and an increase in the number of extension staff with knowledge on seed as opportunities for the improvement on availability of quality cassava cuttings.

Rice: The sources of seed included self-supply, from neighbours and the ministry of agriculture seed unit. The seed from the ministry of agriculture is sold at a subsidised price, while that obtained from neighbours is not paid for. The farmers interviewed satisfy 70% of their household food need with rice, and 35% of their income. They renew seed once every 2-3 years. They would like to receive training on seed multiplication, improve irrigation infrastructure, and get access to new varieties, know how to select quality seed form the own and neighbours' fields.

Sweet potatoes: Farmer growing sweet potatoes use 75% of their land for this, derive 60% of their income from the crop and satisfy 33% of their household food needs through it. Vines are bought or recycled from own fields through selection of disease free plants. New planting materials are sourced every as most farmers do not have access to a water source to preserve vines during the dry season. ZARI research is the original source of sweet potato materials. Farmers would like to get access to water to maintain mother gardens during the dry season, improve their sweet potato disease management, and receive training on the selection of healthy planning material.

Bananas: Farmers on average use 45% of their land for bananas and derived 60% of their agricultural income and satisfy 20% of their food need form their crop. Suckers are obtained from own field and from neighbours against a payment. There is no known outside source for renewal of planting materials other than from among farmers. Farmers sometimes face difficulties getting suckers after drought, banana weevil attack and loss as a result of other diseases. They would like to see the establishment of banana multiplication centres or mother gardens.

Cowpeas: The crop is grown on 80% of their land. It is used as a vegetable where satisfy about 18% of household food need. Seed is purchased form agro-dealers and occasionally self-saved. Seed is preserved by use of fungicides and pesticides. They would like to learn more about proper seed preservation, seed multiplication and get access to new varieties, which are productive like Tumaini. They would like the

government to provide seed like for rice. When providing seed to neighbours this is often for free to help each other out.

ZANZIBAR SEED SYSTEMS

Seven seed systems were identified (see Table 4.3). The informal seed system, especially comprising farmer saved and farmer-to farmer is the predominant source of seed for farmers on most crops except rice and cowpeas. However, the characteristics of some of the systems and the outcomes of the assessments were somewhat unique to Zanzibar. No formal fully certified seed system exists. Furthermore, no basic seed of rice, maize and sorghum is produced in Zanzibar. Instead it is being purchased from ASA by the seed unit. For vegetative propagated crops important on the islands, such as sweet potato, banana and cassava, research does produce some starter material.

Farmer saved, farmer-to-farmer and community-based systems

The main strengths include low cost, availability close by within the community and the fact the source is own. However, quality control in the informal seed is a major challenge because mechanisms for ensuring quality seed are poorly developed. The fact that the informal systems are the main source for seed, especially vegetatively propagated crops, without well developed mechanisms for quality control, there is fear that they may spread seed borne diseases across the country. Though self-control by farmers who sell seed on reputation exists, they do not have adequate knowledge to enable them to do a thorough job.

Public and contract systems

The public system is the most developed system in which the government produces and markets seed. It is also the most formal system. However, the seed produced is not certified nor is it QDS, since the mechanisms and agency for this do not exist on the Island. Separately a 'contract production system' was identified, which is closely linked with the public system, but focuses exclusively on rice. The seed unit buys basic seed from ASA on mainland and provides this to contract growers. The public then buys and distributes it at a highly subsidised price, to rice farmers, through outlets of the ministry of agriculture, at district level, and sometimes down to village level.

The main weaknesses are (i) Absence of a fully formal seed certification system; (ii)seed policies and regulations are not defined; (iii)The existence of the subsidy is not conducive to private investment in the seed sector and is not consistent with the ISSD guiding principles; (iv)Within the public sector the division of roles between research and extension is not well defined; (v) Basic seed I for cereals and grain legumes not produced in Zanzibar, but purchased by the seed unit from ASA in the mainland

Commercial system

Though the seed sector is strongly public sector driven especially the formal system, some seed entrepreneurship exists and can be built on further. The commercial system was defined to include agro-dealers who buy seed (mostly for maize, cowpeas and vegetables) from the main land and sell it to farmers and local seed business who mostly multiply and sell planting materials of vegetative propagated crops such as cassava and sweetpotato. The strengths are that seed is made available at planting time and farmers do not have to travel long distances, seed is affordable compared to the certified seed, also due to packaging and efficient quality control and inspection. Certified seed can be used as starter seed leading to availability of improved seed in rural areas.

The weaknesses are (i) a perceived lack of sustainability (external support); (ii) higher risks of disease spreading due to poor quality control systems; (iii) In rural areas the packaging, labelling and control of weights and standards is limited, and no additional information on crop practices is provided; (iv) inadequate entrepreneur skills among the local seed business enterprises; (iii) there is limited introduction of improved varieties as well as injection of new seed.

TABLE 4.3: SEED SYSTEMS IN ZANZIBAR

Seed Systems	Farmer saved	Farmer to farmer	Community based	Public	Contract farming	Commercial
Percentage of seed supply	85-100%	40%	25 %	60%	30-65%	25%
Crops	Cereal crops, root crops, sweet potatoes, bananas, yams	Cassava, bananas and rice	Mainly root crops, cassava, sweet potatoes, rice	Rice, maize, sorghum, cowpeas, cassava, sweet potatoes and yams.	Rice, cowpeas, maize, sorghum, sweet potatoes, cassava	Vegetables, maize, legumes, root crops
Varieties	Landraces and improved varieties	Recycled improved varieties and local varieties		Improved varieties. Maize hybrids and OPVs	OPVs, hybrid maize	Hybrid, improved, landrace
Seed purchase frequency	20%	40%	25%	25%	OPV 5-7 years; 30-50% Hybrid yearly	Twice a year (Masika and Vuli seasons)
Seed multiplication	Rice public, contract, private producer, cassava contract, individual multipliers, SP, banana, yam farmers.	Farmers	Farmer groups	Contract farmers and research stations	Contract farmers	Kizumbi agr. Research institute, seed unit – Bambi. Private companies mainland & international
Seed marketing	Farmers	Farmers	Farmer groups	Agricultural district service centre	Agricultural district service centre	Dealers and farmers
Quality control	None	-	Trained members of the group, though weak.	Research technical committee	Dep. Of agriculture through agr. Seed production unit	Public institutions (PPD)

FARMER GROUP DISCUSSION

Sources of seed

Farmers confirmed the 5 prioritised crops as most important in terms of food security and farm household incomes. The main source of seed is informal system, where for the vegetative propagated farmers rely on self-supply and from neighbours; while for cowpeas, they source from agro-dealers. Self-supply system was ranked the most trusted source of seed followed by research and third local multiplier. Farmers use their own experience to select healthy looking plants in the fields from which to obtain planting materials for cassava, sweetpotato and bananas. Advice from a field extension staff or a trusted knowledgeable neighbour is sometimes sought to verify the quality of planting material sourced from other farmers. With the exception of cowpeas, where women exclusively do the selection, both men and women are involved when selecting planting materials. Farmers rarely renew seed from an outside source for bananas, while for cassava seed is renewed when signs of decline in yield or disease is noted, usually every three years. For sweetpotato, farmers renew seed almost every season because of the difficult to conserve seed over the dry period before the next cropping season. The main source for seed renewal is often research especially for cassava and sweetpotato Research is also the source of improved varieties for the vegetatively propagated crops.

Issues raised by farmers

Major challenges include (i) absence of well developed mechanism for ensuring quality especially for the vegetatvely propagated crops; (ii) Limited provision of seed extension. The field extension staff lack specialised skills and knowledge with which to train farmers on production of quality seed; (iii) lack of planting material for sweetpotato after dry season due to lack of water to maintain the crop.

Opportunities for intervention (i) improve the quality of field seed extension so that farmers can receive specialized services of seed production; (ii) For sweetpotato, which is difficult to conserve during the dry season, establishment of district level mother gardens at places that have access to water where farmers can obtain starter materials; (iii) promoting and strengthening community based production and distribution, which is not as prevalent as on the mainland;

Overall farmers recommended that the informal seed system should remain and be strengthened through training of farmers and local field extension staff in production of quality seed, and creation of community seed plot at district level where farmers can get starter seed, especially for the vegetative propagated crops.

SEED MULTIPLIERS AND MARKETERS

Most of the multipliers in Zanzibar are involved in cassava, sweet potatoes and cowpeas and are largely individual, producing seed for own use (saved) and selling to neighbours (farmer-to- farmer). There is presence of fairly large commercial multipliers involved in cassava and sweet potatoes, some producing as much as 90,000 cassava cuttings, over 14,000 sweet potato vines (Table 4.4). Both men and women are involved in the multiplication and distribution. Other than rice where the seed is intermediary, the rest is informal seed.

Major challenges:

Seed multipliers receive very few services. These include (i) quality control. With the exception of some rice multipliers who receive some quality control those involved in other crops virtually get no quality control services; (ii) seed extension and training. They do not get training to improve skills in seed multiplication, how to deal with pests (storage pests for cowpeas) and diseases; (iii) No training in seed business for example on market intelligence and marketing;

Opportunities for intervention:

(i) Development of seed policy and appropriate regulations to support the seed sector development in general but specifically to provide clear supportive mechanisms for quality assurance particularly for the vegetatively propagated crops. (ii) Establishment of mother gardens or centres at district level for multiplication of quality seeds to serve as starter or renewal seed and also as source of seed of improved varieties.

TABLE 4.4: DESCRIPTION OF SEED MULTIPLIERS AND MARKETERS IN THE DISTRICTS (ZANZIBAR-PEMBA & UNGUJA ISLANDS)

Name multiplier / marketer	Operating since	Individual or group based enterprise	Crops	How much seed produced per crop last year?	Type of seed multiplied (informal, QDS, certified)	Source of starter seed	Main clients?
Abdalla Z. Rukuni	2010	Individual	Bananas	800 suckers	Informal	Own farm	Farmers in Pemba
Khamis Salim Ali	2011	Individual	Bananas	450suckers	Informal	From farmers	Farmers in Pemba
Issa Omar Haji	1990	Individual	Bananas	450suckers	Informal	From farmers	Farmers in Pemba
Sada Hemed Salim	2010	Individual contract grower	Rice	440KG	Intermediate (not fully QDS)	Ministry of agriculture (Seed Unit)	Ministry of agriculture (Seed Unit) & Farmers
Mabrouk Abdalla Silim	2010	Individual contract grower	Rice	440KG	Intermediate (not fully QDS)	Ministry of agriculture (Seed Unit)	Ministry of agriculture (Seed Unit) & Farmers
Bimkubwa Mohd Abdalla	2010	Individual contract grower	Rice	240KG	Intermediate (not fully QDS)	Ministry of agriculture (Seed Unit)	Ministry of agriculture (Seed Unit) & Farmers
Said Hamad Ali	2010	Individual farmer	Cassava	5,000 cuttings	Informal	Research	Farmers
Salim Abeid Mussa	2010	Individual farmer	Cassava	15,000 cuttings	Informal	Research	Farmers
Mohd Hamad Ali	2010	Group enterprise	Cassava	10,000 cuttings	Informal	Research; NGO called PRADO	Farmers
Rehema Ame Vuai (female)	15 years now	Individual (commercialised farmer)	Cassava	90,000 cuttings	Informal	Research	Small scale farmers
Ali Hassan Silima	45 years now	Individual	Cassava	33,750 cuttings	Informal	Neighbours	Neighbours
Amina Makema Makema (female)	2006	Individual	Cassava	2,500 cuttings	Informal	Research	None
Hatujiwi (name of group)	2002	Group based enterprise	Cassava	42,500 cuttings	Informal	Research	Neighbours
Ussi Fadhil	20 yrs. Now	Individual (commercial multiplier)	Cassava	24,750 cuttings	Informal	Research	Neighbours
Salum Ali Mjombo	2000	Individual	Rice	640KG	Informal	Own purchased	Neighbours
Othman Ali Khamis	2009	Individual	Rice	3,440KG	Informal	Own	Neighbours; contract farmers
Yussuf Kaki Yussuf	1985	Individual	Rice	10,000KG	Informal	Government (seed unit)	Government, and farmers, neighbours
Sada Mbarak (produces cowpea grain and uses as seed)	1988	Individual	Cowpeas	240 KG	Informal	Own	Self & neighbours
Mohammed Ali Hassan	1988	Group based enterprise	Cowpeas	720 KG	Informal	Own & neighbours	Shopkeeper and neighbour
Rajab Silima Haji	2009	Individual (commercialised farmer)	Sweet potatoes	14700 vines	Informal	Purchased from known local multiplier	neighbours
Fatma Omar Kondo (female)	2012	Individual	Sweet potatoes	2100 vines	Informal	own	neighbours

ZONAL SEED SERVICE PROVIDERS

Providers and the services: Unlike in the zones in the mainland, Zanzibar does not have diversity of service providers for the various chain operations (Table 4.5). The service providers are the public research and extension unit of the ministry of agriculture livestock and environment. The limited private sector involvement is the seed marketing by agrodelaers. There is hardly any NGOs involvement in the seed sector activities and agriculture development in general. Similarly, the types of services provided are quite limited. Research (ZARI) does variety testing & release, and some limited quality assurance and rural extension for the root and tubers. The extension department through the seed unit provides some seed extension and inspection and is involved in multiplication and marketing mostly for rice and to some extent cowpeas. Farmers also undertake quality assurance by themselves. There are no providers for business and entrepreneurial as well as finance for seed production enterprises. This situation is a manifestation of the limited development of the seed sector in part could be due to the absence of seed policy and regulations.

Main challenges: The challenges are not unique to any crop but cut across the priority crops and seed systems:

Enabling policy environment: The seed sector in general and service provision is hampered by the absence of policy and regulations for variety testing and release, plant variety protection, on quality assurance in seed production;

Variety testing & release and early generation seed: Here the main challenges are –(i) lack of or inadequate facilities to effectively undertake services related to variety testing and release, quality control and provision early generation seed. These include laboratory facilities for variety purity testing, facilities for tissue culture for vegetative propagated crops; (ii) inadequate qualified staff at ZARI to support provide the research related services in the seed value chain operations

Lack of policy and regulation on in Zanzibar

Provider for quality control: No existing board or agency such as TOSCI for quality assurance in seed production in Zanzibar.

Farmers themselves perform the service of seed marketing. However, they have very limited knowledge in business management services. Unlike the mainland, Zanzibar does not have stakeholders such as NGO who could provide services

Seed storage: Poor seed handling and storage facilities and practices

Rural seed extension: The main challenges in this regard are (i) inadequate qualified extension staff. The existing staff lack or have limited knowledge in seed extension do not have adequate working facilities (transport, working gears)

Seed production and marketing: lack of entrepreneur skills and poor marketing information system and services to support seed marketing. In addition, there is limited knowledge among farmers and seed multipliers on market for seed and the roots.

Opportunities for intervention:

The limited range of partners of service providers in Zanzibar seed value chains calls for deliberate and targeted interventions around strengthening the capacity of ZARI and extension unit to provide the range of services needed in an ISSD Tanzania programme. The capacity strengthening (human, skills, and infrastructure) would be needed for improved service provision across the value chain operations and focusing on the informal system, which essentially is the only one that farmers' access seed of the target crops. Above all, there is an opportunity to support in fast tracking development of seed policy and regulatory frameworks that can provide enabling environment for an integrated seed sector development.

TABLE 4.5: ZONAL SEED SERVICE PROVIDERS

Name of service provider	Service provided	Focus crops	Seed systems	Seed chain components
Research (ZARI)	Evaluation of improved varieties and multiplication	Cassava, sweet potatoes and rice	Intermediate (rice) Informal (sweet potatoes, cassava, bananas, cowpeas)	Variety development Early generation seed
Agricultural office	Rural extension (Farmer production training; Market information)	Cassava, rice, cowpeas and sweet potatoes	Informal (cassava, sweet potatoes, bananas, cowpeas) and intermediate (mainly rice)	Multiplication, variety development, marketing, market information, starter seed, inspection

ZONAL SEED SECTOR PROJECTS

Projects on agriculture in general and touching on aspects of the seed sector or systems in particular have been very few in both Pemba and Unguja. There have been a few projects/programmes in the past namely Agriculture Service support projects (ASSP) and Participatory Agriculture Development programme (PADEP), which provided training to farmers in banana and rice. At the moment there is no on-going project. There is one due to start this year (GAFSIP) and will focus on rice, which is in intermediary seed system (see table 12) at the end of the report.

