



The Republic of Uganda

**MINISTRY OF AGRICULTURE, ANIMAL INDUSTRY
AND FISHERIES**

NATIONAL SEED STRATEGY

2018/19 - 2022/2023

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Acronyms & Abbreviations

AEATREC	Agricultural Engineering and Appropriate Technologies Centre
ARIs	Advanced Research Institutions
ASBP	African Seed and Biotechnology Program
ASSP	Agriculture Sector Strategic Plan
ATAAS	Agricultural Technology and Agribusiness Advisory Services
AU	African Union
BoU	Bank of Uganda
CAADP	Comprehensive Africa Agricultural Development Programme (AU)
CBD	Convention on Biological Diversity
CGB	Community Gene Bank
CIAT	International Centre for Tropical Agriculture
COMESA	Common Market for Eastern and Southern Africa
CSO	Civil Society Organisation
DAO	District Agricultural Officer
DCIC	Department of Crop Inspection and Certification
DSIP	Development Strategy and Investment Plan
FDI	Foreign Direct Investment
FGs	Farmer's Groups
FOs	Farmers' Organisations
IARCs	International Agricultural Research Centres
IPPC	International Plant Protection Convention
IPR	Intellectual Property Rights
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
LSB	Local Seed Business
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MDA	Ministries, Departments and Agencies
MFPEd	Ministry of Finance, Planning and Economic Development
MGLSD	Ministry of Labour, Gender and Social Development
MIA	Ministry of Internal Affairs
MJCA	Ministry of Justice and Constitutional Affairs
MODP	Ministry of Disaster Preparedness
MWT	Ministry of Works and Transport
NAADS	National Agricultural Advisory Services
NARES	National Agricultural Research and Extension Systems
NARI	National Agriculture Research Institute
NARO	National Agriculture Research Organization
NEPAD	New Partnership for Africa's Development
MDGs	Millennium Development Goals
NPA	National Planning Authority
NSB	National Seed Board
NSCS	National Seed Certification Service
NSS	National Seed Strategy
NVRC	National Variety Release Committee

OPM	Office of the Prime Minister
PBA	Plant Breeders' Association
PBR	Plant Breeders' Rights
PGRC	Uganda Plant Genetic Resources Centre
PGRFA	Plant Genetic Resources for Food and Agriculture
PPB	Participatory Plant Breeding
PPP	Public/Private Partnership
PPPP	Public/Private/People Partnership
PVP	Plant Variety Protection
PVPO	Plant Variety Protection Office (under MAAIF)
PVS	Participatory Variety Selection
QMS	Quality Management System
SACCOs	Savings And Credit Cooperative Organizations
SQCC	Seed Quality Control and Certification
SMTA	Standard Material Transfer Agreement (ITPGRFA)
SSES	Single Spine Extension Services
TRIPS	Agreement on Trade-Related Aspects of Intellectual Property Rights
UNCST	Uganda National Council of Science and Technology
UBOS	Uganda Bureau of Statistics
USSIMS	Uganda Seed Sector Information Management System
USTA	Uganda Seed Trade Association.
UNADA	Uganda Agro-inputs dealers Association
ZARDI	Zonal Agricultural Research and Development Institute

/ Introduction

1.1 Background to the National Seed Strategy

In 2016, the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) finalized the drafting of the National Seed Policy (NSP). The NSP outlines the vision, mission, goal, strategic objectives and strategies to boost the performance of the seed subsector. To operationalize the Policy, MAAIF has formulated the National Seed Strategy (NSS). NSS elaborates action and plans to achieve the seed policy objectives. The NSS analyzes the current situation in the seed sub-sector, provides the strategic direction, outlines the activities, presents a budget and describes the implementation arrangements. The strategic areas where government will focus its investment include: research for development of high productive varieties to enhance agricultural productivity; strengthening the capacity of the seed value chain actors to accelerate the performance of the seed sub-sector; seed quality control to protect farmers and promote Uganda's competitiveness in the local and global seed market; and to increase the availability of information and knowledge in the whole seed system.

1.2 National Seed Strategy Objectives

The overall objective of the strategy is to develop a pluralistic, competitive and vibrant seed system that will contribute to increased agricultural productivity production and development. To realize this, the specific objectives of NSS are:

- i. Generate new commercial and food security varieties;
- ii. Sustainably utilize and protect national plant genetic resources;
- iii. Multiply high quality seed under the formal seed system;
- iv. Enhance the production of quality seed within the informal system;
- v. Strengthen seed distribution and marketing to enhance the commercialization of quality seed;
- vi. Enhance the national competitiveness in regional and international seed trade to contribute to economic growth;
- vii. Ensure quality control along the seed value chain;
- viii. Develop human resource for the seed sector development; and
- ix. Establish a Seed subsector Integrated Information Management System (SIIMS).

1.3 The Guiding Principles

The implementation of NSS will be guided by the following principles:

Alignment:

This principle is in line with Vision 2040, National Development Plan, the National Agriculture Policy (2013), Agricultural Sector Strategic Plan (ASSP) and other related policy frameworks.

Private sector-led system:

In line with the government's privatisation policy, commercial activities of seed production, conditioning, marketing and distribution shall be the responsibility of the private sector. The Government will provide an enabling environment to promote growth for all categories of private sector entities; including national and multi-national seed companies, small local seed enterprises and service providers; while protecting all seed users.

Pluralistic:

The seed sub-sector will allow diversity of actors and systems as long they conduct their business in accordance with the laws and regulations. The provision of services will be carried out in a well-coordinated manner that ensures public, private and other non-state actors' involvement.

Gender and Equity:

Beneficiary targeting will be based on the principles of gender equity and fairness.

Financial Realism:

To ensure sustainable availability of, access to, and affordability of high quality seed; entails seed produced in a cost-effective way using schemes with low transaction costs.

Basing on the above background, the strategy will be implemented within the existing policy and regulatory framework, at national, regional and international levels. It will also encompass the existing and evolving seed systems to enhance the performance of the agricultural sector.

2. Situation Analysis

2.1. Policy and Regulatory Environment

In order to realize the vision and mission of the seed subsector articulated in NSP, a conducive policy and regulatory environment is a pre-requisite. This section analyses the current policy and regulatory environment for the seed sub-sector within national, regional and international contexts. Key constraints and opportunities that NSS will address are identified.

2.1.1 Policy Environment

a) National Context

Vision 2040:

Envisages a transformed Ugandan society from a peasant to a modern and prosperous country within 30 years. The goal is to change the country from a predominantly low income to a competitive upper middle income country within 30 years. It recognizes agriculture as one of the key drivers for enhancing national development by transforming agriculture from smallholder subsistence production to commercial production. The availability, access and use of high quality seed will make a major contribution to this aspiration.

The National Development Plan (NDP):

The second NDP (2015/16 – 2019/20) prioritizes agriculture as a vehicle for wealth creation. The main thrust during the period will be increasing agricultural production and productivity; addressing challenges in selected technical areas including seeds, mechanization, water for production and fertilizer production and application, as well as strengthening MAAIF and its institutions and creating an enabling environment.

National Agricultural Policy (NAP) 2013:

NAP was developed to guide all actors in the agricultural sector to make investments that will increase agricultural incomes, reduce poverty and improve household food and nutrition security, create employment and stimulate overall economic growth. Among the strategic thrusts for achieving these outcomes is strengthening capacity in technical areas of agriculture such as seeds, agrochemicals (including fertilizer), water for production and mechanization.

Agricultural Sector Strategic Plan (ASSP):

ASSP is the key instrument for operationalizing NDP and NAP. It focuses on enhancing the performance of the agricultural sector and its contribution to the national economy in terms of poverty reduction, food and nutrition security as well as employment. The strategy also looks at the challenges to agricultural performance as well as the need to strengthen public and private institutions concerned with development of the agricultural sector. It lays down the investment plans and development strategies. ASSIP is further elaborated into Framework Implementation Plans (FIPs) including one for seeds and planting materials.

2.1.2 Regulatory Environment

The Seed and Plant Act, 2006:

This law was enacted to provide for the promotion, regulation and control of variety release and multiplication, conditioning, marketing, importing and quality assurance of seeds and planting materials. It establishes the National Seed Board (NSB) and National Seed Certification Service (NSCS), under MAAIF, as the consultative and executive bodies for implementation of the Act, respectively.

The Plant Variety Protection Act, 2014:

Provides for promotion and development of new plant varieties and their protection as a means of enhancing breeders innovations and rewards through granting of plant breeders rights and other related matters.

Plant Protection and Health Act, 2016:

Consolidates and reforms the law relating to protection of plants against destructive diseases, pests and weeds, to prevent the introduction and spread of harmful organisms that may adversely affect Uganda's agriculture and regulate export and import of plants and plant products so as to protect and enhance international reputation of Uganda's agricultural products including seed.

National ABS Regulations, 2005:

The National Environment (Access to Genetic Resources and Benefit Sharing) Regulations, 2005, provides for Genetic Resources transfers under the authority of Uganda National Council of Science and Technology (UNCST).

The Biotechnology and Bio-safety Bill, 2012:

The objective of the Bill is to provide a regulatory framework that facilitates safe development and application of biotechnology.

b) Regional Context

Comprehensive Africa Agricultural Development Programme (CAADP), 2003:

Endorsed by the Africa Union (AU) Heads of States and Governments in 2003, CAADP is Africa's policy framework for agricultural transformation, wealth creation, food security and nutrition and economic growth. It is an integral part of the New Partnership for Africa's Development (NEPAD).

African Seed and Biotechnology Programme (ASBP), 2007:

Endorsed by the AU Heads of States and Governments in 2007 has the overall goal to contribute to increased food security and nutrition and poverty alleviation in Africa through the establishment of effective and efficient seed systems and enhanced application of biotechnologies and methodologies within the seed sector.

African Union Commission Communiqué on Integrated Seed Sector Development (ISSD), 2011:

Endorsed by the AU Commission as part of efforts towards the implementation of the ASBP.

c) International Context: Treaties and Policies

The International Plant Protection Convention, 1951: Overseen by the Food and Agriculture Organization (FAO), aims to prevent and control the introduction and spread of pests of plants and

plant products. It sets the standards for the issue of International Phytosanitary Certificates under the authority of the National Phytosanitary Services of member state.

International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA):

Implements the Convention on Biological Diversity (CBD)-Nagoya protocol for PGRFA, addressing the conservation and sustainable use of PGRFA and the fair and equitable sharing of the benefits arising out of their use. The Treaty established the multilateral System of Access and Benefit-sharing to facilitate plant germplasm exchanges and benefit sharing through Standard Material Transfer Agreement (SMTA).

The Cartagena Protocol on Biosafety to the Convention on Biological Diversity

Is an international agreement which aims to ensure the safe handling, transport and use of living modified organisms (LMOs) resulting from modern biotechnology that may have adverse effects on biological diversity, taking into account risks to human health.

Agreement on Trade-Related Aspects of Intellectual Property Rights, 1994 (TRIPS):

Administered by the World Trade Organization (WTO), sets out minimum standards for intellectual property rights (IPR) regulations as applied to nationals of other WTO members, including IPR on new plant varieties.

The analyses of the policy and regulatory environment presented above show that there are adequate and supportive frameworks for the seed sub-sector to flourish.

2.2 Constraints and Opportunities

Although there is an enabling policy and regulatory environment in place, there are constraints that hinder the seed subsector. At the same time there are opportunities that need to be seized to transform Uganda's seed sub-sector into a vibrant industry.