SUGGESTED INTERVENTIONS FOR PRIORITY CROPS

Because the challenges and opportunities that emerged from the seed sector assessment were not unique to a specific crop, the proposed interventions are cut across the prioritised crops (Table 4.7)

TABLE 4.6: THE INTERVENTIONS CUT ACROSS THE PRIORITY CROPS

Suggested interventions	Justification
Development of seed policy and legislation	Zanzibar does not have seed policy or legislation. These are necessary tools for Government to prioritise and ensure seed industry is developed and have sustainable impact on overall agricultural development. Seed policy and regulations are needed to guide and support the entire seed sector and would benefit all commodity seed chains. The public –contract system, which is intermediary, requires such policy to support its transformation to formal system and to provide enabling policy frameworks for emergence of private seed companies as well, where applicable or where there is opportunity. It is an opportune time to develop seed policy and regulations where none exists so that there is chance to develop policy that will not ignore informal seed system, which is dominant.
Strengthening private sector participation in seed industry value chain through enabling policy and regulation, business development services to the nascent seed businesses;	Currently private sector participation is weak in all the commodity seed value chains. The only semblance of private enterprise is still rudimental and is either agro-dealers (cowpea seed value chain) or local multipliers (in the vegetative propagated crop value chain) trying to make viable seed business. We need to strengthen their capacity both technically and financially to sustainably play their role in the seed industry in Zanzibar
Review the current subsidy framework on Rice and look for alternative mechanisms for targeting the intended beneficiaries of the subsidised seed	This is crucial for the rice seed value chain because it is stifling potential development of private sector enterprise who once established could also venture into other value chain.
Enhancing skill of extension staff, progressive farmers, seed producers across all the chains and seed systems in seed technology/areas of seed production of quality seed, seed storage/ conservation techniques and technologies, and agribusiness development skills	This is needed to improve quality and quantity of seed produced (also minimize losses incurred through storage pest/ poor conservation during dry season) in all the seed chains and especially from the informal systems. The extension department is the only agency in Zanzibar that can provide the seed and crop production, post-harvest handing extension, and also agri-business services since there are no stakeholders such as NGOs involved in agriculture sector activities. Improving the skills of producer in seed entrepreneurship will enhance the local seed business and cause impact in terms of economic and food security through distribution of quality seed.
Strengthen ZARI in germplasm conservation and developing new varieties	ZARI is only institute of Agricultural Research with mandates towards plant genetic resources management conservation and development of new varieties for crops. Currently ZARI lack Human and Physical Capacity to undertake this capacity.
Strengthen skills in extension system to work more with farmer groups in the model of community seed system. It is still implemented in an adhoc way- not as mainstreamed into extension systems in some zones	To exploit opportunity of the community based system will help to quickly strengthen community level skills in production and distribution of quality seed to increase volume of seed produced and distributed through enhancing the community based system. This could be done especially in the vegetative propagated where the demand for seed is not being met by the current level of production in both Unguja and Pemba islands
Strengthen seed unit on seed quality control system, infrastructure and facilities. This could be done through linkage with TOSCI	At the moment there is no seed quality control institution in Zanzibar that undertakes the seed quality control activities. Low water availability, infrastructure and management leads to low production of the seeds
Support Research Institute to produce certified seeds	Research institute (ZARI) is responsible for breeding and other research works for generating and developing new variety for multiplication and dissemination
Strengthen ZARI on quality seed multiplication	ZARI have tissue culture laboratory which produce clean seed of different crops. At that moment the laboratory lack chemicals, facilities and human resources that can perform its work efficiently

TABLE.4.7 GAP ANALYSIS AND SOME MAIN CONCLUSIONS

Unlike the zones in the mainland, Zanzibar does not have any on-going agricultural projects at the moment. It have does not have organizations such as NGOs engaged in agricultural development like is the case in some of the zones in mainland. The only project identified is the Global Agriculture and Food Security programme (GAFSIP project has not started. When in operation, it will support rice development activities some of which will be on seed aspects. This means that there are no partners, programmes/projects that are addressing any of the emerging issues identified in the seed system analysis, the chain analysis matrices and the suggested intervention in Table 10 above have.

TABLE 4.7: SUMMARY OF SEED INTERVENTION IN THE ZONE, IDENTIFIED ON THE BASIS OF THE STAKEHOLDER INTERVIEWS, TO ALLOW FOR A GAP ANALYSIS

Cluster of seed systems	Seed multiplication and marketing		Seed services		Enabling environment (rules, regulations, policies and strategies)	
	Project / programme	Crops	Project / programme	crops	Project / programme	crops
Informal seed systems	None	none	none	none	none	none
Intermediary seed systems	Global Agriculture and Food Security programme(GAFSIP)	Rice	GAFSIP	Rice	GAFSIP	Rice
Formal seed systems	None	None	none	none	none	none

ANNEX 5: EASTERN ZONE SYNTHESIS

ZONAL BRIEF

The Eastern zone is constituted by 3 regions namely: Morogoro, Tanga and Coast region. Eastern zone has two main climatic zones: the hot humid coastal plain and the semi-arid zone of the central plateau. The rainfall received varies from 600mm-1200mm; and less than 600mm in areas with exceptional droughts. In most areas, the mean annual temperature is around 25°C-30°C. There are three main types of agro-ecological zones. These include: the plains; mid-high altitude and highlands. The zone is characterized mainly by light sandy clay loam soils with short savannah grass and shrubs dotted with scattered trees. It covers 132,694 km^2 and has a population of 5,362,365 inhabitants; according to the 2012 population estimates, of which 80% live in rural areas. Total arable land is about 10 million ha and only 2.2 million ha (22%) are cultivated. The major crops grown in the zone include: rice, maize, sorghum, cassava, sweet potato; coconut trees; pigeon pea, horticultural crops (tomato, cabbages, onions, etc.); and fruit trees (oranges, cashew nuts).

TABLE 5.1: CROP AREA (HA) IN 2007/2008 SEASONS (MASIKA AND VULI) (NBS, 2012)

Maize	Paddy	Sorghum	Pearl millet	Finger millet	Wheat					Category	Total
633154	204844	16577	279	28	160					Cereals	**855042**
Cassava	Sweet potato	Irish potatoe	Bananas								
109567	11679	11642	27741							VP crops	**160629**
Mungbean	Beans	Cowpeas	Green gram	Chickpeas	Bambara nut	Field peas	Pigeon peas	Groundnuts	Soyabeans		
1598	86900	32976	3950	133	267	692	8516	5177	0	Legumes	**140209**
Sunflower	Simsim										
6261	31588									Oil crops	**37849**

Cassava, cowpeas, sweet potatoes, sorghum and pigeon peas were chosen as the priority crops for the zone in the stakeholder meeting, taking into consideration the focus on under-resourced crops. In the stakeholder meeting the districts where these crops are the most important were identified.

TABLE 5.2: DATA ON CROPS PRIORITIZED FOR THE ISSD TANZANIA PROGRAMME IN EASTERN ZONE

	Cassava	Pigeon peas	Sorghum	Sweet potatoes	Cowpeas	Data source
Acreage of the crop / year (in ha)	77,484	8	757	1,579	11,844	District council, statistics office and district agricultural office
Certified seed produced per year (MT /year)	0	0	25.7	0	1.2	District agricultural office, ASA, crop specialists
QDS seed produced per year (MT / year)	4 million cuttings	<1 MT	0	0.6 million cuttings	0	District agricultural office, crop specialists

During the field data collection the choice of priority crops were largely confirmed. Cowpeas are important in most districts, as is sweet potato and sorghum. Pigeon peas are only important in the drier districts.

DESCRIPTION OF CROP AND SEED VALUE CHAIN ISSUES

Pigeon peas: Pigeon pea seed is produced under the informal and intermediate (QDS) seed systems. Most farmers derive (40%) their income from pigeon peas. The main source of their seed is through projects (SIMLESA), while others source from farmer groups and neighbours. Farmers replace their seed once in every 3 years because of difficulty in accessing good quality seed and financial limitations. Farmers' suggestions on how to improve the availability of high quality seed included: (i) educate farmers to produce high quality seed, (ii) provide rural extension advice on seed production, and (iii) linking farmers to the markets as a means of stimulating the seed production. Farmer to farmer seed exchange is against cash, as it is a business. There is a potential for further developing a local pigeon pea seed business. Farmers trust seed from research, their own field and local multipliers most. The most important issues that farmers would like to change in the seed sector included: (i) education on production of quality seed; (ii) timely availability of seed from reliable sources; (iii) need for the local government to avail land for seed production, and; (iv) conduct more research to develop locally adapted varieties.

Sweet potatoes: The importance of sweet potatoes varied depending on the region with the crop contributing between 20-70% of the household incomes. Vines are produced through informal systems as well as the QDS seed system. However, across the zone, the main source of seed is self-supply. In order to assure quality of the seed farmers deliberately select clean-looking vines from the field. However, at the same time they indicated not to know how to select clean vines. The outside source of seed was Singida and the neighbouring villages where farmers grow seed in valleys. Suggestions on how to improve the availability of high quality seed included: (i) control of grazing livestock that destroy vines, (ii) training of farmers on conservation of sweet potato vines, (iii) establishment of seed farms at district level, and; (iv) provision of extension services on sustainable control options for insect pests that damage vines. Vine exchange during the planting season is paid for in cash. Some of the communities within the zone are already growing sweet potato as an early season crop purely for seed which is sold to earn income to support their families and pay for school fees. These findings show that the local sweet potato seed business has a potential to flourish in the zone. The most trusted seed (planting materials) is from research, self-supply, neighbours and local multipliers. The key seed sub sector issues that require urgent attention are: (i) need to empower farmers with financial support (soft loans) to enable them (farmer groups) produce enough seed; (ii) training farmers on high quality seed production; (iii) increasing access and availability of simple and appropriate irrigation facilities since these are crucial for preservation of vines for the next season, and; (iv) control of grazing livestock to prevent destruction of plots for seed production.

Cassava: Cassava cuttings are produced and distributed through informal seed systems. Cassava is a very important crop in eastern zone since it contributes to the household income (70% in Coast region and 50% in Tanga region according to the producers). The main source of seed is self-supply. In order to ensure quality of their own seed materials farmers use cuttings from healthy fields and uproot infected plants. However, farmers lack the technical skills to maintain high quality of planting materials. Stock is replaced roughly once in every 3 years mainly due to financial limitations; and difficulty in accessing good quality seed. In order to improve the availability of high quality seed; farmers need to be empowered to own quality seed. Besides that; more research needs to done to improve quality of locally adaptable materials. Farmers provide cuttings to their neighbours, especially after droughts, against a small fee. Seed producers mainly trust seed from research, farmer associations, neighbours, and the local market. The most important things that need urgent attention within the cassava seed sector are: (i) relevant authorities to establish seed farms in their localities; (ii) access to financial support that will enable the farmer groups to enough seed; (iii) training on high quality seed production, and; (iv) emphasis on seed material that addresses effects of climate change.

Cowpeas: Cowpeas are a very important crop in eastern zone and contributes up to 50% of household income. Farmers have difficulty assessing the quality of the seed they purchase. Seed is replaced at least once in every 3 years mainly because of difficulty in accessing good quality. The main outside of quality seed is Agricultural Seed Agency (ASA). Farmer to farmer exchange is against cash. Farmers trust mostly seed from research, farmer associations, and the agricultural office. Farmers suggested improving the availability of seed in the local market. The three most important issues that should be addressed in the seed sector are: (i) improve distribution of seeds in rural areas (seeds should reach villages); (ii) initiate cowpea market/link farmers to the market; and (iii) timely delivery of seed to villages.

Sorghum: Over the past few years, a majority of seed farmers (about 80%) produced QDS for sorghum. Sorghum appears less important than cowpea, cassava and sweet potato (in terms of income), while it compares well with pigeon pea. Decline in importance of sorghum in the zone could be attributed to a number of factors including: The lack of high quality seed of desired varieties. The main outside of quality seed is Agricultural Seed Agency (ASA). However, the seed that was available through ASA and reproduced by seed farmers as QDS was of a variety prone to bird attack (Quelea), poor local brewing quality and hard to de-hull, and thus fetched a poor market. The three most important things that farmers would like to change in the seed sector included: (i) improve distribution of seeds in rural areas (seeds should reach villages); (ii) Assure availability of seed of desired local land races.

EASTERN ZONE SEED SYSTEMS

Farmer and farmer-to-farmer, and community-based seed systems

The strengths of these systems are the acceptability of the varieties (well adapted and preferred), affordability of the seed, availability of the seed (in the community), the timeliness of availability and the trusted quality. Weaknesses are the quality decline due to recycling, a slow replacement of varieties with new varieties with better traits, the build-up of pests and disease and especially the low volume of seed produced.

Local seed business

The strengths are that seed is available nearby and of varieties responding to the local demand. An important weakness is that access to early generation material is difficult and that access to new germplasm is slow. Also the quality control is weak.

TABLE 5.3: SEED SYSTEMS IN THE EASTERN ZONE

Seed systems	Farmer saved	Farmer to farmer	Community based	Local seed business	Relief	Public	Private seed companies
Seed supply	70%	50%	5%	12%	-	8%	8.5%
Crops	Cassava, sweet potatoes, bananas, cowpeas, pigeon peas, peas, sorghum, millet	Maize, beans, cowpeas, cassava, pigeon peas, sweet potatoes.	Pigeon peas, maize, sweet potatoes, cassava	Pigeon peas, cassava, sweet potatoes, maize	Maize, sorghum, millet, pigeon peas, cowpeas, beans, cassava, sweet potatoes	Maize, sorghum, millet, rice, cowpeas, pigeon peas, green gram, soybeans, sunflowers, SP, cassava, bananas, cocoyam	Maize, rice, sunflowers, sorghum, cowpeas, tomatoes, onions
Varieties	Landraces, OPV	Landraces, OPV, not hybrids	PP, Mali, Tumia; Maize, TMV1, Situka, Staha; cassava, Kiroba; SP, OFSP	OPVs and landraces	OPVs, cuttings	OPVs, landrace, few modern / exotic varieties	OPVs and hybrids
Seed purchase frequency	1-10%	20%	40%	10%	50%	30%	10%
Seed multiplication	Farmers	Farmers	Community / farmer groups	Individuals or groups (trained)	Formal-informal for seed gifts; formal for vouchers	ASA and contract growers	Private companies
Seed marketing	Farmers to themselves	Farmers	Group members	Individuals or groups (trained)	Public / NGOs	ASA., agro dealers	Private companies
Quality control	Farmers themselves	Selection from the actual standing crop or at harvest by farmers	TOSCI, local supervisor	TOSCI, district QDS inspectors	Standard seed for relief (only germination test); voucher certified seed	Government, TOSCI	Formal through TOSCI

FARMER GROUP DISCUSSIONS

Most seed in the zone is produced under the informal and intermediate (QDS) seed systems. The main source of seed for the priority crops was through self supply and programmes/projects. The other sources were: farmer groups and neighbours. Farmer to farmer seed exchange is against cash, as it is a business. Across all crops; the local seed business has a potential to flourish in the zone. Farmers trust mostly seed from research, their own field and local multipliers. The main outside source of quality seed is Agricultural Seed Agency (ASA).

There are seed sector issues that have been identified, and need to be addressed. These mainly include: training of farmers in high quality seed production; timely availability of seed from reliable sources; need for scientists to undertake more research to develop locally adapted varieties; and establishment of seed farms in communities especially for vegetatively propagated crops. Other emerging issues that require urgent attention were: access to soft loans to enable farmer groups produce enough seed; access and availability of simple and appropriate irrigation facilities and control destruction of seed production fields by grazing livestock.

ZONAL SEED MULTIPLICATION AND MARKETEETS

TABLE 5.4: DESCRIPTION OF SEED MULTIPLIERS AND MARKETERS IN THE EASTERN ZONE

Name multiplier / marketer	Operating since	Individual or group based enterprise	Crops	Quantity	Type of seed multiplied (informal, QDS, certified, basic)	Source of starter seed	Main clients?
Wambato Farmer's Group	2006	FO (Farmer group)	Cassava	10.5 tons (90,000 cuttings)	Informal	ARI Kibaha	District Councils
Msafiri Mlindwa Enterprise	2002	Private (Individual)	Cassava	2,025,000 cuttings	Informal	ARI Kibaha	Farmer Groups
Mwanahawa Farmer's Group	2012	FO (Farmer Group)	Cassava	Still in the field	Informal	ARI Kibaha	Farmer Groups
Kiukima Farmer's Group (Kikundi cha Ufugaji Kilimo na Mazingira)	Sept 2009	FO (Farmer Group)	Cassava	500,000 cuttings	Informal	ARI Kibaha	Individual farmers, CARE Intl, ARI Kibaha
Thabit Hassan and Family Enterprises	2011	Private (Individual)	Cassava	20,000 cuttings	Informal	From group producing QDS	Individual farmers,
Ayoub Abdi Enterprises	2013	Private (individual)	Sweet potatoes	200,000 Cuttings	Informal	ARI Kibaha	Other farmers
Khasim Ayoub Enterprises	1983	Private (individual)	Sweet potatoes	180,000 cuttings	Informal	Neighbours	Farmers from nearby and other communities
Enock Mnyandwa Enterprises	2012	Private (individual)	Sweet potatoes	18bags (540,000 Cuttings)	Informal	-Own field -Other farmers (Singida)	Farmers within + outside village
Elia Kobadi Enterprises	1998	Private (individual)	Pigeon Peas	10Kg (bad sn, got 100Kg in 2012)	Intermediate (QDS)	ARI Ilonga	Farmers within + outside village
ASA (Agric Seed Agency)	2006	Public	All crops including cowpeas	1.01 tons	Certified	ARI Ilonga	Farmers + agric companies-Agriseed
Nguvu Kazi Farmer Group	2011	FO (Farmer Group)	Cowpeas	1.2 tons (5 acres)	Informal	ARI Ilonga	Small scale farmers
ASA (Agricultural Seed Agency)	2006	Public	All crops including sorghum which is the target crop	25.7 tons (60 ha)	Certified	ARI Ilonga	Farmers + agric companies-Agriseed
PAPION Enterprises	2014	Private (individual and contract grower)	Sorghum	Not yet produced	Certified	ASA	ASA, farmers

ABDALA DEGE Enterprises	2000-2004	Private (Individual)	Sorghum	Stopped prodn (shifted to maize and oil crops since 2006)	QDS	ASA	Smallholder farmers, (in Gairo +Dodoma)
Muyovela Enterprise	2006	Private (individual)	Sorghum	0.45 tons	Informal	Own seed	Other farmers

*Training on seed selection, production of quality seeds, time of planting, insect- pest control and seed storage; MDC=Mukuranga District Council; MEDA=Mennonite Development Agency, TAP=Tanzania Agricultural Partnership

Findings from the assessment show that a majority of multipliers (individuals and farmer groups) operate as fully informal. ASA seems to be the sole producer of certified seed. Other than for sweet potatoes and cassava, volumes being produced by local multipliers are low. Seed multipliers of pigeon peas and cowpeas are largely dependent on research projects. Also, production of QDS sorghum has declined significantly due to a number of issues as explained above. However, in 2014 there has been renewed interest by contract growers working with ASA to revive sorghum seed production. There is also potential market with the breweries. Across all the priority crops, seed multiplication in the zone is constrained by many factors such as: high incidence of pests & diseases, inadequate irrigation facilities to sustain seed production during periods of severe drought; climate related effects (changing weather patterns which affects quality of seed); and inadequate capital investment for local seed businesses. Other factors include: low awareness on high quality seed availability; unreliable/ inadequate market for cassava seed; and destruction of seed production fields by livestock. At a policy level; provision of subsidies for a few selected crops (such as maize); makes QDS seed from other crops less competitive. Despite the constraints highlighted above, there are a couple of opportunities that can act as entry points for an ISSD Tanzania programme. Such opportunities include: capacity building of farmer groups on high quality seed production; targeted provision of advisory services especially to individual seed multipliers to boost seed production; potential of local seed business to flourish; and existence of new niche markets.

ZONAL SEED SERVICE PROVIDERS

TABLE 5.5: ZONAL SEED SERVICE PROVIDERS

Name of service provider	Service provided	Focus crop	Seed systems	Seed chain components
ARI ILONGA	Dissemination of technologies Development of varieties Promotion and advisory services (advice farmers to use improved seeds to increase productivity) Capacity building on quality seed production	Pigeon peas, cowpeas, sorghum, pearl millet, sesame, sunflowers, maize, cotton	Formal, and intermediate (QDS)	Variety Development Early Generation Seed Multiplication
ARI Kibaha	Selection of multiplication sites Pests and diseases inspection Technology generation, Germplasm development	Cassava	Intermediate (QDS)	Variety development Early Generation Seed Multiplication
	Selection of multiplication sites Pests and diseases inspection	Sweet potatoes	Informal	Variety development Early Generation Seed Multiplication
District Agricultural Extension	Promote and advice farmers to use improved seeds to increase productivity Oversee agro dealers market quality seeds (done with TOSCI and TPRI) Advisory services Capacity building on seed matters	Maize, sorghum, pigeon peas, sweet potatoes, cowpeas	Formal certified Intermediate (QDS)	Marketing Multiplication
	Training on QDS seed production Input provision Sample collection for TOSCI assessment. Marketing and promotion of the farmers QDS seeds at agricultural shows	Paddy, maize, wheat, sesame, sunflowers, beans , tomatoes, onions, amaranths, African egg plants,, black night shade, groundnuts, sorghum	Intermediate (QDS)	Marketing
District councils and government authorities	Capacity building Training of farmers on seed matters	All crops	Informal and intermediate	Marketing
Muheza TCCIA SACCOS	Provision of agricultural loans	Spices, fruits, cash crops	Informal QDS	Marketing

Mshikamano SACCOS	Offer agricultural loans for agricultural production *NB: The loans are no longer given since 2012 because of loan defaulting*	Maize, sorghum, pigeon peas, sweet potatoes, cowpeas	Informal	Multiplication
Un Agency (FAO)	Provision of financial services (financial loans)	Cassava	informal	Multiplication, Marketing
NGOs-TAP, VECO, CARITUS, MUVI	Provision of financial services (financial loans)	Sweet potatoes	Intermediate (QDS)	Multiplication, Marketing
TOSCI	Quality assurance of seed materials	Maize & other crops	Formal Informal	Multiplication
IITA	Quality assurance/seed inspection	Cassava	Informal	Multiplication
DPPO* TOSCI ARI – Kibaha	Quality assurance/seed inspection	Sweet potatoes	Intermediate	PGR Variety development Early Generation Seed Multiplication
TOSCI and ASA	Quality assurance/seed inspection	All crops (but sweet potatoes, pigeon peas, cowpeas and cassava are voluntary certification crops - In the case of cassava, they are in the process of designing the standards/protocols for certification)	Formal	Variety development (final stage) Early Generation Seed(inspection and seed certification)

Service providers in the zone mainly include: ARI KIbaha, ARI Ilonga and IITA (research); district agricultural extension; district councils and government institutions (extension services); SACCOs and NGOs (financial services); and TOSCI, DPPO and IITA (seed inspection). These provide seed services for most of the crops in the zone. The main constraints encountered by the research service providers are: climate change leading to unpredictable rainfall, late inspection of the research trials by TOSCI; and inadequate research and funding for orphan crops. Key issues constraining provision of seed extension services were identified as: limited participation of the private sector; interference by politicians; lack of basic seed at ASA; inappropriate technologies being transferred to the farmers since most of the technologies developed are not based on farmer's preferences; and need to link farmers to the market through the various marketing channels. Service providers for financial services were dominated by SACCOs probably because these are easily accessible to the seed producers. However, most of these SACCOs are closing down because of high default rates for loans taken; and lack of interest by most farmers to acquire loans. Financial services are also provided by a few NGOs and international agencies (NGOs-TAP, VECO, CARITAS, MUVI, and FAO) for a limited crops (sweet potatoes and cassava). Provision of seed inspection service was constrained mainly by conflicting roles between ASA and TOSCI and lack of established protocols for certified cassava multiplication.

Despite the challenges identified above, there are existing opportunities that can be exploited to boost provision of seed services in the zone. These include: Increased participation of the private sector in provision of extension services; and building linkages with private extension systems especially at community level for better performance. There is also opportunity for formal banks and micro-finance institutions (MFIs) to be actively involved in provision of financial services to support seed value chain activities. In terms of research, there is opportunity to establish protocols for certified cassava multiplication to boost seed production and conduct research to develop varieties adaptable to the local climatic conditions.

ZONAL SEED SECTOR PROJECTS

TABLE 5.6: SEED SECTOR PROJECTS IN THE EASTERN ZONE

Name of project or programme	Duration	Public, NGO, CSO / private enterprise led?	Focus on which seed systems?	Crops targeted	Focus on which seed chain components?	Which services to be improved in the project / programme?	Which policy and regulation change or other enabling environment change targeted?	Intervention area (localities, district, zonal, national, international)
FAO (Cassava Disease Surveillance)	2010 to date 4 years (ongoing)	Public	Informal Intermediate (QDS and local seed business)	Cassava	Multiplication	Farmers varieties should be improved and developed not abandoned by multiplying new varieties	Fight cassava diseases Increase productivity to improve food security and income of the farmers	National
CARITAS (Cassava Steam Production)	5 years (ongoing)	NGO	Informal Intermediate (QDS and local seed business)	Cassava	Multiplication	Kizimbani variety should be developed	Production of quality cassava steams Increase productivity to improve food security and income of the farmers	District
BMGF * (Community Action in Cassava Brown Streak Control)	2013 1 year (ongoing)	Public and donor funded	Informal Intermediate (QDS and local seed business	Cassava	Multiplication	More inspection to individual farmers' fields should be done to eradicate the disease	Increase productivity by fighting the diseases	National
RAC (Reaching Agents of Change)	2013 1 year (ongoing)	NGO	Informal Intermediate (QDS and local seed business)	Sweet potatoes (OFSP)	Multiplication	Promotion of orange fresh sweet potatoes	Nutrition especially to children under five years-vitamin A	National
SIMLESA (Sustainable intensification maize and legume in South and Eastern Africa)	2010 to date (ongoing)	Public and donor funded	Intermediate (QDS)	Pigeon peas and maize	Variety development Multiplication (MALI and TUMIA Varieties)	Capacity building Upscaling technology on conservation agriculture	Aim to train farmers to use Conservation agriculture without tillage	Eastern and Northern zone

DONATA (Dissemination of New Agricultural Technologies in Africa)	2009 to date (ongoing)	Public and donor funded	Formal certified	Maize	Multiplication	Promotional activities Technologies dissemination Marketing	Scale-up proven agricultural technologies to contribute to food and nutrition security and economic growth in Africa	Eastern and Northern zone
SPRVP (Sweet Potato Rapid Vine Production)	2013 to date (ongoing)	Public and donor funded	Intermediate (QDS)	Sweet potatoes	Variety development Multiplication Marketing	Capacity building Provision of inputs Marketing	Directed at drought areas to contribute towards food security	Lake zone (Shinyanga and Mwanza), and Eastern zone (Morogoro)
MEDA (Mennonite Economic Development Associates)	Since 2012 to date (ongoing)	NGO	Intermediate (QDS)	Cassava	Multiplication	Enhanced cassava seed availability	None	National
AGRA (Alliance a Green Revolution in Africa)	2009 to date	Public and donor funded	Intermediate	Pigeon peas	Multiplication (Chain 1-5)	Farmers training and seed dissemination	Improves food security and livelihood of the farmers	Eastern and Northern Tanzania
IITA-ARI Kibaha	2008-2010 (ended)	Public	Intermediate (QDS)	Cassava	Variety development	Variety development	Germplasm	Zonal
ETG (Export trading Company Ltd)	2013 to date (ongoing)	Private	Informal and intermediate	Pigeon peas	Marketing	Enhanced markets for pigeon pea seed	None	District
SIMLESA Project	2010 (to date) 4 years (ongoing)	Public	Intermediate and formal certified (for maize)	Pigeon peas, cowpeas and maize	Variety development and seed multiplication	Farmer's field days should be increased. Improve on the breeding aspects	None	Zonal
ASARECA PROJECT (Sustainable Intensification of sorghum-legume system)	2011- 2013 2 years (ended)	Public	Formal certified	Sorghum and cowpeas	Variety development and seed multiplication	Scaling-up of best practices and technologies validated (dissemination & scaling up of best practices & technologies)	None	Zonal

DADEPS (District Agriculture Development Projects)	2007 to date 7years (ongoing)	Public	Intermediate (QDS, local seed business)	Paddy, maize, wheat, sesame, sunflowers, beans, tomatoes, onions, amaranths, African egg plants, black night shade, groundnuts	QDS multiplication	Improve on distribution mechanisms , so as to reach remote areas where farmers are located; also improve on transportation means	Sustainability of farmers after the project to phase out	District
TL II- COWPEA (Tropical legume II) Project	2008 to date 6yrs (on-going)	Public	Formal certified	Cowpeas	Variety development and seed multiplication	From conventional breeding to Molecular marker assisted breeding Laboratory for genotyping	Rules and regulations for seed release should be simplified to speed up variety release	Zonal

Seed sector projects in the zone; mainly focussed on intermediate (61.9%) and informal seed sector (28.6%). Very few projects (9.5%) were involved in the formal (certified) seed production. Among the projects that focussed on the intermediate (QDS) seed sector; many were involved mainly in the multiplication of seed; and few on variety development. Majority of the programmes were involved in the multiplication of QDS for cassava, pigeon peas and sweet potatoes.

SUGGESTED INTERVENTIONS FOR PRIORITY CROPS

TABLE 5.7: INTERVENTIONS FOR PRIORITY CROPS

Pigeon peas	Justification
Capacity building to increase seed multipliers and sellers	Currently there are few seed multipliers and sellers which cause farmers to face difficulties in getting seeds for their crop fields
Appropriate control strategies for insect pest and diseases	Currently there are insect pests and diseases which affect pigeon pea production which must be controlled.
Control of livestock grazing on crop fields	Currently there is uncontrolled livestock grazing which causes damage on pigeon pea fields
Establish a reliable and accessible source of starter seed for farmers. For example: The village government (in collaboration with research) could allocate land to be used for seed production	Currently farmers are depending on projects to provide starter seed which is not sustainable especially when the projects end.
Timely availability of seeds from reliable sources for farmers to buy when needed	Currently there is a delay for the farmers in getting seeds on time from the reliable sources
Sweet potatoes	**Justification**
Capacity building to increase seed multipliers	Currently there are few seed multipliers which cause farmers to face difficulties in getting seeds for their crop fields
Facilitation on the farmers to get irrigation facilities for the sweet potato seed gardens	Currently farmers use buckets to irrigate their gardens which is labour intensive. Drought is a major threat to seed availability.
Control over insect pest and diseases	Currently there are insect pests and diseases which affect sweet potato and vine production and they are new in the area
Control of livestock grazing on crop fields with conserved seed	Currently there is uncontrolled livestock grazing which cause damage on sweet potato seed gardens and harvested sweet potato fields
Cassava	**Justification**
Farmers landraces should be maintained and improved	It is important to maintain and keep the plant genetic resources It is also important to improve the landraces in terms of yield and biotic characteristics
Establish water sources through construction of water wells or bore holes and provide irrigation facilities	Currently drought is a big threat to seed availability
Empower the farmers to enable them purchase modern/appropriate agricultural tools/machinery	Currently the farmers are using very poor equipment such as hand hoe
Government to come up with a policy that will support root and tuber crops to produce certified seeds	There is no category of certified seed in root and tuber crops
Cowpeas	**Justification**
Setup of rules and regulation for cowpea informal seed system to be recognized by TOSCI	To full fill the gap of insufficient seed in the zone.
Other institutions (ARIs, NGOs and companies); be mandated to carry out seed multiplication. Currently it's only mandated to do this.	Necessary to increase cowpea and other seeds production throughout the zone and entire country

Promote/facilitate establishment of agrodealers/stockists services at village levels where a majority of farmers/clients are located	Non availability of seeds in rural areas, so the presence of agro dealers in villages will ensure the availability and accessibility of improved varieties to farmers.
Funding for information and technology dissemination, research and demonstrations	Necessary in order to upscale the new and improved varieties produced at the research centres
Capacity building for farmers	Training farmers on high quality seeds production
Provide farmers with meteorological forecasting data	Negative impact of climate change on seed production is increasing every year. In order to mitigate and escape the risks & seed production uncertainties associated with climate change (drought & floods); farmers need to provide with meteorological information from an early warning system.
Training for agricultural extension officers on seed related aspects	Training will help extensions to disseminate new technologies from research to farmers plus other vital information on profit seed production as a local business
Sorghum	Justification
Restore farmer confidence on QDS sorghum production by linking them to a profitable market like breweries	Very few farmers (actually 1 that works with ASA) currently involved in QDS production.
ARI Ilonga should do more research to address issues raised by the farmers on the improved variety (bird attack, difficulty in processing, and lack of local market due its un suitability for use in local brewing)	This is necessary to stimulate sorghum production in the zone
Promote/facilitate establishment of agro dealers/stockists services at village levels where a majority of farmers/clients are located	Non availability of seeds in rural areas, so the presence of agro dealers in villages will ensure the availability and accessibility of good sorghum varieties to farmers.
Capacity building for farmers	Training farmers on high quality seeds production
Provide farmers with meteorological forecasting data	Negative impact of climate change on seed production is increasing every year. In order to mitigate and escape the risks & seed production uncertainties associated with climate change (drought & floods); farmers need to be provided with meteorological information from an early warning system.
Training for agricultural extension officers on seed related aspects	Training will help extensions to disseminate new technologies from research to farmers plus other vital information on profit seed production as a local business

GAP ANALYSIS AND SOME MAIN CONCLUSIONS

Analysis of the existing gaps in the different seed systems indicates that there a number of gaps that could serve as potential entry points. These gaps included:

- Currently, there are no programmes/projects that are carrying out seed multiplication for sorghum and cowpeas across in the informal and formal seed systems.
- Programmes/projects multiplying certified seed for each of the priority crops are largely non-existent. Its only TL II- Cowpea programme & ASA[6] that is producing small quantities of certified seed for its research project and not for commercial purposes
- Programmes/projects providing seed services in most of the seed value chains are largely missing; with exception of FAO (financial services &start-up capital) for cassava; SRVP (marketing) for sweet potato; and SIMLESA (inputs; marketing extension & advisory services) for pigeon pea + maize
- In terms of enabling environment; supporting policies, and regulations under different seed systems(for each of the priority crops) are largely missing with exception of:
  a) Policy for strengthening advisory services for cassava (under the informal sector)
  b) Policy for strengthening decentralization of seed inspections to enable timely access to high quality seed for sweet potato (intermediate seed system)
- Currently there is no multiplication of certified cassava seed going on because protocols for certified cassava seed are just being developed.

[6] The previous year ASA had produced a very small quantity of certified seed (1.2 tons). This perhaps explains why farmers interviewed complained of acute shortages of quality cowpea seed; and when available is delivered late. ARI Ilonga mainly produces breeder seed and rarely produces certified seed.