The key constraints include the non-operationalization of the Seed and Plant Act. This requires a range of instruments – seed and plant regulations and a national seed strategy, which are critical for the full implementation of the National Seed Policy. Limited financing has also played a part in hampering the implementation of the Seed and Plant Act. This strategy provides a number of interventions to operationalize the Seed and Plant Act.

Institutions to operationalize the seed policy face a range of challenges. For instance, the National Seed Certification Services (NSCS) which is mandated to assure the quality of seed and to make Uganda competitive; lacks the necessary financial and technical capacity to do so. This strategy proposes a wide range of actions to enhance the capacity of NSCS to fully play its role of guaranteeing seed quality and protect farmers.

The National Seed Board (NSB) – though constituted is not fully mobilised to implement its mandate. There is inadequate coordination between the National Agricultural Research Organization (NARO) and Uganda National Council of Science and Technology (UNCST) in the acquisition of plant germplasm to enhance crop improvement. This strategy provides options for strengthening coordination and empowering these entities to function more efficiently.

The registered seed companies lack the necessary capital to expand their seed businesses due to the high cost of agricultural financing. The Uganda Seed Trade Association (USTA) that is supposed to coordinate the activities of the seed companies is also constrained by lack of resources. This strategy will provide opportunities to ensure that USTA plays its role in creating a well-coordinated private seed industry in Uganda.

The National Forest Authority (NFA) which is mandated to produce and manage forestry seed needs to strengthen links with MAAIF to develop a coherent programme for enhancing tree and crop seed systems.

2.3 Seed Systems

There are two co-existing seed systems through which seed and planting materials are availed to farmers in Uganda. These are the formal and informal systems.

2.3.1 Formal system

The formal system is responsible for improved and certified seed production through structured systems of variety development, release, multiplication, quality control, distribution, and marketing. The major players are public institutions (government ministries and agencies, international and national research organisations); and the private sector. The formal system is estimated to contribute 15% of seed planted. The currently regulated certified seed classes are pre-basic, basic and certified, with high Seed Quality Control and Certification (SQCC) standards.

The NSCS regulates the formal seed sector from variety listing through to seed certification. Certified seed is produced by more than 35 locally registered seed companies with total estimated production of 18,000 MT of seed per year. Agro-input dealers carry out seed distribution and marketing. The formal system also covers international seed trade, involving imported seed such as horticultural crops (vegetables and flowers) for the domestic market, and seed exports (mainly maize) to regional markets. Semi-autonomous government bodies facilitate the production and sale of seed/planting materials of mainly cash crops (tea, coffee and cotton) to smallholder farmers. These include the Uganda Coffee Development Authority (UCDA) and Cotton Development Organization (CDO). These entities have their own internal quality controls independent of NSCS and operate within a closed seed system.

For other cash and export crops produced on a large-scale such as oil palm, sugarcane, and tobacco; companies in the sector manage plant propagation and sale along with other aspects of the value chain. This vertical integration has well-established voluntary regulatory mechanisms. Uganda's tea sub-sector has both smallholders (for which government is involved in research and seedling supply) and large producers who manage their own planting materials.

The NSS will facilitate access to foreign varieties adapted to Uganda's agro-ecological conditions through:

- a) granting of plant breeder's rights;
- b) facilitating International Seed Testing Association (ISTA) accreditation of the national seed laboratory;
- c) strengthening of National Phytosanitary Services;
- d) harmonisation of variety registration with the Common Market of Eastern and Southern Africa (COMESA) member states with operationalization of Common Catalogues; and

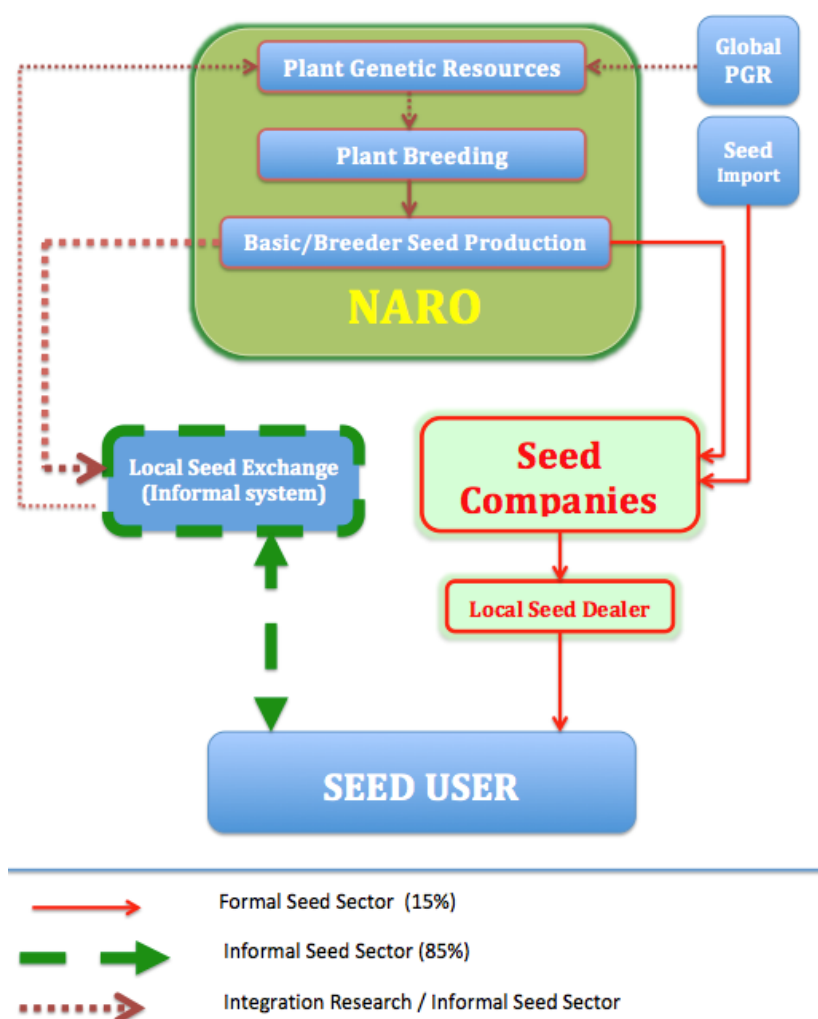
e) harmonisation with COMESA seed standards and SQCC regulations.

2.3.2 Informal system

The informal system also referred to as a local seed system, is based on farmer-saved seed where farmers themselves produce, disseminate, and access seed directly from their own harvest that otherwise would be sold as grain. The process is through exchange and barter among friends, neighbours, and relatives; and sale in rural grain markets. Varieties in the informal system may be improved varieties originally sourced from the formal system or they may be landrace varieties developed over time through farmer selection. The same general steps or processes take place in the local system as in the formal sector (variety choice, variety testing, introduction, seed multiplication, selection, dissemination and storage); but they take place as integral parts of farmers' production systems rather than as discrete activities. While some farmers treat "seed" as special, there is not necessarily a distinction between "seed" and "grain." The steps do not flow in a linear sequence and are not monitored or controlled by government policies and regulations. Rather, they are guided by local technical knowledge and standards and by local social structures and norms. The informal system contributes up to 85% of the seed planted. Women play a pivotal role in this system as they are involved in variety selection, multiplication, seed condition, marketing, and contribute significantly to food security.

The linkages between the two seed systems are shown Fig 1.

FIG 1: Seed flows in formal and informal seed systems in 2014



2.3.4 Public support to the Informal sector

At this phase of seed sub-sector development where certified seed is not accessible to all farming households, it is important to ensure that quality seed is made available from other sources as capacity is built to increase availability, accessibility and affordability.

MAAIF, through NARO Institutes and extension service, provides improved varieties to farmers for further multiplication in the informal system. The latter is being progressively improved through market-oriented farmer groups with support from Non-Governmental Organisations (NGOs). The farmers groups produce seed of particular standard largely based on local quality control and trust. These improvements also include local community activities for maintaining traditional varieties.

Zonal Agricultural Research and Development Institutes (ZARDIs) are supporting farmer groups, through participatory variety selection (PVS) and establishment of local seed businesses (LSBs). The LSBs are being technically equipped to transition into the formal seed system by expanding their production, establishing a brand name, and marketing their seed. MAAIF ensures quality control through District Agricultural Officers (DAOs).

The seed systems constraints and opportunities are presented in Table 2.3

Table 2.3 Seed Systems Constraints and Opportunities

System	Constraints	Opportunities
Formal Systems	- Official Seed SQCC not fully functional - Seed companies lack skills in SQCC	- Seeds and Plant Act provides for Public-Private partnership (PPP) in SQCC - PPP in SQCC provides for training of Seed Companies staff in quality control
Informal Systems	- No SQCC. - Lack of knowledge and resources - Current seed classes not competitive for the main crops in the informal system. - NARO seed distribution to the informal system not optimally used.	- Seeds and Plant Act provides for regulation of seed classes as needed - New QDS seed class to formalise current informal seed production - Farmers motivated in learning and in establishing seed business within proximity of seed buyers

2.4 Seed production 2014

NARO is currently the main supplier of basic seed of new varieties. However, inadequate funding and institutional challenges hinder the production of the volumes required by seed multipliers. Private seed companies and all other seed producers are therefore, vulnerable to challenges that NARO faces in this regard. Seed estimates and production for a range of crops in 2014 are presented in Table 2.4.1

Table 2.4.1 Seed production 2014

Table 2.4.1 Seed production 2014

Crop	Estimated annual seed use	Formal system		Informal System	
	MT (1,000 units)	MT (1,000 units)	%	MT (1,000 units)	%
Banana	50,978	0	0	50,978	100
Maize OP	17,655	6,000	34	11,655	66
Maize Hybrid	8,000	8,000	100	0	0
Beans	90,368	4,000	4	86,368	96
Sweet potatoes	140,639	0	0	140,639	100
Cassava	2,115,148	0	0	2,115,148	100
Groundnuts	36,234	500	1	35,734	99
Sorghum OP	7,128	900	13	6,228	87
Sorghum Hybrid	0	0		0	
Sesame	2,856	50	2	2,806	98
Sunflower OP	1,053	100	9	953	91
Sunflower Hybrid	40	40	100	0	0
Millet	1,595	200	13	1,395	87
Soybeans	9,348	300	3	9,048	97
Sweet bananas	4,163	0	0	4,163	100
Irish potatoes	213,120	0	0	213,120	100
Pigeon peas	1,487	0	0	1,487	100
Cotton	726	0	0	726	100
Rice	8,064	2,000	25	6,064	75
Cow peas	854	5	1	849	99

Data for 17 main crops excluding Coffee. Bananas replanting each 25 year (65,000 out of 1,600,000 Ha).

SOURCES:

- Estimated seed use derived from FAOSTAT, total area harvested per crop and year (2009-2011) times seed rate;
- Formal system: seed produced by Ugandan registered seed companies and derived from data from USTA and NSCS: Seed Crops Planting returns 2014
- Informal system is derived from deducting the formal system from the total seed use

Crop	Estimated annual seed use	Formal system		Informal system	
	MT (1,000 units)	MT (1,000 units)	100%	MT (1,000 units)	100%

Seed Production constraints and opportunities are presented in Table 2.4.2

Table 2.4.2 Seed production Constraints and Opportunities

System	Constraints	Opportunities
Formal System	- Only producing on seed for high value commercial crops (hybrids, vegetables and flowers) - Shortage of basic seed	- Production of the second round of commercial seed (CII) class will reduce by 95 % the needs for basic seed - Allowing marketing of pre-basic seeds will reduce breeder seed demand in another 95 %, - Introduction of QDS provides opportunity to produce and market seeds of other commercial crops not attractive to seed companies.
Informal system	- Highly dependent on NARO to improve seed quality - Low investment in research of most food security crops	- Emergence of market-oriented local seed producers will increase use of quality seed in smallholder farming communities.