TABLE 5.8: SUMMARY OF SEED INTERVENTION IN THE EASTERN ZONE, IDENTIFIED ON THE BASIS OF THE STAKEHOLDER INTERVIEWS, TO ALLOW FOR A GAP ANALYSIS

Cluster of seed system	Seed multiplication and marketing		Seed services		Enabling environment	
	Projects/ programmes	Crop	Projects/ programmes	Crop	Projects/programmes	Crop
Informal seed systems	1.FAO (cassava disease surveillance) 2.CARITAS (cassava stem production/multiplication) 3. BMGF (Community action in CBS control) 4. RAC/SUA/CIP (reaching agents of change)	Cassava Cassava Cassava Sweet potatoes Cassava	Cassava disease surveillance- FAO (financial services and start up seed)	Cassava	Policy for strengthening advisory services to farmers in the informal sector needed	Cassava
Intermediary seed systems	1.FAO (cassava disease surveillance) 2.CARITAS (cassava stem production/multiplication) 3. BMGF (Community action in CBS control) 4. RAC/SUA/CIP (Reaching Agents of Change) 5.SIMLESA 6. SRVP (S/potato rapid vine production) 7. MEDA 8. DADEPS 9. AGRA	Cassava Cassava Cassava Sweet potatoes Pigeon peas, cowpeas & maize Sweet potatoes Cassava Rice, maize, wheat, oil crops, horticultural crops Pigeon peas	SRVP (Extension & marketing) SIMLESA (provision of inputs-herbicides, fertilizer & training farmers, extension & advisory services, marketing)	Sweet potatoes Pigeon peas, cowpeas, maize	Decentralization of seed inspections to enable timely access to high quality seed	ALL CROPS
Formal seed systems	1.TL II- Cowpea(Tropical Legume II research project)-based at ARI Ilonga	Cowpeas			Protocols for certified cassava seed being developed. Currently no certified seed	Cassava

ANNEX 6: LAKE ZONE SYNTHESIS

ZONAL BRIEF

The Lake zone of Tanzania consists of six regions namely Geita (5 districts), Kagera (8 districts), Mara (7 districts), Mwanza (7 districts), Shinyanga (5 districts) and Simiyu (5 districts) making this one of the largest zones in Tanzania. In total, Lake zone covers 37 districts and a total area of 144,411 square km with a population of 11,832,857. Four of the Lake zone districts are among the most populated in the country ranking 4th (Geita district), 5th (Sengerema district), 6th (Muleba district) and 7th (Kahama district).

Mwanza region has surface area of 9,467 km^2, (946,700 ha), Shinyanga region has surface area of 18,901 km^2, Kagera (39,627 km^2, which 28,388 km^2 is land and 11, 239 km^2 water), Geita (20,054 km^2) Mara (31,150 km^2 and Simiyu (25,212 km^2 making the zone to have a total of 151,411 km^2 (15,141,100 ha). The arable land is more than 8,087,484 ha, about 53% of the total land in the zone. The zone is situated in a high, moist lake regions climatic zone, influenced by proximity to the Lake Victoria and Equator. Rainfall is bimodal and unreliable with little seasonal variation, where by the eastern sections receive an average of 750–1000 mm, while the western parts receive 2000–2300 mm. Maximum temperatures from June to August range from 25° C to 28° C.

TABLE 6.1: CROP AREA (HA) IN 2007/2008 SEASONS (MASIKA AND VULI) (NBS, 2012)

Maize	Paddy	Sorghum	Pearl millet	Finger millet	Wheat	Category	Total
1031515	319380	199613	20776	13956	77	Cereals	**1585317**
Cassava	Sweet potato	Irish potatoe	Bananas				
266543	155078	1294	123697			VP crops	**546612**
Mungbean	Beans	Cowpeas	Green gram	Chickpeas	Bambara nut	Field peas	Pigeon peas	Groundnuts	Soyabeans		
724	205622	11777	16260	49372	7037	1974	892	140329	614	Legumes	**434601**
Sunflower	Simsim										
6809	1872									Oil crops	**8681**

The main crops include bananas, common beans, chickpeas, cassava, sorghum, pearl millet and sweet potatoes. In terms of ranking, cassava was ranked highest and beans the lowest. Common beans, bananas and chickpeas are mainly used as cash crops while cowpeas and cassava are mostly used as cash crops. The Lake zone seed sector representatives consider all these crops as important for informal and intermediary seed system support. Subsequently, the districts for data collection were selected on the basis of the importance and extent of cultivation of these crops and included: Muleba, Bukoba, Misungwi, Kishapu and Bunda.

DESCRIPTION OF CROP AND SEED VALUE CHAIN ISSUES

Cassava: The crop is grown on 40% of farmland land and contributes up to 20% of household income. Planting material is largely farm saved or obtained from neighbours and when seed renewal is done, normally at 3-5 years, ARI Ukiriguru is the main source. There is a demand for clean planting material of varieties that are drought and resistant to CMD and CBSD. Shortage of planting material normally occurs due to drought. Generally, unless a farmer requires large quantities of planting materials, cassava cuttings are offered free of charge. The cassava seed value chain is affected by difficulties in maintaining PGR in the field hence the need for in vitro conservation, which can only be done by research. Additionally, the lengthy legal requirements that breeders need fulfil prior to releasing new varieties slows the release of new varieties.

Bananas: Bukoba is the largest producer of bananas in the lake zone and farmers in this area devote 62% of their land to cultivation of the crop, which contributes to 25% of household income. Planting material is obtained from neighbours, or farm saved. Farmers are aware of agronomic practices for clean banana suckers production and paring of the corm paring is normally done to remove banana weevils before planting. Every ten years, clean planting material of a new variety is obtained from ARI Maruku, while maintaining the local varieties that are highly preferred for food. The planting material is traditionally free based on customary

belief, but in large quantities farmers pay for it. There is potential to improve seed multiplication through supporting LSB involved in macro-propagation and promotion of banana decapitation technique.

Chickpeas: Chickpeas are a very important legume in the lake zone and mainly grown as cash crop. At Misungwi, the crops ranks 2nd in the farmers cropping system and 75% of farmland is devoted to cultivation of the crop, which contributes up to 75% of household income. Seed is largely informal (saved, neighbours and local markets), and mainly bought or exchanged for produce of other commodities. Generally, most farmers need to obtain seed at the start of the season, as everything is either sold the previous harvest or consumed, as chickpeas are the most favourite local protein. There is a need for access to timely and quality seed through agrodealers (as with maize) as quality varieties fetch a higher market price. Many farmers desirer a programme that would promote chickpea as a commercial crop due to the contribution it makes to household income.

Sorghum: This is a major crop in the drier parts of the lake zone. In Kishapu sorghum occupies 25% of farmland every season and is estimated to contribute 12% of household income. Most seed (6%) is farm saved, from neighbours (25%) or from the district (5%), local market (7%), or agrodealers (3%). Seed is treated with "Shumba" or botanicals (neem) for storage and preferred varieties tend to be bitter to prevent bird damage. Varieties that are bitter and dark are those normally selected of purchased for seed. These tend to be local varieties thus renewal or replacement with improved varieties is uncommon. Although subsidized seed could be obtained from the district, these varieties are sweet and white and highly preferred by birds thus farmers perceive there is a high risk in cultivating them. A few unreleased varieties can be obtained under farmer-to-farmer system because of lack of recognition of by certifying agencies.

Sweet potatoes: This is an important crop especially at Misungwi and Bunda. Nearly 25-40% of the farmland is planted with sweet potatoes and is estimated to contribute 50-75% to household income. Seed is largely farm-saved and some NGOs such as BRAC and Serengeti Farmer Group have provided starter material to farmers. New varieties diffuse into the farmers cropping system and mainly originate from ARI-Ukiriguru. When farmers need to obtain seed, the planting materials are mostly obtained for free or exchanged. Depending on the availability of a new variety, farmers can renew a variety every 3-5 years. Farmers would like to see easier access to clean planting material every 2-3 years, and irrigation to maintain the cuttings in the dry season, as seed demand is high.

Common beans: This crop is mainly grown by the younger farmers particularly at Muleba. A significant portion of the farmland (90%) is devoted to bean cultivation every season and contributes significantly to household income (60%). Women mostly are involved in seed selection for this crop. Farmers have an innovative way of testing seed quality, by soaking the bean in the mouth. Seed is rarely replaced, but could be renewed due to drought or availability of new variety. New varieties come from ARI Maruku, who also provide clean seed and advisory services. Wider distribution of the new varieties would be preferred as there are no very strong attachments to landraces. Seed access at planting time can be a problem, as prices go up sharply compared to harvesting time.

Pearl millet: Although not important across most of the lake zone, this crop is a key to food security in the drier areas of the zone such as Kishapu. One farmer group in Kishapu grows pearl millet on 75% of their land and obtain nearly 75% off their income from it. Seed is self-saved, exchanged or bought. Disease free large heads are selected at harvest time mainly by women for seed, and sorted after threshing and winnowing. Every 3-4 seasons the seed is renewed, as yield declines due to diseases and outcrossing. There is a lot of interest in newer and higher yielding varieties and demonstrations are an important pathway for adoption. However, there is a general lack of good quality and affordable seed from agro-dealers. There is a heavy reliance on the public sector especially research for the seed. Due to high demand, whenever seed is to be obtained (after a drought) it has to be bought.

LAKE ZONE SEED SYSTEMS

Farmer and farmer-to-farmer, and community-based seed systems
The strengths of these systems are the acceptability of the varieties (well adapted and preferred), affordability of the seed, availability of the seed (in the community), and the trusted quality. These systems can also contribute to the rapid dissemination of the varieties. Weaknesses are the quality decline due to recycling, and related poor yield potential and quality issues, as well as pest and disease storage problems, and no rigorous quality control. Support for this system is considered not sustainable as coming from outside (the country).

Local seed business and Quality Declared seed Systems
The strengths are that seed is made available at planting time and farmers do not have to travel long distances, seed is affordable compared to the certified seed, also due to packaging and efficient quality control and inspection. Certified seed can be used as starter seed leading to availability of improved seed in rural areas.

The weaknesses are the perceived lack of sustainability (external support), higher risks of disease spreading and poor quality control. In rural areas the packaging, labelling and control of weights and standards is limited, and no additional information on crop practices is provided.

TABLE 6.2: SEED SYSTEMS IN THE LAKE ZONE

Seed systems	Farmer saved seed system	Farmer-to-farmer seed system	Community-based seed system	Local seed business system	QDS system	Certified seed system
Percentage of seed supply	60%	15-25%	*4 – 5%*	10 – 15%	*3-5%*	50% of the maize and horticulture
Crops	Common beans, cowpeas, chickpeas, groundnuts, sorghum, pearl millet and finger millet, cassava, bananas and sweet potatoes	Cassava, sweet potatoes, sorghum, green grams, chickpeas	Cassava, sweet potatoes sometimes chickpeas and green grams	Common beans, chickpeas, green gram, cowpeas, groundnuts, sorghum and millets	Cereals and vegetatively propagated; chickpeas and green gram	Sorghum, common beans, horticultural crops, chick peas
Varieties	80-100 % landraces	Largely Landraces	Improved varieties	Land races and local varieties	Improved varieties	Modern, improved varieties
Seed purchase frequency	20%	50%	Once per variety	Twice a year	Depends on variety	10%
Seed multiplication	Farmers mostly women	Individual farmers	Farmers groups and individual farmers	Farmers	Community and Individual farmers	Public (ASA) and private registered seed companies
Seed marketing	Farmers mostly men	Farmers, barter, exchange	Farmers and farmer groups	Traders of the local markets	Community and Individual farmers	ASA, registered seed companies using registered agro-dealers
Quality control	Farmers	Farmers	Community members and seed inspectors.	Very low quality assurance	seed inspectors and TOSCI	TOSCI and LGAs authorized districts seed inspectors

FARMER GROUP DISCUSSION

The farmer saved seed system is the major source of seed for farmers in the lake zone. At the district level there is also a formal system: where trained extension staffs inspect companies producing seed e.g. Itente Seed Company in Muleba district and the agent of ASA producing sorghum seed and based in Shinyanga. Many farmer groups in the Lake zone are registered or in the process of registering to produce seed. It is very difficult to estimate the average percentage of their land used for the crops of choice possibly due to the fact that most farmers intercrop. Estimates of 25 to 90% of income are generated and the source of planting materials is generally known. Most farmers have some inbuilt system of controlling the quality of the planting material. However, during inevitable situations like prolonged drought, famine leading to consumption of seeds and urgent family need, farmers would acquire seed. Crops like chickpea are tasty and there is always a high temptation to consume all the produce without saving seed. A small amount of sorghum and common beans are certified, while the rest of the crops are produced using informally raised planting material.

The key issues that arise related to seed include updating farmers on improved varieties; marketing aspects of seed; becoming empowered seed multipliers; post-harvest handling and marketing, and value chain development. There is also need for strengthening extension by enhancing the capacity to train farmers on seed production; and ensuring advisory services at village level. Variety development is also key for farmers especially improving local varieties and locally adapted varieties and provision of new varieties by Agricultural Research Institutes (e.g. pearl millet, disease resistant cassava), as well as selection of suitable sites for establishment of demonstration plots for comparison of local varieties with the new/introduced varieties. In relation to seed production and marketing, there is need to initiate contracts for QDS of bean seed farmers at village/ward level; individual local seed multiplier or NGO to set up a propagation and marketing unit producing various types of preferred improved banana varieties. Quality control is also essential particularly establishing a strong system to ensure introduced material is clean, and support agro-dealers at village/ward to stock and sell good quality and affordable seed during the planting season.

ZONAL SEED MULTIPLICATION

TABLE 6.3: DESCRIPTION OF SEED MULTIPLIERS AND MARKETERS IN THE LAKE ZONE

Name	Since	Type	Crops	Quantity	Type of seed	Source of starter seed	Clients
Sebastian Michael Maguta	2013 to date	Individual	Sweet potatoes	480 bundles (300 vines each)	Informal	ARI Ukiriguru	Farmers in (Nyasamba-Shinyanga, Ng'hungumalwa Kwimba). These are open markets
ICDP	2010	Individual (NGO)	Cassava	200 cuttings sold at 1000/=	Intermediate	ARI Ukiriguru and Maruku	Farmers
Kagera Community Development Programme (*KCDP*)	1998-2004	Public	Bananas	None	Informal and QDS	Maruku ARI	Farmers
Rajab Hamad 0754061332	2003	Individual enterprise Nyamawa	Chickpeas and green gram	Sold 105t of chickpeas to companies and farmers as grain, *but also regarded as seed/panting materials*	Informal and QDS	Farmers	Consumers and farmers
Itente Seed farm	1980 with livestock 2010 seed multiplication	Individual	Common beans maize; Sweet potato Cassava; Sorghum and soy bean were discontinued due to lack of market	Beans 4ton Maize 30ton Sweet potatoes 3,000 vines Cassava 6,000 cuttings	Formal and QDS	Beans and maize ASA Morogoro wweet potatoes and cassava from Maruku ARI	Maruku ARI and Igabiro Agric. Training Institute and individuals Neighbouring farmers
Mage	September 2012	individual	Sweet potatoes	15 ridges of Polister; 20 ridges of Ukerewe; 30 ridges of Kabode; 10 ridges of Ejumula	Started QDS but ended up with Informal due to lack of inspection	ICDP and district office	farmers
Simba Self help Group	Started 2011 and on-going	group	Sweet potatoes	12,000 first season Last season 8000 vines due to prolonged drought	Informal and QDS	Buhemba Rural Agricultural Centre (BRAC) - ICDP and district office purchased seed from Ukiriguru and Maruku ARIs	Farmers from neighbouring villages and districts

Major constraints encountered in seed production and marketing:

Production constraints: Diseases; prolonged drought; wild animals-primate pests; labour costly because TOSCI requires the crops to be weed free all the time (weed 5 times per season); no regular field inspection.

Resources: Inadequate capital; insufficient funds for project operations; inadequate knowledge in seed multiplication; dependence of donor funds to run the activities.

Access to starter seed: Inadequate planting material (farmers are stealing cassava cuttings from ICDP fields); theft increases cost of producing cassava cuttings because of the need to employ security guards; cassava varieties cuttings need replacement at least every 2 years because of susceptibility to CBSD; lack of appropriate propagation facilities; selection of varieties because mixtures fetch low prices (approximately 3 varieties in the mixture); need for improved varieties; low diversity of varieties.

Capacity building and extension: Insufficient extension services; capacity building to farmers on quality chickpea production.

Marketing: Low demand for certified bean seed; traditional belief hindering sale of vegetatively propagated materials; no reliable market for vines all neighbours already had the varieties; no benefit- would like to raise roots because there is ready market.

Recommendations:

Investment: To ensure consistent supply of sweet potato vines throughout the year needs irrigation facilitates and technical knowhow; increase number of extension staff in the locality; increase number of drought tolerant varieties as a measure against prolonged drought.

Capacity development and extension: Capacity building on value chain so as stakeholders can understand issues related to cassava production and utilization; capacity building to extension staff, farmers on sanitation to control disease spread; farmers are not familiar to the use of certified common bean seed therefore need training, demonstration and advertisement at village and ward level; there is need to train sweet potato farmers to enable them distinguish the difference between vine and root production enterprises; carry out capacity building on quality seed production and marketing.

ZONAL SEED SERVICE PROVIDERS

A large fraction of the service providers are from research, but there are also some NGOs such as TAHEA, Kolping Society and traders. The services provided address only one seed chain component, multiplication and marketing. No service provision is evident for other chain components e.g., early generation seed and variety selection and release. The types of services provided concentrate on agronomic aspects and to some limited extent seed quality control

Main constraints encountered in service provision:

Extension services: Heavy focus on agronomic and production related aspects and little attention to specific seed extension, marketing and entrepreneurship. Though some aspect of extension is provided in seed quality, the extension staff do not have adequate skills especially in the areas of marketing but also in seed technology. There is also the challenge of shortage of extension staff, which means that they cover large areas with limited transport resources.

Farmers' attitude: Farmers' mind-set is difficult to change; farmers are not devoting their time to listen to the radio programme; farmers are not willing to adopt the improved agronomic practices; farmers are stealing cassava cuttings from ICDP fields; after the participatory on-farm trials were completed, farmers continued to multiply the 8 varieties. However, by the time LZARDI communicated which varieties had been released, the farmers had mixed up the seeds of both released and non-released chickpeas and therefore do not have pure varieties; farmers are reluctant to buy improved sorghum seed since they are prone to bird damage; local grains are raised by farmers informally and are not certified to be sold as seed.

Recommendations for seed service provision:

Capacity development services and extension: Capacity building should be done to farmers so that they can commercialise agriculture production; youth should be involved in production of seeds/planting materials; in the Lake zone the project works with Radio Maria for linking vine producers to markets; farmers should be taken to exchange and study visit to learn more; frequent capacity building to extension officers is recommended on new varieties, on seed technology, quality seed production and marketing skills, as well as M&E tools; more demonstration plots in each village; using rapid multiplication techniques like tissue culture would help to meet the demand and reduce risk of theft; needs more extension services especially seed inspection and agronomic practices; seed company should extend their services at village/district level and they should regularly meet and adhere to seed stakeholder's needs and wants; the research institute need a programme to address pertinent issues related to seed (bananas).

Investment: Currently sweet potato seeds are conserved on the wetland near the lake, therefore, in order for farmers to produce large quantity of seeds, irrigation infrastructure is inevitable; inappropriate transport facility to extension officer; increase the number of extension staff; the district has opportunity of large arable land and if provided with ample improved bean seed can lead to high yields.

TABLE 6.4: ZONAL SEED SERVICE PROVIDERS

Name service provider	Service provided	Focus crops in seed	Seed System Focus	Seed chain component
TAHEA	Food security; capacity building in seed production and nutrition; microfinance; facilitating availability of seed to farmers	Sweet potatoes, cassava	Informal	Multiplication Marketing
Farm Radio Project	Information sharing; publicity; marketing linkage between farmers and customers	Sweet potatoes	Informal	Marketing
Raheli Mbaga Agricultural Field Officer II	Improved agronomic practices	Sweet potatoes, cassava, sorghum, chickpeas	Informal	Seed multiplication Marketing
ICDP	Rural extension; quality assurance in seed production; quality assurance in seed commercialization; business management services	Cassava, sweet potatoes, desmodium, Murato II	Intermediate(QDS)	Multiplication Marketing
Jairo Agula Principal Agriculture Field Officer 1	Training/ capacity building on agronomic practices	Chic peas, green gram	Informal	Multiplication Marketing
Alistidia Mutasingwa Agric Field officer 1	Extension services for all crops; Agronomic practices improved varieties yield 7-10 bags but, traditional varieties yield 3-5kgs; training on seed selection & sorting; marketing& food security - household income & expenditure; group formation	Pearl millet	Informal	Multiplication of grain
Georgina Rwekiza	Extension services for all crops; agronomic practices training on seed selection; group formation; seed inspection	Cassava, beans, maize	QDS	Multiplication Marketing
Itente seed farm	Capacity building for farmers; demonstration plots	Maize	Formal	Multiplication Marketing
Benson Batara District seed inspector - Agric officer was seconded to ICDP for part time coordination	Extension services for all project crops; agronomic practices training on seed selection; group formation; seed inspection	Sweet potatoes, cassava, sorghum *Maize; Chickpeas *Paddy	Informal & QDS for Sweet potatoes Cassava and Maize	Multiplication Marketing
Simba Self-help Group	Providing planting materials, especially starter seed	Sweet potatoes	Informal and QDS	Multiplication Marketing
Mage	Providing planting materials, especially starter seed	Sweet potatoes	Informal and QDS	Multiplication Marketing

Genes Tarimo Trading as (IGEMBENSABO AGROVET)	Veterinary services (sell of livestock drugs); provision of agricultural input services (sells of seeds, and agro chemicals); consultancy services	Sorghum (Macia variety).	Formal certified seed (source from ASA through ASA argent in Shinyanga)	Marketing
ARI Maruku	Research; capacity building	Bananas	Informal and intermediate	Multiplication Marketing

ZONAL SEED SECTOR PROJECTS

There are 13 seed sector related projects in the northern zone mostly implemented by public institutions and very few by NGOs. They cover a range of crops including the prioritized crops in the proposed ISSD Tanzania programme and intervene in the intermediary and formal systems, but not in an integrated seed systems approach. In each system, the focus is on a single component of seed chain, primarily multiplication and marketing. Quite a number of the services provided are not seed sector issues but general agricultural production, but some do focus on production of quality seeds. Some of the projects, notably those on vegetatively propagated crops recognize the on going developments towards a policy and regulatory frameworks that can support production of quality planting materials of sweetpotato and cassava including some form of quality standards and certification. Similar policy and regulatory frameworks for banana should be developed.

TABLE 6.5: ZONAL SEED SECTOR PROJECTS

Name	Duration	Type	Seed system	Crops	Seed chain component	Services [provided	Policy targets	Intervention area
Integrated Community Development Programme (ICDP) under Anglican church	Started 2011 and still ongoing	NGO	QDS	Sweet potatoes and cassava	Multiplication Marketing	Regular capacity building availability of soil testing kits; establishment of net tunnels in the selected locations	System that increases availability of planting material	Located in Tamau; Misisi Kitaramaka; Serengeti Bitaraguro
Kagera Community Development Programme (*KCDP*)	1998-2004	Public	Informal	Bananas	Multiplication Marketing	Seeds should be supplied as per farmer demands (variety and taste)	The seed policy for vegetative propagated crops on final stage will promote ISSD but should also look at banana.	District Bukoba and the Kagera, and Tarime district in Mara region.
Integrating HIV/AIDS with leguminous crops	Started 2005 has been running for 7 years, is now in its third phase- still ongoing	NGO	Informal	Chickpeas, green gram, groundnuts, cowpeas, Bambara nuts, pigeon peas	Multiplication Marketing	Rural extension services; quality assurance in seed production; quality assurance in seed trade; business management services; marketing information and promotion	Increase supply of seed agrodealers to sell chickpea seed	Village levels at Mwanashamba, Mbarika Iteje, Lubuga, Misungwi Farmers were trained to
District Agric Sect Investment Project (DASIP) under District Agricultural Development Programme (DADP)	Started 2009 and ongoing	Public	Informal	Cassava *Maize	Multiplication Marketing	Rural extension; quality assurance in seed production and commercialization; cusiness management services; marketing information and promotion	Quality assurance in seed production and seed commercialization	Village level
Integrated Striga Management	From 2013	Public	Informal and QDS	Sorghum	Multiplication	Rural extension facilitation for routine monitoring	Quality assurance in seed production and seed trading; marketing information and promotion	Ikome, Misasi, and Inonelwa villages
Orange Flesh Sweet potato (OFSP) DONATA and Orange Flesh Sweet potato - AIS	Started 2008 Ended 2013	Public	Informal and QDS	Sweet potatoes	Multiplication of vines and roots	Rural extension; business management services – coordination; marketing information and promotion	Rural extension services; quality assurance in seed production and trading; marketing	Villages of Isamilo, Nange Mwalo gwabagole

							information and promotion	
Harnessing Opportunity Productivity Enhancement (HOPE) funded by ICRISAT	Started 2010 Ended 2013	Public	informal	Sorghum	Multiplication	Capacity building Transport and logistics	-	Located in 2 wards in 5 villages
Integrated Striga Management (ISM)	Started 2012 and is ongoing	Public	informal	Sorghum	Multiplication	Capacity building Transport and logistics	-	Located in 3 wards in Kishapu; Uchunga Ukenyenge
ASARECA	Started 2012 Ended 2013	Public	informal	Pearl millet	Multiplication	Capacity building Transport and logistics	-	Located in Talaga ward
District Agricultural Development Programme	Started 2009 ongoing	Public	informal	Bananas	Multiplication Marketing	Improve transport facilities; increase human resource-extension officers improve farmer organisation	Seed system to increase availability of quality seed	Only in 10 villages out of 161
Kagera Agricultural and Environment Management Project: IPM and IPN	Started 1997 Ended 2004	Public	QDS and informal ;	Bananas, beans, maize, sweet potatoes, cassava	Multiplication	Start farmers', organisation into functional groups at an early stage of the project	Seed system to increase availability of quality seed	In 5 divisions in Muleba
AGRA funded project	Started 2010 Ended 2013	Public	QDS	Maize, beans, soybeans, sweet potatoes and cassava	Multiplication Marketing	Improve farmers, organisation and marketing	Seed system to increase availability of quality seed	Bukoba; Muleba; Misenyi Biharamuro districts
CIAT funded project promoting farmers' preference - yellow beans in Muleba	Started 2013 is ongoing	Public	Interme diate (QDS)	Common beans	Multiplication Marketing	more improved varieties for testing	Seed system to increase availability of quality seed	Kimwani Kyebitembe Ngenge wards

SUGGESTED INTERVENTION FOR PRIORITY CROPS

The possible interventions that emerged from the SWOT analysis are not unique to a specific priority crops. The interventions fall into three categories: seed production and marketing; services and; policy and regulations (Table 6.7)

TABLE 6.6: SUGGESTED INTERVENTIONS FOR PRIORITY CROPS IN THE LAKE ZONE

Interventions	Justification
Production and marketing: • Building farmers' capacity on Entrepreneurial skills. To enable them to engage in income generating businesses - investments in propagation and transportation of planting materials so as to overcome the issues of insufficient government project funds • Build capacity of farmers to keep basic farm input and output records. • To organise farmers into functional groups and provide them with group marketing skills and also to reduce the production costs associated with outsourcing of inputs from distant locations • Help farmers to organise themselves into functional innovation platforms and develop the commodity value chains. • Sensitisation and mobilisation of farmers to adopt improved crop varieties and to carry out integrated crop and pest management. • Use of climate smart agriculture techniques to combat prolonged drought • To build the capacity of the farmers to use integrate crop management and Integrated insect pests and disease management such as use of soil amendments, use of push-pull techniques promoted for control of striga and stem borers. • To provide women's crop e.g. green gram as a means of income	• Farmers are not making profit from farming because they are mainly producing to meet their household consumption need and only sell the surplus. However, if they are to transform their livelihoods, they need to do farming as a business. • The extension staffs are willing to offer their services but, their area of jurisdiction are very large and they lack reliable transport and facilitation. Currently, both research and extension officers are struggling with issues of insufficient project funds and are not able to meet farmers' expectations in terms of planting material and technical backstopping. • Most of the farmers met, are not keeping farm inputs and outputs records, however, these are crucial when determining enterprise profitability. Therefore it is necessary to build capacity of both producers and buyers by providing them with basic business records keeping techniques. • The farmers are selling their produce as individuals and as a result do not have enough bargaining power concerning the price offered by traders and individual farmers lack the ability to meet the market demand, but, selling as a group increases the volume of produce and bargaining power. • There are no agro-dealers selling good quality seeds and other inputs of the selected crops. As a result farmers have to outsource from distant locations and this increases production costs. • Some of the farmers are still using local varieties which are lower in nutrient content and sometimes are also lower in yield. Although some of the local varieties have succumbed to prevalent insect pests and diseases, some farmers still insist on planting them, because they are hesitant to plant any variety whose performance they have not observed from the demonstration plots or during field days at the ARIs or during Nane Nane Agricultural and Trade shows. • Prolonged drought has led to lower yields in the farmers' fields especially where irrigation is not used. It is therefore necessary to help farmers to construct structures for water harvesting during the rainy season • As a result of climate change, there are several new insect pests and diseases attacking the different crops • In Tanzania, there are men's crops and women's crops. Almost all the selected crops except potato vines are men's crops. Therefore it is important that women also get a crop that will help them to meet their financial needs.
Services: • Improvement of the existing extension services to motivate farmers to adopt improved crop varieties and agronomic practises. • Facilitation of individual farmers or NGOs with experience in propagation of vegetative materials to erect modern propagation units like net tunnels, screen houses and others to rapidly produce adequate good quality plantings for selling to the community. This will increase the frequency of renewing the starter planting material.	• Farmers have low knowledge on agronomic practises for improved crops. There is need to increase household production and access to organise and reliable markets. • For some of the selected crops like vegetatively propagated crops (Cassava, sweet potato and banana), chickpea and pearl millet there is not assured source of clean planting material at village or ward level. There is a need to establish rapid multiplication sites to produce materials to meet the growing demand, so as to prevent further pest and disease spread • The farmers lack supply of good quality seeds at affordable price. The grain/cutting/vines/suckers purchased from the market lead to poor quality crop and low yields. • The area has ample arable land, suitable for crop production. However, it has poor road network and

• Identify demonstration sites at village/ward level. Select localities for seed farms for the different crops. • Improve access infrastructure - roads and storage • Extension staff should sensitize farmers on the importance of using soil amendments and their effect on production • TOSCI, ARIs and Extension staff to train farmers on use of quality seed and seed categories through use of demonstration plots, farmer field schools and exchange visit to seed processing plants.	farmers have poor storage facilities. However, they are interested and willing to improve their post-harvest handling methods and structures • Currently, most farmers lack the capacity to differentiate between seed and grain and as a result they are taken advantage of by traders and agro-dealers.
Policies: • District councils and Local Government Authority should formalise the policies related to standard measuring units (e.g. Kilograms along the value chain) used in trade • Districts should enforce bylaws on soil nutrient improvement	• Farmers feel cheated because they sell in tins and sacks, but, the traders and retailers sell in Kilograms. The transporters charge based on number of pieces e.g. sacks can be overflowing but will be charged on piece basis not weight. The district council levy is based on number of sacks no matter the weight or size • Districts already have laws guiding general agriculture. It is therefore necessary to emphasize soil nutrient improvement activities at farm level • Extension staff should sensitize farmers on the importance of using soil amendments and their effect on production, through use demonstration plots • ARIs, policy makers to create enabling environment for input-output marketing and markets

SUMMARY OF SEED INTERVENTIONS IN THE LAKE ZONE

Five of the nine projects identified in the zone have interventiosn in the intermediary system (local seed business and QDS based seed systems both individual and groups) and the remaining have inputs into the informal system (farmer-saved, farmer-to-farmer, and community based). There is none on the fomal system (Table 6.8) with some interventions in systems are focusing on the informal (4) and intermediate (5). The main crops covered are the vegetatively propagated (cassava, sweet potatoes and bananas) and some grain legumes (mainly beans, chickpea) in both systems, but none on sorghum and millets. There are a variety of grassroot level service providers who are potential partners for an ISSD Tanzania programme. These include the local government, NGOs such as Kolping society, Kagera Agricultural and Environment Management Project (KAEMP) and TAHEA, Radio programmes as well as several CBOs.

TABLE 6.7: SUMMARY OF SEED INTERVENTIONS IN THE LAKE ZONE

Seed systems cluster	Seed multiplication and marketing	Seed services	Enabling environment
Farmer-saved, farmer to farmer and community-based seed systems	Sebastian Michael Maguta (SP); Farm Radio programme (SP); Farmer led Cassava (men/women) (Rwabu village) Integrating HIV/AIDS with leguminous crops (Chickpea) District Agricultural Development Programme (DADP) (Banana)	TAHEA (SP) Farm Radio programme NGO (ICDP) (SP) Integrating HIV/AIDS with leguminous crops (Chickpea) Itente (Beans)	Local government (SP)(Misungwi district council) System that increases availability of good quality seed to farmers (Beans
Local seed business and QDS based seed systems	Kagera Agricultural and Environment Management Project (KAEMP) was doing Integrated Pest Management (IPM) and Integrate Plant Nutrition (IPN) (Beans, banana, SP, cassava) AGRA funded project (Beans, SP, cassava) CIAT funded project (Beans) NGO (ICDP) (Cassava, SP, pastures) Maruku; LGAs; Kigaze Farmer Group (Individuals & Groups); Kolping Society; CBOs World vision (Banana)	Kagera Agricultural and Environment Management Project (KAEMP) was doing Integrated Pest Management (IPM) and Integrate Plant Nutrition (IPN) Maruku; LGAs; Kigaze Farmer Group (Individuals & Groups); Kolping Society CBOs World vision (Banana)	System that increases availability of good quality seed to farmers (beans, SP, cassava) System that increases availability of good quality seed to farmers System that increases availability of good quality seed to farmers
Formal seed systems	n/a	n/a	n/a

ANNEX 7: SOUTHERN ZONE SYNTHESIS

ZONAL BRIEF

The Southern zone is comprised of two administrative regions, Mtwara and Lindi. Mtwara has 5 districts while Lindi has 5 districts, however one district, Tunduru, is from Ruvuma Region making the whole zone to have a total of 11 administrative districts. Mtwara region has surface area of 16,707 km^2, (1,670 700 ha), Lindi region has surface area of 67,000 km^2, (6,700,000 ha) and Tunduru district has a surface are of 18,778 km^2 (1,877,800 ha), making the zone to have a total of 102,485 km^2 (10,248,500 ha). The arable land is approximately 8,015,095 ha, about 78% of the total land in the zone. The average cultivated land is about 887,640 ha per annum (11% of arable land) used for both food and cash crops.