2.5 Seed Uptake/Use

The level of uptake of certified seed is very low, only 5 % (corresponding to 80% of formal hybrid maize seed). This is partly due to inadequate capacity in SQCC of the formal sector and low consumer confidence in certified seed. Seed uptake in 2014 is presented in Table 2.5.1, while constraints and opportunities are shown in Table 2.5.2.

Table 2.5.1: Seed uptake 2014

Annual Seed uptake	Total needs	Formal sector	Informal sector
Total area (ha)	5,144,917	737,861 (15%)	4,407,056 (85%)
Total area (ha) plantlets excluded	4,648,367	737,861 (16%)	3,910,506 (84%)
Data for 17 main crops excluding Coffee. Bananas replanting each 25 year (65,000 out of 1,600,000 Ha) SOURCES: FAOSTAT, Total area Harvested per crop and year (2009-2011) USTA: Formal sector seed production NSCS: Seed Crops Planting returns 2014			
35% of formal sector seed is currently certified: 5 % of total Area			

Table 2.5.2: Seed uptake Constraints and opportunities.

System	Constraints	Opportunities
Certified Seed	- Chronic shortages of Certified seed	- All formal seed could be certified if PPP in SQCC is set up under this NSS and - New seed classes can be provided for crops where certified seed class is not competitive (CII and QDS)
Uncertified Seed	- A source of counterfeit seed	- Strengthening capacity of NSCS

2.6 Distribution and Marketing

It is estimated and broadly accepted that counterfeit/fake seed accounts for 30-40 % of the seed offered for sale in Uganda. NSCS, which is mandated to enforce regulations against counterfeiting/faking seed lacks the necessary means to do so. Moreover the penalties for seed counterfeiting are not deterrent enough. Delivery of seeds to farmers is not done in time, mainly due to the high cost of distribution to widely disperse small farmers and a weak network of seed dealers. Seed price is often not competitive as the returns for seed use (outputs) are low and this is compounded by the inadequate availability and high cost of other complementary inputs such as fertilisers and pesticides. Constraints and opportunities are presented in Table 2.6

Table 2.6: Seed distribution and marketing constraints and opportunities table

Issue	Constraints	Opportunities
Counterfeit/Fake seed	- High prevalence in the market.	- Tougher laws and regulations to make sale of counterfeit /fake seed a highly risky business. - MAAIF police to mobilise, coordinate and build the capacity of local police forces to fight the vice.
Distribution networks	- Insufficient distribution networks	- Seed companies willingness to improve marketing channels. - Farmers groups willing to enter seed businesses.

2.7 Seed Quality and Regulations

SQCC require official inspection of almost all the operations of seed production. Contracted seed growers are required, without intervention of the seed merchant (Seed Company or cooperative) to request registration under the NSCS to plant a seed crop. Official controls include testing of the harvested product, permission to transport the seed to the seed company, official order to process the seed and supervision of seed processing and conditioning. This increases transaction costs to seed companies who have to pay for these services. International standards for SQCC of basic and certified seed only require official field inspection and seed sampling and testing.

2.8 Seed Knowledge and Science

Uganda's scientists pursuing higher degrees specialize mainly in plant breeding, biotechnology and crop protection. Until recently, other disciplines such as seed sciences have not been receiving equivalent attention. For example, Makerere University has established a regional program for Masters of Science in Plant breeding and Seed systems. AGRA and RUFORUM (a consortium of 33 institutions of higher education) provided the initial support. The goal of the program is to produce functional plant breeders who are able to design and efficiently conduct variety development activities with a minimum of supervision; have sufficient theoretical training to continue self-learning and; qualified to undertake a PhD programme at a world class institution.

Additionally a consortium of International Agricultural Research Centres (IARCs), Advanced Research Institutions (ARIs) and National Agricultural Research and Extension Systems (NARES) offer focused short-term courses in seed production and deliver extended online mentoring and advice. Currently, information documentation, sharing and usage among seed sector stakeholders are limited. This needs to be addressed not only through physical improvements such as the building of advanced online data and information services, but more importantly by strengthening the information capacities of stakeholders at the production end of the value chains. This requires an operational knowledge-sharing platform.

In order to develop an efficient competitive seed industry in Uganda, human resource capacity in seed science and an efficient knowledge sharing platform is indispensable. A knowledge-sharing platform facilitates the connections between multi-stakeholders innovations and makes it possible for staff to act as the managers of knowledge at their disposal. It is frequently observed that in the absence of a proper knowledge sharing mechanism, large quantities of fragmented data and information which has the potential to support the mission lie untapped. Hence, it is important to mobilize this information in formal, but easily accessible ways. This knowledge-sharing platform will enhance awareness of stakeholders including researchers and end users (consumers and farmers) thus enhancing seed sector impacts in agricultural productivity. Constraints and opportunities are presented in table 2.7.1.

Table 2.7.1: Seed Science and knowledge constraints and opportunities

Issue	Constraints	Opportunities
Seed knowledge sharing	- Weak or absence of knowledge sharing among stakeholders.	- NSCS can host a web- based knowledge sharing platform for all stakeholders
Training of Seed Scientists	- Seed science not emphasised in crop science courses.	- Development partners offer grants for post-graduate training in plant breeding and seed systems including seed technology. - A consortium of international agricultural research centres offering short-term courses in seed science skills to existing staff at national research centres and seed companies. - Accessibility to information platforms.

Issue	Constraints	Opportunities
Seed Companies	- Lack of seed technologists among their staff. - Lack of connectivity to appropriate information platforms.	- Expression of urgent need for seed technologist in seed would attract support. - Linkages to an efficient information and knowledge sharing platform. - Use of emerging user-friendly ICT technology such as web to mobile smart phone information exchange.
Farmer's communities	- Lack of basic knowledge about seed issues.	- Linking farmer groups (including women and youth) to information and knowledge sharing platform. - User-friendly information pathways, short-term training in priority skills.

3. The Strategic Direction

3.1. Strategic Thrusts

The strategic thrusts are under four components as defined in the seed policy with a number of objectives (Table 3.1).

Table 3.1 National Seed Strategy Components and Objectives

Components			
1. Strengthen Research and Development for the seed sub-sector	2. Strengthen the capacity of key seed players along the seed value chain	3. Strengthen the seed quality control system along the value chain	4. Enhance knowledge and information management for the seed sub-sector
Objectives			
1.1 To generate new commercial and food security varieties. 1.2 To sustainably utilize and protect Uganda's national plant genetic resources	2.1 To multiply high quality seed under the formal seed system. 2.2 To enhance the production of quality seed within the informal system. 2.3 To strengthen seed distribution and marketing to enhance the commercialization of quality seed 2.4 To enhance the national competitiveness in regional and international seed trade to contribute to economic growth	3.1 To ensure quality control along the formal seed value chain. 3.2 To ensure quality control along the value chain for Quality Declared Seed.	4.1 To develop human resource for the seed sector development. 4.2 To establish Seed Sector Integrated Information Management System (SIIMS)

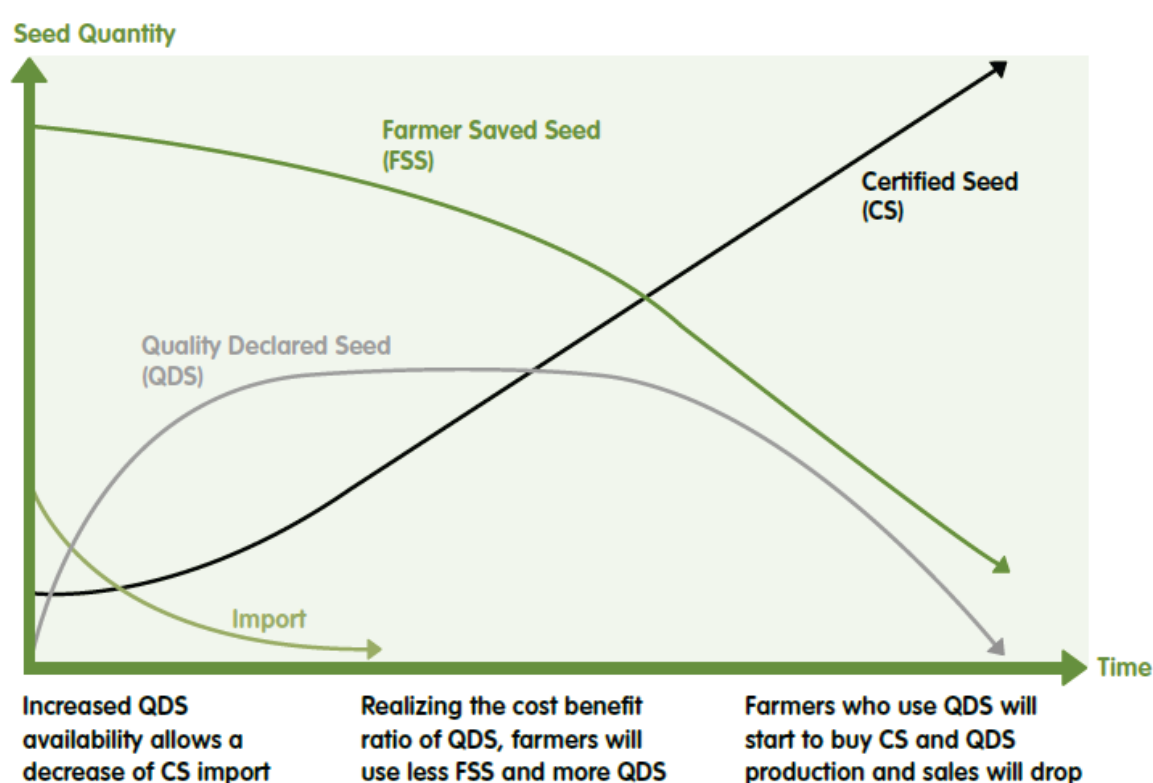
3.2. Targets 2023

3.2.1 Transformed and Integrated Seed System by 2023

To solve the shortage of quality seed for all crops, Government will over the next five years adopt a transformed and integrated seed system. This will require adaptation of technology, flexible seed regulations providing for more competitive SQCC, with strict enforcement and institutional capacity. The implementation of this strategy will gradually reduce the use of farm-saved seed to a fully regulated quality assurance system. This is illustrated in Fig. 2.

Currently seed is being imported into the country by registered seed companies but the majority of farmers are unable to access good seed due to the relatively high cost or limited knowledge on where to get it. In line with the policy direction of government to transform 68% of farming households from subsistence into commercial agriculture, high productive varieties and improved seed are imperative. Therefore, the desire is to ensure that this farming population can access high quality seed to improve yields and have surpluses for the export market. This can be achieved by supporting activities that will enhance seed production and quality in both the formal and informal seed systems. In the interim, increasing production of QDS will reduce on seed imports as well as the use of farm saved seed. With simultaneous strengthening of seed production and quality assurance in the formal system, the overall result will be farmers starting to buy certified seed with a consequent drop in QDS sales.

Fig.2: Conceptualization of the benefits in availing quality seed to farmers



Source: Seed system science in East Africa (ASERECA 2014)

3.2.2 Research and Development Targets for 2023

To ensure a steady flow of improved varieties for food and cash crops, relevant interventions and institutional arrangements to make it happen are elaborated in this strategy. Intensifying demand-driven creation of new varieties will be through on-farm participatory variety selection trials/demonstrations with farmer institutions and groups to identify farmer and market-preferred varieties. Selected varieties will be popularised through appropriate pathways including sale of small seed pack samples, field days, extension brochures and pamphlets, variety descriptors, seed fairs, user-friendly visual material, print and electronic media. ZARDIs will play a crucial role in this process.

Research and Development Targets 2023

- NARO licences seed production of its varieties for 12 crops.
- Farmers access NARO adaptability trials twice a year.
- All NARO breeding programs strengthened with personnel and laboratories.
- PPB included in NARO Plant breeding strategies.
- 150 farmer groups participate in PVS.
- 300 Demonstration Fields established by Seed Companies and SSES.
- Agricultural fairs available at each Agro-ecological Zone.
- 10 food security crops listed as next priorities for NARO breeding programs.
- 3 Private companies with breeding programmes.
- PVP Act implemented.
- MoU signed by NARO and CSO to promote new varieties of specific crops in specific areas.
- 10 Seed Crop production manuals published by NARO.
- 55 technology packs available with information to Seed Farmer groups.
- 1 international forum in Plant Breeding organised in Uganda.

3.2.3 Plant Genetic Resources 2023

The Plant Genetic Resources Center (PGRC) and other NARO institutes will support local communities and CSOs to undertake in-situ conservation of indigenous varieties. This is essential because Plant Genetic Resources are critical in the development of climate-smart varieties for the present and future generations. The conservation and management of diversity will guarantee seed security and enhance livelihoods of farmers who depend on them. The NSS proposes necessary actions, institutional linkages, and policies to strengthen the capacity of farmers and other stakeholders in the conservation and sustainable use of these resources to ensure seed security.

Plant Genetic Resources Targets 2023

- 14 Community Gene Banks supported by PGRC
- Diversity Fairs in all agro-ecological zones.
- Traditional varieties listed in the National List.

3.2.4 Seed Production Targets for 2023

Table 3.2.4.1 presents MAAIF targets for seed production in 2023, and table 3.2.4.2 the corresponding one for basic seed. During the five year period of the NSS, NARO seed which has been provided to the informal seed system will be channelled through LSB and Farmer Groups for further multiplication into QDS.

Table 3.2.4.1 – MAAIF seed production targets for 2023 by crop and sub-sector

Crop	Estimated annual seed use	Seed Companies		QDS (Farmers Groups)		Informal Sector	
	MT(1,000 units)	MT (1,000 units)	%	MT(1,000 units)	%	MT(1,000 units)	%
Banana	50,978	0	0	2,549	5	48,429	95
Maize OP	15,655	6,262	40	626	10	9,393	60
Maize Hybrid	10,000	10,000	100	0	0	0	0
Beans	90,368	4,518	5	18,074	15	67,776	75
Sweet potatoes	140,639	0	0	21,096	15	119,543	85
Cassava	2,115,148	0	0	317,272	15	1,797,876	85
Groundnuts	36,234	725	2	3,623	10	31,886	88
Sorghum OP	6,059	1,212	20	606	10	4,241	70
Sorghum Hybrid	1,069	1,069	100	0	0	0	0
Sesame	2,856	50	2	1,864	15	942	33
Sunflower OP	993	100	10	149	15	744	75
Sunflower Hybrid	100	100	100	0	0	0	0
Millet	1,595	200	13	239	15	1,156	72
Soybeans	9,348	600	6	935	10	7,813	84
Sweet bananas	4,163	0	0	208	5	3,955	95
Irish potatoes	213,120	4,262	2	21,312	10	187,546	88
Pigeon peas	1,487	30	2	149	10	1,309	88
Cotton	726	0	0	0	0	726	100
Rice	8,064	3,226	40	1,210	15	3,629	45
Cow peas	854	17	2	171	10	666	78

Crop	Estimated annual seed use	Seed Companies		ODS (Farmer Groups)		Informal system	
	MT (1,000 units)	MT (1,000 units)	100%	MT (1,000 units)	100%	MT (1,000 units)	100%

Data for 17 main crops excluding Coffee. Bananas replanting each 25 year (65,000 out of 1,600,000 Ha)

SOURCES: FAOSTAT, Total area Harvested per crop and year (2009-2011):

USTA: Formal sector seed production;

NSCS: Seed production targets by crop and sector 2022;

ISSD: Projections from 30 LSBs production data from 2014

2014 NARO seed into informal sector 2014 based in disperse incomplete information and rumours, proper planning of potential QDS production will need a BLS of NARO seed distribution and capacities for seed production cleaning and cleaning propagating materials.

Table 3.2.4.2 – MAAIF Basic and Breeder seed production targets for 2023 by crop

Crop	CERTIFIED CLASSES						QDS CLASS				
	Seed Companies Basic Seed needs	Basic Seed produced by Seed Companies		Basic seed from NARO to Seed Companies		NARO Pre- basic Seed Production	QDS mother seed needs	CII seed produced by seed companies		Breeder Seed from NARO or custodian	
	MT (or 1000 units)	MT (or 1000 units)	%	MT (or 1000 units)	%	kg (or units)	kg (or units)	kg (or units)	%	kg (or units)	%
Banana	0	0	0	0	0	0	6,372	0	0	6,372	100
Maize IL	1	0.0	0	1	100	6,251.3	0	0		0	
Maize O.P.	1.0	1.0	100	0	0	12.2	3	3	100	0	0
Maize Hybrid	250.0	250.0	100	0.0	0	0.0	0	0		0	
Beans	5.2	5.2	100	0.0	0	172.6	200,818	140,573	70	60,246	30
Sweet potatoes	0.0	0.0	0	0.0	0	0.0	29,300	0	0	29,300	100
Cassava	0	0.0	0	0	0	0.0	3,623	0	0	3,623	100
Groundnuts	13.5	13.5	100	0.0	0	1,681.4	150,975	135,878	90	15,098	10
Sorghum I.L.	0.2	0.0		0.2	100	2.5	0	0		0	
Sorghum OP	0.1	0.0	0	0.1	100	1.2	2,020	1,414	70	606	30
Sesame	0.009	0.01	100	0.0	0	0.1	7,767	5,437	70	2,330	30
Sunflower I.L	1.3	0.0	0	1.3	100	15.6	0	0		0	
Sunflower OP	0.028	0.03	100	0.0	0	0.0	0	0	100	0	0
Millet	0.080	0.1	100	0.0	0	1.6	1,595	1,116	70	478	30
Soybeans	0.020	0.02	100	0.0	0	0.1	1,781	1,781	100	0	0
Sweet bananas	0.000	0.00	0	0.0	0	0.0	372	0	0	372	100
Irish potatoes	49.7	49.7	100	0.0		4,973	710,400	710,400	100	0	0
Pigeon peas	0.005	0.005	100	0.0		0.1	620	0	0	620	100
Rice	6.565	6.6	100	0.0	0	295.4	18,144	16,330	90	1,814	10
Cow peas	0.003	0.0	100	0.0	0	0.03	683	478.1952	70	205	30
TOTALS											
Botanical seed (kg)	328,854	326,043	99	2,811	1	8,434	417,700	303,008	73	114,691	27
Total plantlets (units)	0	0	0	0	0	0	3,623	0	0	3,623	100
Total tubers (kg)	49,728	49,728	100	0	0	4,973	710,400	710,400	100	0	0

SOURCES :

Formal seed production from table 3.2.1.1 times multiplication rate up to CII except hybrids (C)

Seed companies Basic seed production from USTA, corrected when in excess in red numbers. For clonal varieties, Basic means true to-type virus free material.

All formal seed crops **CII class** except hybrids. QMS to replace mother seed every 3 years Cassava QDS seed growers three years cycle from Basic to QDS seed. Tubers three cycles from basic to QDS

Banana mother trees replacement every 5 years.

3.2.5 Seed Uptake /Use targets for 2023

Table 3.2 .4.34 – Projected Seed uptake targets 2023

Annual Seed uptake	Total needs	Seed companies		QDS		Informal sector	
Total Ha	5,169,966	941,390	(18%)	755,402	(15%)	3,473,174	(68%)
Total Ha excluded plantlets	4,673,415	941,390	(20%)	688,272	(15%)	3,043,753	(65%)
Data for 17 main crops excluding Coffee. Bananas re-planting each 25 year (65,000 out of 1,600,000 Ha) SOURCES: FAOSTAT, Total area Harvested per crop and year (2009-2011) USTA: Formal sector seed production NSCS: Seed production targets by crop and sector 2023 ISSD: Projections from 30 LSBs production data from 2014							
Seed Uptake /Use targets for 2022							
- 100% of Seed Companies seed production is Certified: 18-20 % of total - QDS seed is increasingly available: 15 % of total - Total uptake of quality controlled seed is 33-35 % in 2023							

3.2.6 Seed Distribution and Marketing

With the establishment of a MAAIF police unit, cooperating with local police to complement seed market inspections by NSCS as well as enforcement of stiffer fines, the sale of fake seed will be drastically reduced. A network of seed dealers linked to LSB, Farmers Groups and Cooperatives will offer the demanded seed in close proximity. A network of seed agents will consolidate the village demand and link the most remote villages with the seed dealer. Seed price, under more competitive seed classes and availability of other inputs will result in enhanced use of quality seed by households. Local Governments will support CSO and Farmers groups in conducting seed fairs.

The targets to increase seed distribution and marketing are:

- MAAIF police in collaboration with local police to enforce seed market regulations.
- Prevalence of fake seed under 5%.
- Higher demand of quality seed under efficient value chains.
- 5,000 villages with a seed agent.
- 450 LSBs operating as seed dealers.
- 100 annual Seed Fairs held.
- Quality controlled seeds widely available in small packages (down to 1 kg).

3.2.7 *Seed Quality Control Targets for 2023*

Achievement of all targets in Seed production, conditioning, distribution and marketing are contingent on an efficient and effective SQCC enforced and monitored by NSCS under PPP. Further, for NSCS to fulfil its mandate and functions, the capacity enhancement proposed in this NSS is indispensable. By 2023 the following are envisaged to be achieved

- A complete Quality Management System (QMS) implemented at NSCS, including financial, accounting and budgeting procedures for self-funding.
- A new **QDS quality assurance system** to allow SQCC for crops and varieties where certified classes are not competitive.
- **Seed regulations harmonised** with COMESA and EAC for seed standards and Common Catalogues. (Proper seed regulations and procedures precede any other attainable objective for seed production in this NSS).
- NSCS Standard procedures for all SQCC operations approved by NSB.
- NSCS regularly conducting DUS testing and control plots.
- Clear efficient and written standard procedures approved by NSB for all operations related to SQCC.
- Specific procedures for registration in the National List of traditional varieties in place, including DUS requirements.
- 23 seed companies with internal QMS.
- National Seed Laboratory ISTA accredited.
- 20 official seed Inspectors.
- 30 authorised field inspectors.
- 20 authorised seed analysts.
- 11 accredited bodies for SQCC.
- 10 Accredited Laboratories.
- USSIMS in place.

3.2.8 *Seed Knowledge and Science*

Interventions under this strategy will increase the availability of breeders, seed scientists (MSc and PhD level) and seed technicians (B.Sc. level) to manage a competitive seed industry. The NSS envisages at least two plant breeders, a soil scientist and a plant pathologist per crop. Seed companies and other organisations involved in seeds production will have a pool of qualified scientist from which to recruit. The targets are as follows:

- NSB knowledge sharing platform hosted at USSIMS.
- Three tertiary institutions offering seed technology grades.
- Three tertiary institutions receiving financial and technical assistance for seed related education.
- 450 LSB operating with household approach for inclusiveness.
- 450 LSB running SQCC.
- 23 Seed companies running QMS and PPP SQCC.