Mtwara region has a population of about 864,652 with a population density of 13 persons per km^2 and Lindi about 1,270,854 with a population density of 76 persons per km^2 and Tunduru district has population of about 298,279 (Census 2012). The total population in the zone is 1,653,785.

The zone experiences two types of climates. The coastal climate prevails along the coastal belt of Mtwara and Lindi regions. It is generally hot and humid (28 - 32°C) for most of the year. Humidity ranges from 63% to 82%. The rainfall pattern is bi-modal with two rain seasons, ranging from 980 to 1,200 mm the long rains (Masika), from about Mid-March to May, and the short rains (Vuli) from about late October to December. This climate type prevails in the eastern part of the zone. The western part of the zone where most of the data collection was done exhibits a mono-modal type of rainfall. The rain season starts from December – May. The average annual rainfall ranges from 800mm – 1000mm, while the annual temperature ranges from 22°C - 34°C, with the annual mean temperature being 25°C. The dry season range from June to November.

Main food crops grown in the zone include maize (TMV-1, Situka-1), sorghum (Pato and Macia varieties), cassava (improved variety- Naliendele 034/94 and local cultivars - Dide, Mkomboleka, Mwaya), sweet potatoes (Jeshi and Karoti (OFSP) varieties), pearl millet, paddy and legumes (mainly pigeon peas, cowpeas, Bambara nuts) and fruits and vegetables. Cash crops include cashews, groundnuts (Pendo 98, Mnanje, and Mangaka varieties), and sesame (Naliendele 92 and Ziada 94 varieties), Bambara nuts, pigeon peas, cassava, green gram, sunflowers, coconuts and tobacco.

TABLE 7.1: CROP AREA (HA) IN 2007/2008 SEASONS (MASIKA AND VULI) (NBS, 2012)

Maize	Paddy	Sorghum	Pearl millet	Finger millet	Wheat					Category	Total
893390	182729	34885	1637	31866	27657					Cereals	**1172164**
Cassava	Sweet potato	Irish potatoe	Bananas								
92568	15883	22942	46219							VP crops	**177612**
Mungbean	Beans	Cowpeas	Green gram	Chickpeas	Bambara nut	Field peas	Pigeon peas	Groundnuts	Soyabeans		
1183	219031	10490	157	0	3359	11064	16772	86551	6505	Legumes	**355112**
Sunflower	Simsim										
88374	37860									Oil crops	**126234**

During the multi-stakeholder workshop in Mtwara, the Southern Zone seed sector representatives selected the following crops as being important for informal and intermediary seed system support: Bambara nuts, cassava, groundnuts, pigeon peas, sorghum, and sweet potatoes. Data collection was done in three districts: Nanyumbu, Ruangwa and Tunduru.

TABLE 7.2: DATA ON CROPS PRIORITIZED FOR THE ISSD TANZANIA PROGRAMME IN THE SOUTHERN ZONE

	Bambara nuts	Cassava	Groundnuts	Pigeon peas	Sorghum	Sweet potato	Data source
Acreage of the crop / year *(normal fields, not seed)*	4567	69527	24341	26403	16742	5778	DAICO Offices
Certified seed produced per year (tonnes / year)	n/a	n/a	n/a	n/a	n/a	n/a	DAICO Offices
QDS seed produced per year (tonnes / year)	350.7	400000	8500	280	322.5	n/a	DAICO Offices

DESCRIPTION OF CROP AND SEED VALUE CHAIN ISSUES

Bambara nuts: Bambara nuts are grown for food and for cash where by up to 30% of the land can be cropped with Bambara nuts, contributing to 40% of the household's income. Seed is mostly obtained from neighbours at TShs 2000/kg or paid as labour, however new varieties can be obtained from Naliendele Research Institute (NARI) which is reliable source of improved seeds. Maintenance of seed quality is done by keeping the seed separate from other grains and seed selection is done by both men and women. When they acquire seed, they ensure that it is free from pests and diseases. They also renew the seed every three years. This is done often to maintain seed quality properties.

Farmers would like to see the number of agro-dealers stocking the seed increased, as well as have better extension services on Bambara nuts. The changes they would also like in the seed sector include provision of training on Bambara nuts seed production, provision of improved varieties for seed multiplication under contract and provision of market information and linkages both local and foreign market.

Cassava: Cassava is one of important crops in the zone, which can cover about 20% of the land and contribute to about 30% of the household's income. Seed is from own stock or free from neighbours. Planting material is locally selected and not renewed. Improved planting material is not available or not known. They do also provide planting material to neighbours free of charge.

The changes they would also like in the seed sector include establishment of multiplication sites in selected villages, Farmer Field Schools/Demo plots for farmers to learn and multiply, starter seed for new varieties should be distributed to selected farmers in villages from whom other farmers will obtain the seed and imparted with skills and knowledge of seed multiplication.

Groundnuts: Farmers grow groundnuts on 60% of their land, contributing to 80% of their income. They largely rely on their own seed, however in every 2-3 years they renew seeds of improved varieties from NARI. Frequent replacement is needed to maintain the quality where NARI and neighbours are good sources of seed. However NARI is declared as a reliable and accessible source of improved groundnut seed. They can pay about Tshs 2000-3500 per kg seed.

The Farmers would like to see more improved groundnut demos, as provision of improved seed in small packages. Also they would like the seed sector hold farmers' field exchange excursions/visits and provide market information and linkages for both domestic and foreign market.

Pigeon peas: Pigeon pea is on about 50% of their land, providing up to 25% of household income. Farmers rely on their own seed and that from neighbours, which is free of charge. Women select for quality seed using colour and damage as criteria. The cream white peas are for market while red peas are for their home consumption. Seed can be obtained easily, but it is not of good quality because they do not have planned renewal. They only renew when there is a flood or drought, which could not allow them to produce enough. They have no alternative sources of seed. Would be interested in testing new varieties and produce seed in groups.

Farmers would like to see that researchers and farmers collaborate in development of improved pigeon peas varieties and formation of seed producing groups at village levels.

Sorghum: Sorghum is grown on about 50% of their land, leading to 60% of potential household's income, but largely consumed at home. About 80% of the seed is farmer-saved, some farmers get seed from neighbours. Seed is not selected (too small), and seed is not renewed, only in case of calamity where production is low thus need to buy new seed, no alternative sources are known.

Farmers are interested in getting new varieties, which store well and combined with good storage methods. Seed can be bought sometimes, or sold in return for labour in case of disasters. Also they would like the seed sector to establish more programmes and projects, which will collaborate with farmer groups in seed production, researchers develop new sorghum varieties and have capacity building in seed management and post harvest handling at farmers levels.

Sweet potatoes: Farmers grow sweet potatoes on 50% of their land contributing to about 90% of the household's income. Seed/planting material is maintained locally in wetland (madimbe) and quality is maintained through selection (by both men and women) based on yield and physical appearance.

Farmers are interested in improved quality planting material, which is difficult to get and requires cash. They would like the seed sector provide training and improved starter seed to local multipliers on seed multiplication techniques and establish demo plots and educate farmers on importance of improved varieties.

SOUTHERN ZONE SEED SYSTEMS

Farmer saved, farmer-to-farmer and community-based seed systems

These form a group of informal seed systems in the zone. Their strengths include: availability of local seeds (contribute to about 80% of seeds) and informal individual seed producers, as well as seed producing groups; affordability; farmers' preference; experience with the varieties; existence of mutual relation of trust; evidence of performance in the preceding seasons; sharing of production knowledge; strong linkage between research/extension/farmers/NGOs; and local seed storage. However the systems have some weaknesses which are: inadequate knowledge of producers on post-harvest seed handling; inadequate awareness on importance of using improved seeds; inadequate capital of farmers' seed producing groups and individual multipliers; inadequate seed technical and business management skills to seed producers; inadequate planting material; poor quality control system; cannot be sold out of the community where it is produced; and lack of promotion.

Local seed business seed systems

Individuals and farmer groups operate this system for a profit. Its strength lies on availability of seed; seed can be purchased at any quantity; price of seed is affordable; and collaboration between research and farmers. However some of it weaknesses are: no assurance of getting seeds timely; lack of education to farmers in value chain; poor quality seed (mixed, germination ability); local market sellers have inadequate knowledge on seeds; and poor package and storage.

TABLE 7.14: SEED SYSTEMS IN THE SOUTHERN ZONE

Seed system description	Farmer saved	Farmer to farmer	Community based	Local seed business	Public/Private Companies
% of seed supply	50	15	15	15	5
Crops	Groundnuts; maize; Bambara nuts; cassava; sesame; sweet potatoes; sorghum; pigeon peas	Groundnuts; maize; Bambara nuts; cassava; sesame; sweet potatoes; sorghum; pigeon peas	Groundnuts; maize; Bambara nuts; cassava; sweet potatoes	Groundnuts; maize; Bambara nuts; cassava; pigeon peas; sorghum; maize; paddy; cowpeas;	Groundnuts; maize; sesame; maize
Varieties	Improved groundnuts (Pendo 98, Mnanje, Mangaka) Local Bambara	Landraces: local/improved varieties	Local (groundnuts,) Improved: Groundnuts Improved cassava	Local/improved varieties Some improved Bambara	Improved groundnut varieties Improved maize varieties Improved Bambara
Seed purchase frequency	25%	15%	Less than 30%	2-5%	5%
Seed multiplication	Farmers groups	Farmers/Farmer groups/Certified farmers	Farmer groups/NGOs	ARI Naliendele/Farmer Research Groups	ARI/farmer groups/ASA/Agro dealers
Seed marketing	Farmers; AMCOS	Farmers/farmer groups	Farmers	ARI Naliendele and Farmers	Marketing-ASA Dissemination - Agro dealers
Quality control	Physical appearance/by looking	Farmer indigenous knowledge	None	TOSCI/farmer	TOSCI

FARMER GROUP DISCUSSION

During the discussions with Farmer Focus Groups, a number of issues were raised mainly on the source of seed, challenges and suggestion for a better seed sector development. In general the farmers reported that their main sources of seeds are own savings and from neighbours. However in for some crops they obtained seeds form local seed businesses, agro-dealers and NARI. They confidently ranked NARI higher as a trusted source of quality seeds for a number of crops.

The farmers discussed some issues they would like to see for a better development of the seed sector. These are farmer capacity development through activities like farmers field exchange visit, impart skills and knowledge on seed multiplication techniques, seed management and post-harvest handling at farmers levels; build capacity of producer groups in seed production regulations and business management; access to new crop varieties where by researchers should develop new/improved crop varieties and providing improved starter seed to local multipliers. The farmers also suggested that there is a need for their capacity for seed multiplication to be built through provision of equipment such pumps for irrigating. In marketing they suggested a need for small size seed packages to meet different famers need in terms of quantity.

ZONAL SEED MULTIPLICATION

TABLE 7.4: DESCRIPTION OF SEED MULTIPLIERS AND MARKETERS IN THE SOUTHERN ZONE

Name	Since	Type	Crops	Quantity	Type of seed	Source of starter seed	Clients
Nawaje Farmers Group	2012	Group based enterprise	Bambara nuts; sesame green gram; groundnuts pigeon peas	320 kg; 0;0; 120 kg; 145 kg	QDS	NARI	Neighbour, Farmers and NARI
Umoja Farmers Group (Mnanje village)	1996	Group based enterprise	Groundnuts; maize Bambara nuts pigeon peas	1200 kg	QDS	NARI	ASA, NARI and Farmers
Songambele Group (Sisi kwa sisi village)	2012	Group of 16 (12 men and 4 women)	Groundnuts; maize; pigeon peas	80Kg of groundnut kernels Maize-started this season; Pigeon pea started this season	QDS	NARI and District Council	Farmers
Athman Rashid (Misufini village)	2008	Individual	Sweet potatoes (Local) Groundnuts (Local)	100 bags of s/potato vines (1.5 acres); 240 kg of groundnut Kernels (1.75 acres)	Informal I	Nearby village (local) Bought from neighbours	Farmers and businessmen (from Masasi and Nanyumbu District); Farmers and businessmen
Muungano group (Namasakata village)	2008	Group based (16 members; 11 men and 5 women)	Cassava (Kigoma red and Kitumbua) Green gram	350 bundles of 30 stems each (each stem 6 cuttings); 100 Kg of green gram	Informal	DAICO	Prisons, farmers Farmers
Said Kaisi Boma (Namasakata)	1997	Individual	Cassava	500 bundles of 30 stems each	Informal	Neighbours (farmers)	Farmers
Jitegemee Youth Group	2004	Group based enterprise	Maize; paddy; cowpeas groundnuts; sesame cashew nuts; vegetables	770 kg (rice, 2012) 107 kg (2013, sesame)	QDS	DADP's	Surrounding farmers, District Agricultural office
Halima Hamisi Pitimbi (Jitegemee youth group member)	2004	Individual	Paddy (TXD 306); maize (STAHA); pigeon peas (local); cowpeas (improved)	140 kg; 250 kg 140 kg; 100 kg	Informal	NARI; and own	Surrounding farmers
Omari Hamis Likalame (marketer) 0716 728242; 0687904080	2004	Individual	Maize; pigeon peas; cowpeas; sorghum; green gram	No records	Informal (Local Seed Business)	Farmers	Domestic consumers; Farmers
Juhudi Farme Group (Kitandi village)	Started 2004 under DANIDA	Group based enterprise	Sorghum; sesame; groundnuts maize; paddy; Bambara nuts; vegetables	600 kg (2012); 350 kg (2013); 30 kg (2013) 80 kg (2012)	QDS	DANIDA, (phased outs) DADPS, AKF,	District Agricultural Office
Juma Ally Athuman (Marketer) 0719 001802	2008	Individual	Cowpeas Sorghum Maize	(60 kg) (40 kg) (100 kg) Lack of record	Informal (LSB)	Wholesellers in the market	Domestic consumers; farmers

MAJOR CONSTRAINTS ENCOUNTERED IN SEED MULTIPLICATION:

Unfavourable weather due to climate change; unreliable market information; pests and diseases outbreak; labour extensive production; inadequate supply of starter seed; limited capacity to cultivate large seed production fields; limited advisory services; inadequate resources (financial and physical); lack of knowledge on quality seed multiplication; limited known market channels for planting material; inadequate supervision of seed market has led to seed producers compete unfairly with grain sellers; inadequate number of financial services providers to seed producers (credit and insurance). Others are difficulties to meet seed production farm isolation standards (100 m distance from other farms) due to other farmers growing similar crop around; inadequate technical know-how on post-harvest seed handling; lack of credit facilities; seasonality of business (Farmers buy between Dec & Jan); lack of proper seed package particularly for informal seed sector.

SUGGESTIONS AND OPPORTUNITIES FOR ENHANCED SEED MULTIPLICATION:

There are several opportunities for seed multiplication which are but not limited to introducing seed production mechanization (like provision of planters, harvesters, shelling, sorting and packing machines); availing drought tolerant varieties; starting cassava and sweet potato planting materials multiplication sites; providing quality starter seed of improved varieties from reliable source; assisting local seed producers on the process of registering as certified seed multipliers; training on seed multiplication; providing land in the village for farmer seed producer group; establishing demo plots for farmers to observe performance of different varieties before adoption; improving supervision of seeds marketing including building capacity of producer groups in terms of production and marketing; encouraging formation of local financial services providers (SACCOS and VICOBA). There is also a need to follow on seed production regulations at village level; need to set price differentiation between normal grains and seeds; need for a close supervision and support for farmer groups to attain proper packaging and labelling of the seeds.