3.2.8 Paradigms for sustainable seed systems

Regardless of the legal context and type of institutional arrangements (state & private - led seed sub-sector), there is a need to set benchmarks for a sustainable seed subsector. The focus will therefore be on enhancing Public-Private-People-Partnerships (PPPP) to realise a fully private sector-led seed industry in Uganda. Aspects of this paradigm shift are presented in Table 3.3

Table 3.3: Paradigms for effective Seed Systems in Uganda

Seed system component	Old paradigms	New paradigms
Plant breeding and research	- State plant breeding (P)	- Public/private/people partnership (PPPP) in variety development and deployment
Crops	- A limited number of food security crops for “calorie security”	- Nitrogen-fixing leguminous crops for nutrition security and soil health. - Major cereals grown for “calorie security”
Varieties	- New varieties targeting high yielding, input demanding agriculture	- New varieties targeting high yielding input demanding agriculture. - New climate- smart varieties. - More research on neglected crops - Preservation of indigenous varieties. - New high nutrition value varieties for food security
Intellectual Property Rights	- of Plant breeders on the new varieties developed by them	- of local populations on the traditional varieties bred and being bred by them through traditional plant breeding. - of Plant breeders on the new varieties developed by them. - of plant breeders and farmers on the new varieties developed through Participatory Plant Breeding (PPB)
Variety Maintenance	- Strict uniformity and stability of new varieties kept by plant breeders / appointed breeders	- Strict uniformity and stability of new varieties kept by plant breeders / appointed breeders - Local strains of indigenous varieties kept by custodian farmers in local communities.
Variety registration	- DUS and VCU requirements for new varieties.	- DUS and VCU requirements for new varieties. - Recognized custodians (individual communities) and variety description for indigenous varieties.
Seed production	- Private companies producing Certified Seed of varieties for high input demanding agriculture.	- Private companies producing Certified Seed of varieties on high fertility lands. - Farmer Seed Systems production of QDS seed of all types of varieties.
SQCC	- State run	- Under Public/Private Partnership
Informal seed sector	- Not regarded as a proper player in the Seed System other than a source of germplasm for plant breeders	- Recognized as important player providing seed resilience, and strengthened in a dynamic interaction and integration with the formal system. - Getting adequate support in its role of preserving the National Heritage of Plant Genetic Resources for Food and Agriculture.
Regulations	- Addressing the production of certified seed of new varieties.	- Creating an enabling environment for a dynamic, pluralistic and market led seed system.

4. Objectives, Strategies and Activities

To realise the objectives and targets of NSS, wide-ranging interventions will be implemented by various actors based on their mandates, roles and responsibilities along the seed value chain. This is the focus of this chapter where for each strategic component, strategy activities and sub-activities have been elaborated for implementation over the 5 years period (Table 4.1). Furthermore, the time framework for each activity and the costs are presented in Annex 2.

TABLE 4.1 COMPONENTS, OBJECTIVES, STRATEGIES AND ACTIVITIES TO IMPLEMENT THE NSS

1. Strengthen Research and Development for the seed sector

Activities		Output	Primary Implementing body	Secondary Implementing bodies		Assumptions
Objective 1.1 To generate new commercial food and nutrition security varieties						
Strategy 1.1.1 Support the public and private sector to develop and promote new commercial, food and nutrition security crop varieties						
1.1.1.a	Strengthen the link between farmers and NARO through increased involvement in dissemination of technologies.					A functional and efficient research and extension system
1.1.1.a.1	Institutionalise farmer visits to adaptive research trials.	Two annual Visits per NARI and ZARDI	ZARDIs	NARIs	LSBs, FOs, FGs	
1.1.1.a.2	Support ZARDIs to establish PVS fields	50 PVS field at LSB per year	ZARDIs	LSBs	CSO	
1.1.1.a.3	Establish an effective communication strategy to reach all farmers	Communication strategy in place	NARO	CSOs		
1.1.1.a.4	Institutionalise a framework of cooperation between NGOs and–Researchers through MOUs to promote the uptake of new varieties of crops in specific areas through the extension service	10 MOUs	NARO	CSOs		
1.1.1.a.5	Provide information on new varieties to all actors	provided for in 5.1.10.a				

Activities		Output	Primary Implementing body	Secondary Implementing bodies		Assumptions
1.1.1.b	Increase the of demonstration fields set up by Seed Companies.	10 per company	SEED COMPANIES			Seed companies have access to credit to do so
1.1.1.c	Organise biannual Regional Agricultural Trade Fairs.	Two per Agro ecological Zone	MAAIF			MAAIF makes this an institutionalized activity
1.1.1.d	Incorporate a budget for dissemination in every NARO project as a policy and practice.	One policy adopted	NARO			
1.1.1.e	Provide human and material support for NARO plant breeding at NARIs					Human resource plan in place
1.1.1.e.1	Employ at least one breeder per crop	One breeder per each for 15 crops	NARO	NARIS		
1.1.1.e.2	Strengthen the breeding team with other experts including physiologists and seed scientists	Two persons at each NARI	NARO	NARIS		
1.1.1.e.3	Provide 1 vehicle (pick up) per breeding programme	One per program	NARO			
1.1.1.e.4	Provide equipment and consumables for laboratory, plant pathology and food science	One per NARI	NARO	NARIs		
1.1.1.e.5	Establish analytical laboratory for plant health and food science	Two per NARI	NARO	NARIs		
1.1.1.e.6	Construct screen houses	One per NARI and ZARDI	NARO	NARIs	ZARDIs	
1.1.1.e.7	Upgrade weather stations at NARIs (continuous)	One per NARO Centre and satellite	MAAIF	DAO		
Strategy 1.1.2 Operationalize the Plant Variety Protection Act 2014						
1.1.2.a	Support Plant Breeders Association to address issues of implementing PBR as provided under the PVP Act.	One month consultancy per year	PBA			PVP Act and operational regulations in force
1.1.2.b	Operationalize PVP Act					
1.1.2.b.1	Set up institutions under PVP Act	Set institutions	MAAIF			
1.1.2.b.2	Develop PVP regulations and procedures	Two months consultancy in year 2	MAAIF			

Activities		Output	Primary Implementing body	Secondary Implementing bodies		Assumptions
1.1.2.c	Sign a MOU between PBA and NARO to monitor the implementation of PVP Act on a regional basis.	One MOU	MAAIF	PBA		MoU is signed
Strategy 1.1.3 Strengthen processes for new variety evaluation, release and registration to promote regional harmonization						
1.1.3.a	Government to concentrate on orphaned crops and start supporting the entry of private breeding in maize and other commercially profitable crops					Orphaned crops included in the NDP
1.1.3.a.1	NARO providing parental lines of maize to private companies	Companies receiving materials	NARO	SEED COMPANIES		
1.1.3.a.2	Authorize NARO to provide exclusive rights for crop varieties to seed companies and charge royalties	NARO collects royalties	MFPED	NARO	USTA	
1.1.3b	Supporting the development of food security crop varieties through public breeding programmes					
1.1.3b1	MAAIF and NARO to establish list of 10 priority crops (All food security crops and review annually)	10 crops identified	MAAIF	NARO		Priority crops included in the NDP and ministerial policy statements
1.1.3c	Strengthening modalities for coordination of public and private research and extension service providers for effective transfer and dissemination of seed related technologies					
1.1.3.c1	Produce Seed production manuals per crop translated into the 5 main local languages and disseminate to end users.	10 Crop Seed production manuals (400 copies each)	NARI's			People demand this information and it relates accurately to information needs
1.1.3.c2	Establish a Resource Centre at every NARI, ZARDI and Satellite Stations, (55) for dissemination of agricultural technologies (particular for seed)	55 Technology packs	NARO	NARIs	ZARDIs	Funding is availed for this investment

Activities		Output	Primary Implementing body	Secondary Implementing bodies		Assumptions
1.1.3.c3	Facilitate multi-stakeholders seed platforms	Annual meeting	NARO	CSO	USTA	
1.1.3d	Reviewing variety evaluation, release and registration processes to promote regional harmonisation and effective release and popularisation of new varieties					
1.1.3.d1	Review, Release and Registration procedures	One review in first year	NSB	NSCS		
1.1.3.d2	Approve procedures for variety release	Approved in the first year	NSB	NSCS		Procedures approved
1.1.3d3	Supporting Ugandan breeders to source genetic materials from international breeding institutes and /or from other countries	In this strategy but costed under PGRFA Budget				
1.1.3.e	Document entry of genetic materials from international breeding institutes and /or from other countries and monitor their performance	Documenting system	NARO	PGRC		Adherence to norms and standards for acquisition of genetic material
1.1.3f	Developing a system which enables different rights on public varieties through exclusive rights, shared rights or any other inclusive system that is deemed most beneficial to increase the adoption rates of new varieties by farmers					
1.1.3.fl	Introduce modalities for variety licensing in case of national interest	Intellectual property rights system put in place	NARO			NARO adopts "limitation clause" in licencing agreement
Strategy 1.1.4 Facilitate community-based seed producers to access basic seed						
1.1.4.a	Decentralise basic seed production to the ZARDIs	ZARDIs producing basic seed	NARIs	ZARDIs		Enhanced capacity at ZARDIs
1.1.4.b	Support LSBs, farmer organisations and farmer groups in seed production planning (request seed 6 months in advance)	LSB, Farmer Organisations and Farmer Groups with annual seed production plans	ZARDIS	CSOs		LSBs and FOs and FGs request for seed

Activities		Output	Primary Implementing body	Secondary Implementing bodies		Assumptions
Strategy 1.1.5 Enhance the cooperation with international crop development centres including the Consultative Group for International Agricultural Research (CGIAR) to access new varieties						
1.1.4c	Facilitate Scientists to participate in annual international crop development fora.	Five scientist attending international fora	NARO			Available funding for international participation
1.1.4.d	Organize one international development forum in Uganda during the 3rd year of NSS implementation	One International development forum	NARO			Funding for this event is obtained
Objective 1.2: To sustainably utilise and protect Uganda’s national plant genetic resources						
Strategy 1.2.1 Strengthening the mapping and creation of registers at national level and within communities						
1.2.1.a	Establishing Biodiversity registers at CGB					Community awareness is enhanced on importance of traditional varieties
1.2.1.b	Conduct sensitisation meetings	14 Communities aware of importance of registration of traditional varieties	PGRC	CSO	CUL. INS.	
1.2.1c	Undertake capacity building and development of community Biodiversity registers	14 community registers in place	PGRC	CSO	CUL. INS.	
1.2.1d	Carry out training in participatory monitoring of Biodiversity Registers	14 community Biodiversity registers yearly up to date	CSO	PGRC		
1.2.1e	Develop procedures for the registration of traditional varieties.	Procedures approved by NSB	NSCS	NSB		
1.2.1f	Undertake sensitisation workshops	Stakeholder aware of traditional varieties registration	MAAIF	PGRC	NSCS	
Strategy 1.2.2 Develop a new law to protect and preserve indigenous knowledge of local varieties and effectively protect community intellectual property rights						
1.2.2a	Support the drafting of the PGRFA Bill	One Stakeholder Workshop	PGRC	MAAIF		Parliament approves Bill
1.2.2b	Send Bill to Parliament for enactment	Bill becomes an Act	MAAIF			
1.2.2c	Enact Traditional Varieties Protection Law	Approved procedures in place	UNCST	NPPO		

Activities		Output	Primary Implementing body	Secondary Implementing bodies		Assumptions
Strategy 1.2.3 -Promoting and building capacity of farmer and community groups including those led by women or youth to conserve crop varieties that have a high food security value						
1.2.3a	Link LSBs, Farmer Organisation and Farmer groups including for youth and women to Genetic Resources Centre	Provided for in 2.2.1.a				Community awareness raised on conservation of crop varieties
1.2.3b	Link conservation to seed business and target high food security value crops	50 LSBs and 14 CGBs selling conservation seed	LSB	CSO	PGRC	
1.2.3c	Undertake specialised training of farmers on farm conservation aspects	14 gene bank custodian farmers trained	PGRC			
1.2.3d	Organize diversity fairs	One Fair per agro ecological zone	PGRC	ZARDIs	CSO	
1.2.3e	Facilitate farmer exchange/ cross-site visits	One annual cross -site visit per gene bank	PGRC	ZARDIs	CSO	
1.2.3f	Carry out training in participatory monitoring	14 Community gene banks annually monitored by the communities	PGRC	CSO		
1.2,3.g	Undertake field trials and establish demonstration fields for conservation varieties	One per gene bank per year	PGRC	CSO		
Strategy 1.2.3 – Enhance the development of community seed banks						
1.2.3a	Establish a network of community seed banks under the coordination and technical support of PGRC	Community Gene Banks at LSBs, at least one per agro ecological zone				PGRC capacity is to boosted to establish this network
1.2.3.a.1	Hold sensitisation meetings	14 Communities and DAO field staff aware of importance of conservation	PGRC	CSO	CUL. INS.	
1.2.3.a.2	Facilitate community-scientist negotiations	14 Communities supporting in situ conservation of national genetic heritage	PGRC	CSO	CUL. INS.	
1.2.3.a.3	Construct CGB facility	14 CGBs facilities built	PGRC	CSO	CUL. INS.	
1.2.3.a.4	Establish CGB management structures	14 CGBs management structures operational	PGRC	CSO	CUL. INS.	
1.2.4.a.5	Set up seed production and distribution mechanisms	14 CGBs with working seed production and distribution	PGRC	CSO	CUL. INS.	

2. Strengthen the capacity of the key players along the seed value chain to achieve an effective and efficient seed sub-sector

Activities		Output Assumptions	Primary Implementing body	Secondary Implementing bodies		Assumptions
Objective 2.1 To multiply high quality seed in the formal seed system						
Strategy 2.1.1 Create an opportunity for companies to access affordable credit for seed production and multiplication						
2.1.1a1	Engage financial institutions including SACCOs to extend low interest credit to seed companies and agro-dealers as well	Interest rates are lowered with incentives from an development or agricultural bank	UDB, agricultural insurance banks and SACCOs	MoFPED	MAAIF	Seed companies satisfy the requirements to credit
Strategy 2.1.2 Create a mechanism for seed demand articulation						
2.1.2a	To develop a methodology that captures seasonal seed need for all crops	Districts trained on this methodology	MAAIF	NARO	DAES	Appropriate methodology available
2.1.2.b	Conduct regular seed demand estimation.					
2.1.2.c	Establish multi stakeholder platforms to standardize messages					
Objective 2.2 To enhance the production of quality seed within the informal seed system						
Strategy 2.2.1 Promoting and building capacity of market-oriented farmers to produce, use and market quality seed with the focus on crops and varieties that have a high food and nutritional security value						
2.2.1a	Scale up number of LSBs, Farmer Organisations and Farmer Groups involved in seed production and marketing	450 LSBs, Farmer Organisations and Farmer Groups established and functional nationwide	ZARDIs	CSO		Upscaling partners willing to support the process
Strategy 2.2.2 Strengthening participatory variety selection to enhance adoption of new improved varieties						
2.2.2a	Strengthen support to PVS	New productive varieties are available for testing	ZARDIs			A well-structured outreach programme for variety selection and adoption
2.2.2b	Introduce Participatory Plant Breeding in NARO breeding programmes.		NARO			
2.2.2c	Strengthen the link between farmers and NARO through increased involvement of NARO in dissemination of its own technology	ZARDIs can support this process in their ecological zones	ZARDIs	NARO		

Activities		Output Assumptions	Primary Implementing body	Secondary Implementing bodies		Assumptions
Strategy 2.2.3 – Strengthening systems for emergency seed supplies in case of localised or national calamities to ensure continued availability of good quality seeds						
2.2.3a	Develop guidelines to supply seed in case of emergencies	Guidelines on emergency seed supplies adopted	OPM	MAAIF	NSB	Strict guidelines for acquisition and supply of seed for relief purposes in place
2.2.3.b	Adopt appropriate MOUs with strategic stakeholders to build up buffer stocks	MOU signed and terms agreeable to	MAAIF	MODP		
Strategy 2.2.4- Promoting improved affordable and gender friendly technologies to support seed multiplication and post-harvest handling						
2.2.4.a	Strengthen women and youth groups by providing labour saving technologies such as ploughing and threshing equipment and transportation on credit under a business approach.	LSBs, Farmer Organisations and Farmer Groups equipped with appropriate labour saving technologies	ZARDIs	CSO	LSBs, FOs, FGs	Availability of appropriate labour saving technologies
2.4.4.a	AEATREC Namalere to identify, develop and test seed related low cost technologies.	Appropriate technologies identified, developed and tested	AEATREC			Funding to increase capacity at AEATREC
2.2.4.c	ZARDIs to test and disseminate seed related low-cost technologies.	Appropriate technologies disseminated	ZARDIs	AEATREC	LSBs	
2.2.4d	Conduct national campaigns to educate farmers on use of quality seed and regulations using ICT.	Improved attitude towards use of ICTs	MAAIF	USTA	CSO	Availability of internet connectivity as well as a good communication strategy
2.2.4e	Promote awareness on the different seed classes in Uganda using tools that effectively reach actors	Appreciation of the use of the different seed classes	MAAIF	USTA	DAES	Awareness gradually increased on seed classes
Strategy 2.2.5 - Promoting local seed selection and preservation methodologies;						
2.2.5.a	Promote selection of indigenous varieties and include them in the national variety list.	Indigenous varieties				Availability of indigenous varieties
2.2.5.b	Train LG Agricultural Staff and Field based staff on local seed selection and preservation methodologies	Team of capable staff recruited and in post in 50% of all districts	PGRC	DAOs		Agriculture staff n post for this activity
Objective 2.3 To strengthen seed distribution and marketing to enhance commercialization of quality seed						

Activities		Output Assumptions	Primary Implementing body	Secondary Implementing bodies		Assumptions
Strategy 2.3.1 – Support seed companies to market seed in appropriate and affordable packages to promote the use of certified seed by all farmers;						
2.3.1.a	Regulate packaging of certified seed down to 1 kg	Regulations for small packaging of seeds in place	NSB			Effective marking in place and 1Kg bags and other ranges available
2.3.1.b	Support Seed Companies to assess economic viability of small packs, link to financial sources, appropriate machinery, etc.	Study on economic viability of small packages done	USTA			
Strategy 2.3.2 - Supporting seed marketing outlets in remote areas by encouraging establishment of network of seed stockists;						
2.3.2a	Increase number of LSB operating as seed dealers.	Provided for already under component 1				
2.3.2b	Nominate village/parish agents to collect village seed demand and submit it to Sub county township for consolidation.	5,000 villages/parishes count with seed agent	DAOs			At each level trainable agents are available
Objective 2.4: To enhance national competitiveness in regional and international seed trade to contribute to economic growth						
Strategy 2.4.1 - Enhancing the capacity of Phytosanitary services to issue relevant plant health certificates in line with regional and international standards;						
2.4.1.a	Develop a strategic plan to build capacity of Phytosanitary services	Strategic plan approved	MAAIF	Ministry of Trade Industry and Cooperatives	Ministry of Health	A well-structured SPS regulatory framework
2.4.1b	Recognise Phytosanitary test from private but accredited laboratories	Plant Protection and Health Act now recognise private accredited laboratory results for Phytosanitary certificates	MAAIF	NPPO		
2.4.1.c	Undertake outreach on regionally harmonised standards	Stakeholders are familiar on regional seed standards	MAAIF	USTA	NSCS	
Strategy 2.4.2 – Strengthening Institutional coordination that ensures effective border control services and provides efficient facilities, laboratories visual inspection kits, refrigerators at principal boarder points						
2.4.2.a	Procure for appropriate facilities at border posts	Provided for in 4.2.1.a				

Activities		Output Assumptions	Primary Implementing body	Secondary Implementing bodies		Assumptions
2.4.2.b	Hire qualified personnel and provide for minimum facilities at high risk entry points (laboratories, visual inspection kits, refrigerators)					An implementable human resource development plan
Strategy 2.4.3 – Promotion of awareness on regional harmonized seed trade standards						
2.4.3.a	Disseminate the harmonized Seeds and Plant regulations and their adherence to international conventions and protocols	Regulations harmonised	NSCS			User friendly regulations in place

3. Strengthen the seed quality control system along the value chain

Activities		Output Assumptions	Primary Implementing body	Secondary Implementing bodies	Assumptions
Objective 3.1: To ensure quality control along the value chain					
Strategy 3.1.1 Ensuring enforcement of all regulations regarding seed production, storage, chemical application and residues on the market in conformity with international standards					
3.1.1a	Review the legal framework to strengthen deterrent measures for those engaged in counterfeit seed	Deterrent measures within the legal framework	MOJCA	MIA	Amended Seed and Plant Act (2006) that includes provisions for strict enforcement
3.1.1b	Establish enforcement mechanisms to fight against seed adulteration in the market	Community police and other oversight agencies trained to pursue seed adulteration cases	MIA	NSCS	
Strategy 3.1.2 Strengthening and enforcing existing seed certification (quality control, seed testing, labelling, etc.) for locally produced and imported seed					

Activities		Output Assumptions	Primary Implementing body	Secondary Implementing bodies	Assumptions
3.1.2.a	Support infrastructure for seed quality assurance at NSCS				A well facilitated (with human, technical and logistical) organization to effectively carry out its mandate
3.1.2.b	Agricultural facilities for DUS and control plots		NSCS		
3.1.2.b.1	- Establish a mini-irrigation facility for 2Ha	- Mini-irrigation facility for 2Ha procured and established	NSCS		
3.1.2.b.2	- Construct a standard screen house.	Standard screen house procured and constructed	NSCS		
3.1.2.b.3	Provide a tractor and accessories	Tractor and accessories procured	NSCS		
3.1.2.b.4	Provide consumables for field work, fertilizers, etc.	Consumables for field work, fertilizers etc. procured			
3.1.2.c	IT equipment (computers and accessories)	7 laptops for inspectors procured	NSCS		
3.1.2.d	NSCS Training Centre Facilities (office equipment and consumables)	Training equipment procured	NSCS		
3.1.2.e	Field inspection equipment (GPS, Cameras, I-Pads)	10 GPS gadgets procured	NSCS		
3.1.2f	Field vehicle (buses, pickups and motorcycles)				
3.1.2.f	Laboratory equipment and consumables for ISTA Accreditation	Inventory and procurement list	NSCS		
3.1.2.g	Hire new NSCS technical staff (10 persons)	NSCS QMS documentation in place	NSCS		
3.1.2.h	Develop NSCS Quality Management system documentation	250,000 tamper proof labels available	NSCS		
3.1.2.i	Extend tamper proof labels to 100% of certified seed (250,000) for 100,000 MT in 5Kg packages per year				