ZONAL SEED SERVICE PROVIDERS

TABLE 7.5: ZONAL SEED SERVICE PROVIDERS

Name of service provider	Service provided	Focus crops	Seed System	Seed chain components
[7]Mangaka Farmers Centre (Attn: Mr. David Marijani Mobile no: +255787025352)	Sales of improved seeds; Sales of chemical fertilizers; Extension services especially on crop husbandry agronomic practices; Sales of veterinary medicines	Groundnuts, Green gram, Sorghum, Maize, Sesame, Horticultural crops	Informal and intermediary	Marketing
"Pembejeo za Kilimo" (Attn: Mr. Majid Sued Mobile no: +255786781932)	Sales of different types of improved seeds; Sales of agrochemicals	Horticultural crops; Maize; Sesame	Community-based	Marketing
Kariuki Agro dealer (Mobile no: +255 787 289 695)	Sales of improved seed; Sales of fertilizers	Maize; Sesame; Horticultural crops	Community-based	Marketing
District Crop Officer Nanyumbu (Attn: Frank Kwingwa Mobile no: +255 784 499 383)	Provide information on reliable agro dealers to farmers; Training farmers on different improved seed technologies	Maize; Cassava; Groundnuts Green gram; Rice; Cowpeas	Farmer-to-farmer	Production
Mumba Agro Store (0755849567 or 0684821955	Seed and Agrochemicals	Maize (200Kg); Sesame (100Kg); Vegetables	Community-based	Marketing
Madunda Agrovet Investment (0769339212 or 0719011703)	Seeds; and Agrochemicals	Maize; Sesame (obtained some from CDC and Songea) Vegetables	Community-based	Marketing
Bwana Yesu Asifiwe Store (0786549745)	Seeds; -Agro-chemicals; Advisory services	Sesame; Sunflower; Rice; Maize; Vegetables	Community-based	Marketing
District Seed Inspector	Inspecting seed multiplication fields and marketing; Inspecting seed stores; Training to agro-dealers; Advisory service to agro-dealers; To ensure seed quality (Condemn seeds which are below standard)	All crops grown in the district such paddy, maize, groundnuts, sesame, sorghum, Bambara nuts, pigeon peas, cassava, sweet potatoes	Intermediate (QDS, local seed business)	Multiplication and marketing
Mrisho Agrovet (0782192662)	Seeds and Agro-chemical	Maize, vegetables, rice	Farmer-saved	Marketing
Abdul Mfaume Lilanga	Sells legumes and cereals for both consumption and seeds	Bambara nuts, maize, pigeon peas, sorghum, green gram, beans	(Local seed business)	Marketing
Mattauna Agro-dealer	Seed sale and Advice on particular seed usage to buyers.	Maize; Sesame; Cowpeas; Vegetables	Community (maize, vegetables) Farmer saved (cowpeas); Farmer-to-farmer (sesame)	Marketing
Bakari Hamisi Panyangula (Kwa mjomba Selenge)	Seed sale and Advice on particular seed usage to buyers	Sesame; Maize	Community (maize) QDS (sesame)	Marketing
Mohamed Vicent Mpunga (Agro-dealer)	Seed sale and Advice on particular seed usage to buyers	Paddy; Maize; Vegetables	Community (maize, vegetables) Intermediate (Paddy)	Marketing

[7] In Nanyumbu district, Mangaka Farmers Centre managed to sale a total of 1.00 ton per season of different types of improved seed (Sesame = 250 kg; Maize = 400 kg; Groundnuts = 150 kg; Sorghum = 100 kg and Green gram = 150 kg)

MAIN CONSTRAINTS ENCOUNTERED IN SERVICE PROVISION:

Main constraints encounters by service providers are mainly on **costs** (i.e. farmers do not afford to get certified seed to produce QDS, transport costs lead to high seed prices, some seed prices are too high for most farmers to afford e.g. Sesame); **knowledge** (there is inadequate awareness on availability of improved technologies at farmers level, farmers do not save their seeds properly, most farmers groups are aware of isolation distance but somehow difficult to implement; insufficient knowledge on how to use seed as some customers do not understand varieties and agronomy of traded seeds, and insufficient information on where to get seeds of some varieties); **capacity** (there is low capacity in seed business skills; lack of training on seed issues e.g. production techniques); **governance** (the procedures for certified seed multiplication are bureaucratic); **quality control** (TOSCI which is sole institution responsible for seed inspection at multiplication stage is not easily accessible thus limits someone who needs to venture into seed multiplication, there is insufficient training to district seed inspectors which makes it difficult for them to enforce rules and regulations in case of violation in seed multiplication and marketing (e.g. some seed sellers in local markets sell both seeds; limited collaboration between DSIs and TOSCI. Poor germination rate of seed from some of companies discourage farmers on the use of improved seed but also may lead to conflict between the dealer and farmers; Centralised TPRI activities causing high cost and time lag).

Another constraint is **business and marketing** (packaging most of improved seeds are on large packets of 2 – 10 kg while farmers prefer small packets of 0.25 - 1.0 kg, seed companies have no agents in the zone therefore service providers travelled long distance upto Dar, Arusha or even Nairobi to secure seeds, it is difficult to sell vegetatively propagated crops i.e. cassava and sweet potatoes, in adequate seed production by ASA and other seed multipliers, there is less trust by farmers/customers in case of lack of proper packaging and labelling; some of seed package do not contain recommendations on seed usage; inappropriate taxation system whereby stockists are charged high taxes compared to realist business environment; complex registration and licensing procedures and also input business requires huge initial capital which is also a limitation to majority of small-scale traders who want to invest in this kind of business).

ZONAL SEED SECTOR PROJECTS

TABLE 7.6: ZONAL SEED SECTOR PROJECTS IN THE SOUTHERN ZONE

Name	Duration	Type	Seed system	Crops	Seed chain component	Services provided	Policy targets	Intervention area
Rural Oriented Sustainable Development Organization (ROSDO)	14 years	NGO	F2F, community-based	Groundnuts Maize Sesame	EGS, production and marketing	Funds not sufficient Marketing for produced improved varieties Shortage of staff and transport	Most of agriculture policy on seed related issues are not clearly understood by stakeholders in the seed chain	Zonal
SWISSAID	21 years	NGO	F2F	Groundnuts; Green gram; Pigeon peas Sorghum; Sunflower	Production	Price of improved seed is very high Seed storage facilities at farmer level; Demo plots from NARI should be increased	Training and education to stakeholders on seed policy	Regional
Masasi High Quality Farmers (MHQF)	6 years	NGO	2F2F and C-based	Sesame, Groundnuts, Green gram, Mucuna spp,	Production	Market reliability; Seed loan; Short training on seed production techniques	Most of agriculture policy on seed related issues are not clearly understood by stakeholders in the seed chain	District
ZARDEF	3 years	Public	F2F	Groundnuts	Production and marketing	Provision of seed in time	TOSCI & ASA decentralization	District
DADPS	1 year	Public	F2F	Paddy & Maize	Production and marketing	Availability and accessibility of certified seeds; Sensitization on the importance financially support QDS production, inspection and certification; Follow up of the seed producers e.g. Transport	-Availability of quality/improved seeds	Localities
Extension	1 year	Public	F2F	Cassava	Production and marketing	Financial services	Specific programmes should be made known to local policy makers	Localities
TL II	5 years	Public	F2F	Groundnuts	Variety development, production and marketing			Zonal
McKnight	5 years	Public	F2F	Groundnuts Bambara nuts	Variety development and EGS			Zonal

District Agricultural Development Programme Support (DADPS)	2007/08 – to date	Public	(QDS)	Sesame, groundnuts Cassava, Soybeans Sorghum (2012; Baraka); Cowpeas Maize; Sunflower Vegetables	Production and marketing	Approach (TOP – DOWN) selection of crops to work with should be participatory Need for Increase of basic and foundation seed production to meet demand	Need for strengthening TOSCI capacity Procedures for seed certification.	District
AGAKHAN FOUNDATION (Coastal Rural Support Programme Tanzania)	2009 – To date	(NGO)	(QDS)	Sesame Paddy	Marketing	To collaborate with key actors in the seed sector to increase seed production. E.g. (primary societies; Private companies like TANSEED and NGO's).	ASA should focus on regulatory roles only and leave seed production to Research Institutes and private companies; Strengthening capacity of TOSCI and ASA (Need for establishing sub-stations at zone level).	Zone (except Liwale and Tunduru districts).

SUGGESTED INTERVENTIONS FOR PRIORITY CROPS

TABLE 7.7: INTERVENTIONS FOR PRIORITY CROPS IN THE SOUTHERN ZONE

Cassava	Justification
Varieties: Build NARI capacity	Inadequate capacity of NARI in terms of resources
Production: Training local seed multipliers of cassava planting materials Strengthen farmer groups and use them for seed multiplication and dissemination Enable local multipliers to access planting materials of improved varieties Strengthen the system for cassava planting material multiplication and dissemination	Local multipliers do not have enough knowledge on procedure for multiplication of planting materials - Farmer groups are willing to multiply cassava planting material Limited capacity to cultivate large fields for planting material multiplication Farmers are asking for improved planting materials The system for cassava planting material multiplication and dissemination is not mainstreamed
Marketing: Introduce cassava trials and demonstrations in Tunduru District Awareness campaigns on the importance of using improved planting materials Strengthen linkage between producers and users (farmers) of planting material	There has never been cassava trials in Tunduru Farmers use local varieties which have low genetic potential and succumb easily to biotic and abiotic stresses; Presence of disease resistant cassava varieties at NARI There is information gap between multipliers and farmers (i.e. multipliers do not have enough information on where their materials are needed, and farmers also do not have information about where to get planting materials)
Services: Enable farmers to use experience from cassava DADPs groups	Existence of DADPs groups which deals with cassava planting material multiplication
Sorghum and Pigeon peas	**Justification**
Production: Establishment of irrigation schemes for rapid seed production particularly for pre-basic and foundation seeds. Capacity building of seed producers on production technical knowhow, post-harvest handling and also business management.	Due to climate change, rainfall has been becoming more and more unpredictable. Droughts and dry spells have becoming the order of day leading to partial or total losses of seeds in the farm. There since Ruangwa has numerous valleys, small irrigation schemes will minimize adverse effects of droughts and dry spells to seed producers. Seed producers have limited knowledge on production technical knowhow, post-harvest handling and also business management
Services: Encourage formation of self-help financial associations such as VIKOBA, SACCOS Mobilise more development partners to support seed development sector particular on sorghum and pigeon peas.	Most of seed producers do not have collateral to access loan from commercial Banks. Self-help financial associations will not only provide financial services at affordable terms but will also provide social collateral to seed producers. Currently, there is no project or programme supporting seed sector development; no improved seed available in the market
Policy: Enforcement of regulations governing seed production at village level. Need for advice of the Parent ministry to decentralise activities of ASA and TOSCI. Awareness creation and distribution of seed policy, act and regulations copies to seed producers Enhance seed system promotion through formation of seed producers, sellers and	Normally Seed production farms should be 100 m from other farms growing similar crop in order to avoid cross-pollination. It was reported by most of respondents that there was difficulties to observe the above regulation. Village government have not hitherto by laws governing seed farms. It has been very expensive to carry seed samples Morogoro (more 700 km distance from southern zone) for quality inspection and certification.The process is time consuming. ASA fail to meet zone seed demand priorities.

consumers networks	Majority of farmers and seed producers have limited knowledge on seed policy, act and regulations; also copies of the policy not available to most of key actors of seed sector. Policy makers rarely pay attention to remarks of individuals. But when individuals join together and form an organization, their views will easily be incorporated in either new policy formulations or amendment of the existing ones. The case is the same as far as seed policy is concerned
Sweet potatoes	**Justification**
Varieties: Build capacity of NARI in terms of resources Strengthen breeding programme for drought resistance	Low capacity of NARI to reach a wide range of farmers and other stakeholder in sweet potato value chain Possibility of unevenly distribution of rainfall due to climate change and variability
Production: Training local seed multipliers of s/potato planting materials Strengthen farmer groups and use them for seed multiplication and dissemination Improve accessibility of starter seed of improved varieties to local multipliers Sensitize more farmers to multiply sweet potato planting materials during dry season (to be used in the subsequent season)	Local multipliers have limited knowledge on seed multiplication protocols Farmer groups are willing to multiply sweet potato planting material Local multipliers use local varieties because of inaccessibility of improved planting materials There are many permanent rivers and low wet lands There is high demand for sweet potato planting material in the neighbouring districts (Nanyumbu and Masasi)
Marketing: Introduce sweet potato trials and demonstrations in Tunduru District Awareness campaigns on the importance of using improved planting materials Strengthen linkage between producers and users (farmers) of planting material Promote and disseminate sweet potato improved varieties	There are five newly released potato varieties at NARI and no trials and/or demonstrations for sweet potatoes in the district Farmers use local varieties which have low genetic potential and succumb easily to biotic and abiotic stresses There is information gap between multipliers and farmers (i.e. multipliers do not have enough information on where their materials are needed, and farmers also do not have information about where to get planting materials) No target promotion and dissemination of improved sweet potato varieties
Services: Organize on-job training for extension staff	Most newly recruited extension personnel have limited practical experience on planting material multiplication
Groundnuts	**Justification**
Promotion of improved groundnut small seed packets	Packaging of improved seed in small packets of 0.25 – 2.00 kg
Collaboration with NARI on new improved groundnut production technologies	Available new improved groundnuts technologies at NARI
To promote and link groundnut markets	Establishment of market information centre in the district
Aflatoxin mitigation in groundnuts Conducting research to address Aflatoxin issues)	- Aflatoxin mitigation practices available at NARI Use of box ridges and other mitigation for Aflatoxin, aflatoxin awareness
Collaboration with NGO`s to promote groundnut seed production	- Good number of NGO`s in the district which are working with farmers groups
Variety evaluation	- Assess improved germplasm for their adaptability across lots of environments to provide opportunity for farmers to select preferred varieties according to stress and circumstances faced
Availability of drought and rosette resistant varieties	- Fast rack multiplication of improved drought and rosettes resistant varieties and market preferred seed varieties
Improved groundnut storage	- Seed producers face rat problem in storing groundnut seeds until planting season
Communicating research results to wide audiences, farm radio, participatory video activity at Mnanje	- Mnanje needs a TV set for showing event s of on-farm trials to public.

Bambara nuts	Justification
To promote preparation and utilization of Bambara recipes	- Presence of Nutritionist with different types Bambara recipes
Collaboration with NARI on new improved Bambaranuts production technologies	- Available new improved groundnuts technologies at NARI
To invite NGO`s to promote Bambaranuts seed production	- There is good number of NGO`s in the district
To sustain legumes breeding programme at NARI	- Crosses of different legumes performed, maintenance and evaluation of germplasm is conducted and development of new varieties is on place at NARI
Collaboration with NARI to promote productivity and production	- New improved Bambara nuts technologies are available at NARI
To avail inputs especially seeds at affordable price	- Four new varieties of Bambaranuts released by December 2013 and available at NARI
Further evaluation of new improved germplasm of Bambara	- To provide more options for farmers to choose according to intended value chain
Bambara product development	- To increase utilisation of Bambara in different forms by different users/consumers

GAP ANALYSIS AND SOME MAIN CONCLUSIONS

TABLE 7.8: SUMMARY OF SEED INTERVENTION IN THE SOUTHERN ZONE, IDENTIFIED ON THE BASIS OF THE STAKEHOLDER INTERVIEWS, TO ALLOW FOR A GAP ANALYSIS

Cluster of seed systems	Seed multiplication and marketing		Seed services		Enabling environment (rules, regulations, policies and strategies)	
	Project / programme	Crops	Project / programme	Crops	Project / programme	Crops
Informal seed systems	Individuals	Cassava, sweet potatoes				
Intermediary seed systems	- FAO - ZARDEF - McKNIGHT - TL 2 - MIVARF - AKF - ROSDO - DADPs	- Cassava - Groundnuts - Groundnuts - Groundnuts - Green gram - Rice - Groundnuts - Paddy, Sesame (QDS), Groundnuts, Cassava, Soya bean, Sorghum (2012), Cowpeas, Maize, sunflower, Vegetables	- SWISSAID - WAKFU - McKNIGHT - TL 2 - NARI - District Executive Director - AKF	- Sunflower - Cashew nuts - Groundnuts - Groundnuts - Groundnuts - Paddy - Paddy and Sesame	- ROSDO - DADPS (Seed Inspector) - TOSCI	- Groundnuts, Bambara nuts, Sesame, Cashew, Maize - Sesame (QDS), Groundnuts, Cassava, Soya bean, Sorghum (2012), Cowpeas, Maize, sunflower, Vegetables - Sesame (QDS), Maize
Formal seed systems	ZARDEF	Groundnuts				

ANNEX 8: INTERNATIONAL SEED SYSTEM INTERVENTION PROJECTS IN TANZANIA

A number of international organizations including CGIR, ASARECA, AGRA and FAO have projects scattered across the six zones of mainland Tanzania targeted for a possible ISSD Tanzania Programme. The projects are mostly concentrated in eastern zone, where 8 out of the 22 projects are implemented, and proportionately spread across lake, central and northern zones and only one featuring in southern and western zones. All the prioritized crops seem to be covered though the intervention areas in seed chain vary with project and zone. None of the projects seem to have an integrated approach to the seed sector interventions. Rather they show a strong singular focus on formal or intermediate (QDS) with over 60 % of and a few on the informal system. Also most of them seem to be dwelling on variety development, seed multiplication and distribution where the service provided is on farmer training and capacity building and promotion of improved varieties. There is little evidence of specific intervention in seed policy and regulatory frameworks.