Activities		Output Assumptions	Primary Implementing body	Secondary Implementing bodies	Assumptions
Strategy 3.1.3 - Establishing procedures of accreditation for field inspection, sampling, testing and labelling;					
3.1.3a	Develop accreditation procedures for Field Inspection	Accreditation procedures approved by NSB	NSCS	NSB	An accredited NSCS with ISTA accredited seed testing laboratory
3.1.3b	Develop accreditation procedures for Seed sampling and labelling	Accreditation procedures approved by NSB	NSCS	NSB	
3.1.3c	Develop accreditation procedures for Seed Laboratory	Accreditation procedures approved by NSB	NSCS	NSB	
3.1.3d	Develop accreditation procedures for label printing				
Strategy 3.1.4 Strengthen the quality management of seed companies and national seed laboratories					
3.1.4a	Require Seed Companies to have at least 1 seed technologist among its staff for registration as seed merchants	Regulations for registration updated	NSCS		An accredited NSCS with ISTA accredited seed testing laboratory
3.1.4b	Provide external audit to Seed Companies Internal Quality Control twice a year.	23 Seed companies audited annually	USTA		
3.1.4c	Develop authorisation procedures for Field Inspectors	Authorisation procedures approved by NSB	NSCS	NSB	
3.1.4d	Develop authorisation procedures for Seed sampling and labelling	Authorisation procedures approved by NSB	NSCS	NSB	
3.1.4e	Develop authorisation procedures for Seed Analysts	Authorisation procedures approved by NSB	NSCS	NSB	
3.1.4f	Extend development of QMS to all companies.	All companies with QMS in development	USTA	SEED COMPANIES	
3.1.4g	Develop procedures to audit Accredited organisations	Accredited organisations regularly audited	NSCS	NSB	
3.1.4h	Carry out 2 audits a year of companies QMS	Provided for in 5.1.2.b			
3.1.4i	Provide Technical Assistance to NSCS seed Laboratory to facilitate ISTA Accreditation	NSCS laboratory ISTA accredited	NSCS		
3.1.4j	Recruit three (3) additional seed analysts at the National Seed laboratory	Analysts in National seed laboratory	NSCS	MAAIF	

Activities		Output Assumptions	Primary Implementing body	Secondary Implementing bodies	Assumptions
Strategy 3.1.5 - Establishing public/private partnership for seed quality control;					
3.1.5a	Accredit Private Companies and associations for Seed Quality Control and Certification.	11 Bodies accredited	NSCS	USTA - SEED COMPANIES	An accredited NSCS with ISTA accredited seed testing laboratory
3.1.5b	USTA and MAAIF sign a MoU covering accreditation	MoU signed	USTA	MAAIF	
Strategy 3.1.6 - Encouraging all registered seed companies and other seed merchants to join seed associations for purposes of self-regulation to ensure seed quality					
3.1.6a	Government to encourage all companies to be member of USTA (at registration).	Only USTA members Seed Companies can produce seed	NSCS	NSB	An incentive mechanism is place to ensure companies register under USTA
3.1.6b	Government to coordinate with USTA when procuring seeds.	Government to adopt policy	GoU	MODP and USTA	
3.1.6c	USTA to define minimum requirements for Seed company to join	Minimum requirement defined by USTA	USTA	NSCS	
Strategy 3.1.7 - Develop modalities for seed certification of horticultural crops, industrial crops, forestry and other plant species which have no variety maintenance					
3.1.7a	Establish procedures for quality control and certification of horticultural crops	Quality controlled Horticultural crops seeds available	NSCS	NSB	The appreciation of quality standards to enhance competitiveness
3.1.7b	Develop procedures for quality control and certification of Industrial crops	Quality controlled Industrial crop seeds available	NSCS	NSB	
3.1.7c	Develop procedures for quality control and certification of forestry crops	Quality controlled forestry crops seeds available	NSCS	NSB	
3.1.7d	Develop procedures for quality control and certification of vegetatively propagated crops	Quality controlled Horticultural crop seeds available	NSCS	NSB	
Objective 3.2: To ensure quality control along the value chain for Quality Declared Seed					
Strategy 3.2.1 Develop regulations and standards for quality declared seed					
3.2.1a	Develop regulations for QDS class	QDS Regulations approved by MAAIF	NARO	NSB	Specific crops are designated for QDS production

Activities		Output Assumptions	Primary Implementing body	Secondary Implementing bodies	Assumptions
Strategy 3.2.2 - Establishing a delegated and decentralised system at zonal and/or district level for seed inspection for Quality Declared Seed					
3.2.2a	Provide Seed laboratory equipment to 9 ZARDIs plus one in North Sub-station + three NARIs	10 laboratories furnished	NARO	NARIs, ZARDIs	There is a nationally accredited seed laboratory to do seed inspection and certification at ISTA standards
3.2.2b	Accredit Seed laboratories at 9 ZARDIs plus 1 in North Substation + 3NARIs	10 laboratories accredited	NSCS	NARIs, ZARDIs	
3.2.2c	Authorize 2 seed analysts per ZARDI. and NARI	26 seed analyst authorised	NSCS	NARIs, ZARDIs	
3.2.2d	Delegate official seed inspectors at ZARDIs and NARIs	Provided for in 5.2.3.a			
Strategy 3.2.3 - Establishing seed traceability system for Quality Declared Seed					
3.2.3a	Register seed producers through district authorities	100% of seed producers registered by 2020 by law	NSCS		By-laws on seed registration at district level
Strategy 3.2.4 - Providing for listing of traditional and participatory bred varieties					
3.2.4a	NSCS develops procedures for listing, registering LSBs, FOs and FGs through District production departments	Procedures developed	NSCS	NSB, DAOs	Capable LSBs available
3.2.4b	Nominate official Seed inspectors at ZARDIs and NARI level	9 official seed Inspectors nominated	MAAIF	NARIs, ZARDIs	Accredited national seed laboratory in place

4. Enhance Knowledge and Information management for the seed sub-sector

Activities		Output Assumptions	Primary Implementing body	Secondary Implementing bodies	Assumptions
Objective 4.1: To Develop human resource for the seed sector development					
Strategy 4.1.1 - Supporting the development of seed science centres at tertiary institutions including seed research, training and accreditation purposes					
4.1.1.a	Provide incentives for tertiary institutions to train seed technologists	Tertiary institutions respond with needed investments for training	NSCS	Academia	An appropriate curriculum and government support for training programs at various levels
4.1.1b	Support tertiary institutions to develop seed technology curriculum	Curriculum developed	NARO	NSCS	

Activities		Output Assumptions	Primary Implementing body	Secondary Implementing bodies	Assumptions
Strategy 4.1.2 – Empower communities to appreciate and acquire seed knowledge and its relation to enterprise development					
4.1.2.a	Build the capacity of extension staff in seed knowledge	Government facilitates the DAES to implement this extension	DAES	LGs	Seed knowledge is embedded in the extension service system
Strategy 4.1.3 –Promote adult literacy and seed business skills training to enhance men, women and youth participation in seed business					
4.1.3a	Provide skills in seed business to farmer through LSBs, FOs and FGs.	Improved attitude to see seed as an investment	MAAIF	MoGLSD	Seed knowledge is embedded in the extension service system
Objective 4.2 – To Establish a Seed Sector Integrated Information Management System					
4.2.1	Establishing web based seed sector information management portal linked to other MIS	Resources will be availed for this investment	NSB	NSCS	High speed internet connectivity to support access to a web-based easy to use IMS
4.2.1a	Provide a IT staff for system maintenance	One staff	MAAIF	NSCS	
4.2.1b	Build the skills of NSCS staff on data management and start IMS tables	NSCS data management skills developed	NSCS		
4.2.1c	Provide IT equipment (server)	one server in place	NSCS		
4.2.d	Develop applications and web site	USSIMS Web site accessible to stakeholders	NSCS		

5. Implementation

5.1. Implementation Mechanism

Efficient and effective seed subsector institutions are critical for realising the vision, mission and objectives of the seed policy. To this end, Government will strengthen relevant organizations to completely fulfil their mandates (roles and responsibilities). These are summarised in Table 5.1. Government will also ensure full operationalisation of the Seeds and Plant Act (2006) and make necessary amendments where necessary.

Table 5.1. Institutions, mandates, roles and responsibilities to implement the NSS

Institution	Mandate, roles and responsibilities
MAAIF	- The mandate of MAAIF is to support, promote and guide production of crops, livestock and fisheries, so as to improve quality and increased quantity of agricultural produce and products for domestic consumption, food security and export - Responsible for promoting an enabling environment for the seed sector - Coordinates its affiliated institutions including NARO, NAADS, Department of Crop Production, Department of Crop Inspection and Certification, and semi-autonomous units dealing with specific crops. - Undertakes policy formulation and implementation, - Coordinates research and extension. - Advises government on the drafting of relevant laws and regulations, and enforces regulations. - Interacts with other branches of government to support agricultural education, credit, and other services to support agriculture in general and the seed industry in particular.
National Agricultural Research Organization (NARO) Agency under MAAIF	- NARO operates through a decentralised network of seven National Agricultural Research Institutes (NARIs) and nine Zonal Agricultural Research and Development Institutes (ZARDIs). - Develops modern varieties for commercial production. - Maintains developed varieties and produces breeder seed. - NARO provides pre-basic and basic seed and works with the private sector and farmer groups in joint variety development, dissemination and technology commercialization. - Collaborates with international research institutions associated with the Consultative Group for International Agricultural Research (CGIAR).

Institution	Mandate, roles and responsibilities
National Plant Genetic Resources Centre (PGRC) under NARO	- Responsible for ensuring genetic diversity and conservation in Uganda. - Oversees the botanic gardens activities. - Undertakes agricultural research on PGR related issues. - Disseminates agricultural technologies. - Sensitises the population on plant diversity conservation. - Promotes utilisation of indigenous PGR. - Advices on PGR policy, strategy and legislation development.
Directorate of Extension Services Under MAAIF	- Responsible for facilitating farmers' access to knowledge, skills and information to enhance agricultural productivity throughout the country. - Support development along value chains through selected PPPs by promoting out-grower schemes and expanding access to production and marketing. - Encourages agricultural competitions among farmers in the countryside to reward best performers in production. - Enhances adoption of improved seeds and planting materials by farmers.
National Seed Certification Service (NSCS) in the Department of Crop Inspection and Certification Under MAAIF	- Responsible for design, establishment and enforcement of certification standards, methods and procedures. - Responsible for variety testing and registration in the National List of varieties. - Carries out field inspection, testing, labelling, sealing, certification, and seed factory inspection. - Responsible for accreditation and licensing, field inspection, seed sampling and laboratory seed testing.
National Seed Board (NSB) under MAAIF	- Advises the Minister on the National Seed Policy. - Coordinates and monitors the public and private seed sector in order to achieve the national seed industry objectives; - Responsible for establishing a system of implementing seed policies through technical committees; - Responsible for formulation and advising the Minister on seed regulations and standards.
National Variety Release Committee (NVRC) under NSB	- Reviews and maintains the National Variety List. - Approves the release of new varieties and entry into the seed multiplication programme.