TABLE 8.1: INTERNATIONAL PROJECTS WITH INTERVENTIONS IN SEED SYSTEMS

Name	Duration	Type	Seed system	Crops	Seed chain component	Services provided	Policy targets	Intervention area
AGRA	Started 2010 ended 2013	Public	QDS	Maize, beans, soybeans, sweet potatoes and cassava	Multiplication Marketing	Improve farmers, organisation and marketing	Seed system to increase availability of quality seed	International Bukoba; Muleba; Misenyi; Biharamulo districts LZ
	2014	International project	Formal	Maize, beans and pigeon peas	Multiplication		KILIMO KWANZA-promotes rapid sustainable growth on smallholders farmers& support the govt effort-'including smart efforts'-subsidies programme that improve farmers access to seeds & fertilizers	International Babati, Arumeru, Karatu NZ
	2009 to date	Public and donor funded	Intermediate	Pigeon peas	Multiplication (Chain 1-5)	Farmers training and seed dissemination	Improves food security and livelihood of the farmers	International Eastern and Northern Tanzania EZ
ASARECA Sorghum and Legume intensification (SLI)	2011-2013	Public	Intermediate	Sorghum; cowpeas; green gram	Multiplication		Soil water management Striga management Soil fertility improvement	International CZ
	2011- 2013 2 years (ended)	Public	Formal certified	Sorghum and cowpeas	Variety development and seed multiplication	Scaling up of best practices and technologies validated (dissemination & scaling up of best practices & technologies)	None	International EZ
	2011	Public and NGO	Certified	Sorghum, cowpeas, green gram	Variety development	Promotion of developed varieties Extension services	Food Security Timely availability of seed to farmers	International NZ
ASARECA Pearl millet innovations project	Started 2012 Ended 2013	Public	Informal	Pearl millet	Multiplication	Capacity building Transport and logistics	-	International Located in Talaga ward NZ
	2011-2013	Public	Intermediate	Pearl millet, cowpeas	Multiplication	Increase coverage area	Soil water management Soil fertility improvement	International CZ

CIAT Promoting farmers' preference - yellow beans in Muleba	Started 2013 is ongoing	Public	Intermediate (QDS)	Common beans	Multiplication Marketing	More improved varieties for testing	Seed system to increase availability of quality seed	InternationalKimwani Kyebitembe Ngenge wards LZ
DONATA (Dissemination of New Agricultural Technologies in Africa)	2009 to date (ongoing)	Public and donor funded	Formal certified	Maize	Multiplication	Promotional activities Technologies dissemination Marketing	Scale-up proven agricultural technologies to contribute to food and nutrition security and economic growth in Africa	InternationalEastern and Northern zone EZ
DONATA Orange Flesh Sweet potato (OFSP)	Started 2008 Ended 2013	Public	Informal and QDS	Sweet potatoes	Multiplication of vines and roots	Rural extension Business management services coordination Marketing information and promotion	Rural extension services; quality assurance in seed production and trading; Marketing information and promotion	International Villages of Isamilo NangeMwalo gwabagole LZ
FAO (Cassava Disease Surveillance)	2010 to date 4 years (ongoing)	Public	Informal Intermediate (QDS and local seed business)	Cassava	Multiplication	Farmers varieties should be improved and developed not abandoned by multiplying new varieties	Fight cassava diseases Increase productivity to improve food security and income of the farmers	International EZ
ICRISAT Harnessing Opportunity Productivity Enhancement (HOPE)	2009-2013	NGO	QDS	Sorghum, finger millet	EGS; Multiplication; Marketing	Scaling up marketing of quality seed; Increase coverage area; Inclusion of P/millet in project mandate crops	Affordability, accessibility of quality seed, and market linkage; Food security; Striga control; Harmonisation of seed policy in East Africa	International CZ
	Started 2010 ended 2013	Public	Informal	Sorghum, millet	Multiplication	Capacity building Transport and logistics	-	International Located in 2 wards in 5 villages LZ
ICRISAT Sorghum for Multiple Use (SMU)	2010	Public and NGO	Certified	Sorghum	Variety development	Promotion of developed varieties Extension services	Food Security Timely availability of seed to farmers	International NZ
IITA	2013 -2016	Public	Intermediate	Cassava	Multiplication Marketing and processing	Mechanization	Seed Multiplication should be decentralized	International WZ-SARD
	2008-2010 (ended)	Public	Intermediate (QDS)	Cassava	Variety development	Variety development	Germplasm	International EZ-Kibaha

IITA Africa Rising- http://africa-rising.net/about	2003	International project	Formal	Beans	Multiplication	Extension services – transport Training to farmers	KILIMO KWANZA-To increase agricultural productivity and household livelihoods and conserving the environment for the next generation	International Babati, Karatu, Arumeru NZ
SIMLESA (Sustainable intensification maize and legume in South and Eastern Africa)	2010 to date (ongoing)	Public and donor funded	Intermediate (QDS)	Pigeon peas and maize	Variety development Multiplication (MALI and TUMIA)	Capacity building Upscaling technology on conservation agriculture	Aim to train farmers to use Conservation agriculture without tillage	International Eastern and Northern zone EZ
	2010 (to date)	Public	Intermediate and formal certified (for maize)	Pigeon peas, cowpeas and maize	Variety development and seed multiplication	Farmer's field days should be increased. Improve on the breeding aspects	None	International Zonal EZ
Striga control project	2012 to date	Public	Intermediate	Sorghum	Marketing and use	To increase coverage of the group and area.	Striga control	International CZ
TL II Tropical legume II Project	5 years	Public	F2F	Groundnuts	Variety development, production and marketing			International National SZ
	2008 to date 6yrs (ongoing)	Public	Formal certified	Cowpeas	Variety development and seed multiplication	From conventional breeding to Molecular marker assisted breeding Laboratory for genotyping	Rules and regulations for seed release should be simplified to speed up variety release	International Zonal EZ

ANNEX 9: NATIONAL SEED SYSTEM INTERVENTIONS

There are 24 national projects that have some seed system interventions. The projects are largely implemented by the public sector but a few by NGOs and private sector. The projects span across the target zones in mainland Tanzania but with a concentration in lake, eastern and northern zone. A wide range of crops is covered, including the target crops for an ISSD Tanzania programme. The main seed chain component being intervened upon is multiplication and distribution, and the main systems covered are intermediate and informal. Services provided are mainly on training of farmers and farmer groups, sensitization and supporting QDS production for the cereal, oil crops and grain legumes. There seem to be no intervention in areas of seed policy and regulations, early generation seed. All the projects that are working on vegetatively propagated crops are intervening in the informal system. However, other than activities on QDS, there is no indication of interventions to improve seed quality under the informal seed systems.

TABLE 9.1: NATIONAL PROJECTS WITH INTERVENTIONS IN SEED SYSTEMS

Name	Duration	Type	Seed system	Crops	Seed chain component	Services provided	Policy targets	Intervention area
ASDP DADP/DADIP DASIP District Agricultural (Sector) Development (and Investment) Programme	2006	Government /public	Informal	Bananas, beans	Multiplication Marketing	Rehabilitation of traditional canals; Sensitization of certified seeds	Food security and increasing income; Nutrition	National NZ
	2000-todate 2007-Kondoa 2006-Singida	Public	QDS	Maize, pearl millet, sorghum, sunflowers, pigeon peas	Multiplication Marketing	Training of farmers and seed inspectors on seed production; Expand the targeted group and crops covered; Regulate procedures in financial aspects	Affordability and availability of quality seed; Food security and accessibility of seed; Capacity building of farmers	National CZ
	2006	Public	Intermediate	Sorghum	Marketing	Late delivery of government funds i.e., timely availability of seed	Food Security policy; Promotion of Sorghum	National NZ
	Started 2009 (ongoing)	Public	Informal	Bananas	Multiplication Marketing	Improve transport facilities; increase human resource-extension officers; improve farmer organisation	Seed system to increase availability of quality seed	National Only in 10 villages out of 161 LZ
	2008-2013	Public	Informal	Cassava	Multiplication	Funds availability; Availability of multiplication centres at ward level; Introduction of sweet varieties; Improvements of extension services; Farmers training in Cassava processing	Laws protecting farms from livestock grazing	National Districts WZ
	1 year	Public	F2F	Paddy, maize	Production Marketing	Availability and accessibility of certified seeds; Sensitization on the importance financially support QDS production, inspection and certification; Follow up of the seed producers e.g. Transport	Availability of quality/improved seeds	District SZ
	2007 to date 7years (ongoing)	Public	Intermediate QDS, local seed business	Paddy, maize, wheat, sesame, sunflowers, beans,	QDS Multiplication	Improve on distribution mechanisms, so as to reach remote areas where farmers are located; also improve on transportation means	Sustainability of farmers after the project to phase out	Districts in EZ

				tomatoes, onions, amaranths, African egg plants, black night shade, groundnuts.				
	2008 – 2013	Public	Intermediate	Sorghum	Multiplication	Timely disbursement of funds	NIL	Districts in WZ
	2007/08 – to date	Public	QDS	Sesame, groundnuts Cassava, Soya bean Sorghum (2012; Baraka); Cowpeas Maize; Sunflower Vegetables	Production and marketing	Approach (TOP – DOWN) selection of crops to work with should be participatory; Need for Increase of basic and foundation seed production to meet demand	Need for strengthening TOSCI capacity; Procedures for seed certification.	District SZ
	Started 2009 and on-going	Public	Informal	Cassava *Maize	Multiplication Marketing	Rural extension; Quality assurance in seed production and commercialization; Business management services; Marketing information and promotion	Quality assurance in seed production and seed commercialization	District Village level LZ
ASSP Agriculture Service Support Project	Closed			Bananas, rice		Training		National Zanzibar
BMGF / Community Action in Cassava Brown Streak Control	2013 1 year (On going	Public and donor funded	Informal Intermediate (QDS and LSBs)	Cassava	Multiplication	More inspection to individual farmers' fields should be done to eradicate the disease	Increase productivity by fighting the diseases	National EZ
BTC Banana Project	2009-2013	Public	Informal	Bananas	Variety development Multiplication	Marketing and processing	Financial regulation at LGA`s	National WZ
GAFSIP / Global Agriculture and Food Security programme	Current		Intermediate	Rice		Training		National Za
Integrated Striga Management (ISM)	From 2013	Public	Informal and QDS	Sorghum	Multiplication	Rural extension facilitation for routine monitoring	Quality assurance in seed production and	National Ikome

							seed trading; Marketing information and promotion	Misasi Inonelwa Villages LZ
	Started 2012 and is ongoing	Public	informal	sorghum	Multiplication	Capacity building Transport and logistics		3 wards in LZ
MEDA Mennonite Economic Development Associates	Since 2012 to date (ongoing)	NGO	Intermediate (QDS)	Cassava	Multiplication	Enhanced cassava seed availability	None	National EZ
NACO (Namburi company)	2013 to date	Private	Intermediate	Sorghum and pearl millet	Multiplication Marketing	Further training of seed production; To increase coverage area and number of farmer	Market oriented contracted seed producers	National CZ
OFSP Seed multiplication project	2014 to date	Public	Intermediate	Sweet potatoes	Multiplication	n/a	Improve nutritional status & income generation	National CZ
PADEP Participatory Agriculture Development Programme	2005-2011	Government /Public	Informal	Bananas	Multiplication	Training on banana diseases control; Rehabilitation of traditional canals; Sensitization on certified seeds	Food security and increasing income; Nutrition	National NZ
	Closed			Bananas, rice		Training		National / Za
RAC Reaching Agents of Change	2013 1 year (ongoing)	NGO	Informal Intermediate (QDS and local seed business	Sweet potatoes (OFSP)	Multiplication	Promotion of orange fresh sweet potatoes	Nutrition, especially to children under five years-vitamin A	National EZ
SPRVP (Sweet Potato Rapid Vine Production)	2013 to date (ongoing)	Public and donor funded	Intermediate (QDS)	Sweet potatoes	Variety development Multiplication Marketing	Capacity building; Provision of inputs; Marketing	Directed at drought areas to contribute towards food security	National Lake zone (Shinyanga, Mwanza); EZ (Morogoro)
Voucher Subsidies Programme	2008	Public	Certified	Sorghum; sunflowers; paddy and maize	Marketing	Timely availability of seeds	Food Security Policy	National NZ

ANNEX 10: ZONAL AND DISTRICT LEVEL SEED SYSTEM INTERVENTIONS

At the zonal level, 19 projects that had some interventions in seed system were identified. At this level, there is a high involvement of NGOs and private sector as implementers compared to the international and national level projects. The seed systems covered are exclusively informal (farmer-to-farmer, community based) and intermediate. Broad ranges of projects including those targeted for a possible ISSD Tanzania programme are covered in these projects. With the exception of 3 projects that have some interventions on variety development and early generation seed, all the rest focus on multiplication and distribution of seed. Main services provided include rural extension and capacity building of farmers and farmer groups on different agricultural and seed production topics. No evidence of an integrated seed system intervention or addressing any policy and regulatory challenges. These projects are concentrated in southern followed by lake and eastern zones. As was the case with the international and national projects, none of these projects extend to Zanzibar.

TABLE 10.1: ZONAL AND DISTRICT LEVEL PROJECTS WITH INTERVENTION IN SEED SYSTEMS

Name	Duration (since)	Type	Seed system	Crops	Seed chain component	Services provided	Policy targets	Intervention area
Integrated Community Development Programme (ICDP) under Anglican church	Started 2011 and still ongoing	NGO	QDS	Sweet potatoes and cassava	Multiplication Marketing	Regular capacity building; Availability of soil testing kits; Establishment of net tunnels in the selected locations	System that increases availability of planting material	District Located in Tamau; Misisi Kitaramaka; Serengeti LZ Bitaraguro
Integrating HIV/AIDS with leguminous crops	Started 2005 has been running for 7 years, is now in its third phase- still ongoing	NGO	Informal	Chickpeas, green gram, groundnuts, cowpeas, Bambara nuts, pigeon peas;	Multiplication Marketing	Rural extension services; Quality assurance in seed production; Quality assurance in seed trade; Business management services; Marketing information and promotion	Increase supply of seed agrodealers to sell chickpea seed	District Village levels at Mwanashamba, Mbarika Iteje, Lubuga, Misungwi LZ
Kagera Agricultural and Environment Management Project: IPM and IPN	Started 1997 Ended 2004	Public	QDS and informal	Bananas, beans, maize, sweet potatoes, cassava	Multiplication	Start farmers', organisation into functional groups at an early stage of the project	Seed system to increase availability of quality seed	District in 5 divisions in Muleba LZ
Rural Oriented Sustainable Development Organization (ROSDO)	14 years	NGO	F2F, community-based	Groundnuts Maize Sesame	EGS, production and marketing	Funds not sufficient; Marketing for produced improved varieties; Shortage of staff and transport	Most of agriculture policy on seed related issues are not clearly understood by stakeholders in the seed chain	District SZ
AGAKHAN FOUNDATION (Coastal Rural Support Programme Tanzania)	2009 - To date	NGO	(QDS)	Sesame, paddy	Marketing	To collaborate with key actors in the seed sector to increase seed production. E.g. (primary societies; Private companies like TANSEED and NGO's).	ASA should focus on regulatory roles only and leave seed production to Research Institutes and private companies; Strengthening capacity of TOSCI and ASA (Need for establishing sub-stations at zone level)	District (except Liwale and Tunduru districts). SZ

Kagera Community Development Programme (*KCDP*)	1998-2004	Public	Informal	Bananas	Multiplication Marketing	Seeds should be supplied as per farmer demands (Variety and taste)	The seed policy for vegetative propagated crops on final stage will promote ISSD but should also look at banana.	District Bukoba and the Kagera, and Tarime district in Mara region. LZ
BUMACO-RUFIP	2006	Private	informal	Bananas	Multiplication of sackers and marketing of bananas	Training for seed Dissemination; Quality and less resistance diseases banana seed variety; Marketing of bananas	Food security and income increasing to farmers	District Locality only in some parts of Moshi District council NZ
SWISSAID	21 years	NGO	F2F	Groundnuts; green gram, pigeon peas, sorghum, sunflowers	Production	Price of improved seed is very high; Seed storage facilities at farmer level; Demo plots from NARI should be increased	Training and education to stakeholders on seed policy	District SZ
Masasi High Quality Farmers (MHQF)	6 years	NGO	2F2F and Community-based	Sesame, groundnuts green gram, Mucuna spp	Production	Market reliability; Seed loan; Short training on seed production techniques	Most of agriculture policy on seed related issues are not clearly understood by stakeholders in the seed chain	District SZ
ZARDEF	3 years	Public	F2F	Groundnuts	Production and marketing	Provision of seed in time	TOSCI & ASA decentralization	District SZ
Extension	1 year	Public	F2F	Cassava	Production and marketing	Financial services	Specific programmes should be made known to local policy makers	District SZ
McKnight	5 years	Public	F2F	Groundnuts, Bambara nuts	Variety development and EGS			District SZ
DADPS (District Agricultural Development Plans)	2007 - 2008	Public	Informal	Sweet potatoes	Multiplication	Timeliness in fund disbursement; Training in multiplication; Transparency in project management	-	District, zonal WZ
VECO-TANZANIA	2013	NGOs	informal	Horticultural crops, beans, paddy	EGS, multiplication and marketing	Training on good agricultural practices; Dissemination of improved seed in horticultural crops Market linkage	Food security and increasing income; Nutrition	District-Moshi District council NZ

QDS project in Kondoa	2009-2013	Public	ODS	Maize, pearl millet, sorghum, sunflowers. pigeon peas	Multiplication marketing	Training seed inspectors and farmers	Facilitate dissemination and market linkage.	Districts in CZ
CARITAS (Cassava Steam Production)	5 years (ongoing)	NGO	Informal Intermediate (QDS and local seed business)	Cassava	Multiplication	Kizimbani variety should be developed	Production of quality cassava steams; Increase productivity to improve food security and income of the farmers	Districts in EZ
ETG (Export trading Company Ltd)	2013 to date (ongoing)	Private	Informal and intermediate	Pigeon peas	Marketing	Enhanced markets for pigeon pea seed	None	Districts in EZ
Seed multiplication project	1995-2000	NGO (religious based).	Informal	Sorghum	Multiplication	Farmers training on seed multiplication; Farmers mobilization and awareness creation	NIL	Districts in WZ