Institution	Mandate, roles and responsibilities
Department of Crop Inspection and Certification (DCIC Under MAAIF)	- Manages the Phytosanitary and Quarantine Service, and implements the Plant Variety Protection Act. - Is the lead agency within MAAIF to advice on regulatory decisions governing genetically modified organisms (GMOs) through UNCST. - Issues Phytosanitary certificates for export of seeds and controls seed imports into Uganda
Uganda Coffee Development Authority (UCDA)	- Responsible for promoting the coffee industry. UCDA obtains plantlets of improved varieties from NARO (NaCORI) and private tissue culture laboratories for multiplication by private nursery operators and eventual distribution to farmers.
Uganda Cotton Development Organization (CDO)	- Has the mandate to support the cotton subsector, obtains pre-basic seed from NARO, arranges for seed production and processing, and distributes seeds to farmers
Local Government Production Department	- Responsible for about 70% of extension services to farmers - Provide technical support on seed multiplication to farmers groups
Uganda National Council of Science and Technology (UNCST)	- Designated Authority for matters relating to access to genetic resources: receives and facilitates the processing of all applications for access to genetic resources submitted to it. - Coordinates all activities of lead agencies relating to access to genetic resources and establishes and maintains a depository for all Material Transfer Agreements and Accessory Agreements. - Responsible for the registration of private research providers. - Under the Seeds and Plant Act, it is in charge of recommending procedures and protocols to deal with varieties developed through the use of biotechnology.
Seed Companies	- Account for all production, import, and sale of seeds for field crops and vegetables in the formal sector, with some exceptions. - Other formal organizations not registered as seed companies provide seeds and other planting materials through closed chain systems for tobacco, cotton, coffee, tea, and some other crops

Institution	Mandate, roles and responsibilities
Other seed-related organizations	Uganda Flowers Exporters Association (UFEA) involved in production of flowers and export trade.
	Civil Society Organizations (CSO) , including NGOs and Cultural Institutions support Farmer Seed Systems in production and multiplication process of quality seed
	Uganda Seed Trade Association (USTA) mission is to expand business opportunities for member companies through awareness campaign; production support, quality assurance, capacity building, advocating for policies that promote the development of new plant varieties and movement of seed; and collaborating with different stakeholders in the seed sector locally, regionally and internationally.
	Uganda National Farmers Federation (UNFFE) with its affiliate district associations promotes agricultural developments for its members.
	Uganda National Agro-inputs Dealers' Association (UNADA) has 1,300 members drawn from retail traders specializing in seeds and other agro-inputs distribution and marketing.
	Uganda Plant Breeders Association (UPBA) promotes breeders' interests through information sharing, policy advocacy (e.g. urging establishment of plant breeders' rights and other activities).
	Development Partners (DPs) assist government through funding, training and technical assistance. DPs currently involved in the seed sector include JICA, USAID, Bill and Melinda Gates Foundation through AGRA, and the Embassy of the Kingdom of Netherlands (EKN).
	International Organizations: UNDP, FAO, WFP and others complement government efforts in training, crop production and marketing systems and at times buy seed from seed companies for distribution to vulnerable communities.
	Financial institutions: extend credit to seed companies and agro-inputs dealers as well as insurance products (Insurance Companies)
	Savings and Credit Cooperative Organizations (SACCO) extend credit to their member to help them buy seeds and other inputs
	Farmers groups grow seeds for themselves or under contract for seed companies

6. Monitoring and Evaluation

The implementation of this strategy will be monitored at various levels. MAAIF will track broad high-level indicators and performance issues. The National Seed Board will have the primary mandate for monitoring and evaluation of the national seed policy while the National Seed Certification Service will deal with strategies and activities. Other stakeholders will monitor and report on activities under their mandates. To guide the monitoring and evaluation of the policy, indicators have been developed and agreed for each level. Periodically the NSB will bring stakeholders together to reflect on the implementation of the policy and make input for improvements. Another important tool to aid monitoring will be the Uganda Seed Sector Integrated Information Management System (USIIMS) and web portal that will be established by the NSCS.

Given the dynamic policy environment nationally, regionally and globally, it is imperative to be responsive to this wider policy context. This will be addressed through periodic review of the policy. As the policy is implemented through a seed strategy, issues that arise will be dealt with by revising the strategy, which has a 5-year cycle. The policy as a whole shall be reviewed on a cycle of 10 years.

6.1. Monitoring

6.1.1 *Monitoring, Evaluation and Supervision Roles*

The Comprehensive Africa Agriculture Development Programme (CAADP), to which Uganda is a signatory country is committed to work towards investment in agriculture sector at the targeted level of 10% of national budget, to achieve a targeted growth rate of 6% in agriculture and to reduce poverty and hunger through agriculture. Agriculture is expected to contribute to these commitments through DSIP implementation. Hence it is necessary to continuously monitor the contribution and progress towards achieving the objectives and targets in those commitments. In this regard, M&E system plan for the NSS will be important in providing the policy makers, implementers and other information users with the basis for making informed choices in NSP priorities and allocation of resources against many competing priorities.

One of the mandates of MAAIF is that of monitoring and evaluating the implementation of interventions in the agricultural sector. This requires an efficient and effective mechanism for monitoring and evaluation to be in place at the Ministry Headquarters, its agencies, programmes and projects. This NSS M&E plan builds on the overall MAAIF M&E Framework Implementation Plan for operationalizing the NDP.

6.1.2 *Monitoring and Reporting*

A Base Line Survey (BLS) will be done immediately after approval of the NSS by the Top Management. Annual M&E work plans and budgets will be produced by NSCS in conjunction with departments and agencies involved in the implementation of the NSS. The implementation of the work plans will provide the basis for the M&E Plan to be assessed comprehensively as an important component during the reviews and evaluation of NSS which will be aligned with those of the new DSIP (ASSP) and NDP II. The review of the NSS will be overseen by MAAIF but will involve other actors/stakeholders in a participatory process.

6.1.3 Gender and Youth:

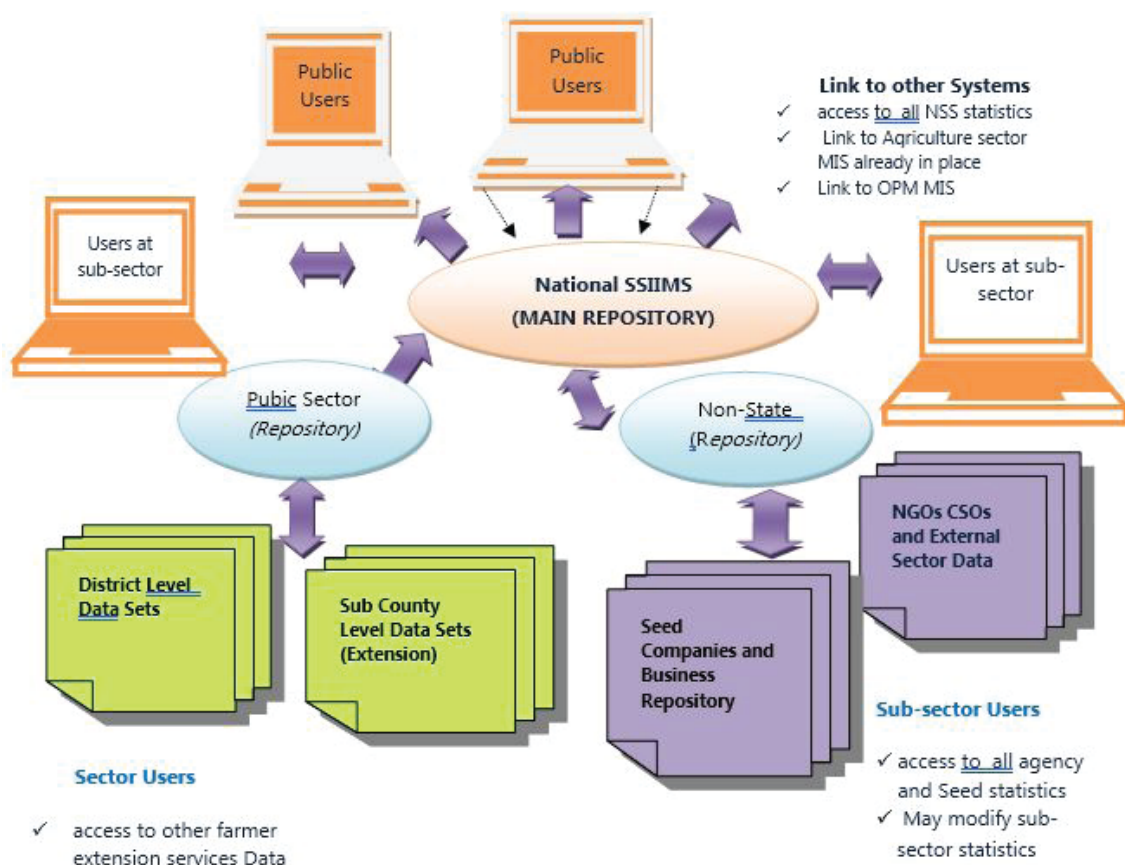
In characterizing the indicators in the M&E plan, provision has been made for disaggregation of the data by gender and age for those indicators that relate to people. This requires that all implementing organizations will perceive gender disaggregation as an important way of revealing and understanding the social dimensions of the achievements made taking cognizance of differences that may exist between the gender of farmers, age, farm household heads and beneficiaries of NSS in general. There is need for a sustainable and comprehensive M&E framework to guide the implementation of the policy. There is need to include key performance indicators (KPIs) under Output Budget Tool (OBT) to allow reporting on value for money – which is now a critical part of NDP reviews and the Government Annual Performance Review (GAPR). To put these processes in place, there will be need for the following to be instituted:

- i. **Identifying Responsibility centers:** The sector will identify actors who will manage reporting on key activities during policy implementation at the following levels: At the lowest level, sub counties will collect information at community levels and report to a designated officer in charge of the seed system at the district level. To ease their work, it is proposed that parish coordination committees be set up to reach farmers preferably through the extension service system. CSOs and NGOs will be required to disseminate information on their seed work through Village Farmer's Forums; farmer groups and associations that they support. Seed companies and local seed businesses will be regulated by the National Seed Board but will be required to report their work both at district and sector level depending on their size and scope of outreach. The National Agricultural Research System will report on work related to seed research at the national level.
- ii. **M&E plans; results frame work, OBT:** The District Agriculture officers will be responsible for ensuring that M&E plans are embedded in the Department Work Plans as part of the overall district development plans. These will be synchronized with the national results framework as will be handed down by MAAIF through the National Seed Board. In the interim, this will require that MAAIF works with MoFPED to include KPIs of the seed system on the OBT which are now lacking.
- iii. **Indicators to monitor:** It is usually more effective to let stakeholders at various levels participate in the determination of their own performance indicators. While MAAIF will be interested in KPIs like for instance percentage of farmers using QDS, seed companies will be more keen on seed types on demand as well as price changes. Farmers will be interested in seed availability and source. As all of this happens, the NSS will be required to track performance along the seed value chain. This will be the purpose of the Uganda Seed Sector Integrated Information Management System.
- iv. **Reporting:** Sub-county level agriculture officials will report using a short-template about the various aspects of the seed system at their level. This information will feed into the reporting forms at the district level and will be uploaded onto the USSIMS and analyzed at the national level. Based on these reports, information will be made available and relayed on the Ministry Website for public use.
- v. **Reflection platforms; M&E** is for collaborative learning and improvement. Under the policy's implementation, a feedback process will be set up that will provide an opportunity for duty bearers at various levels to receive views from farmers, business actors, local leaders and seed experts on the progress of the policy implementation and make the necessary implementation adjustments where needed.

6.2 Setting up a result based M&E system

Government is aiming to align policy implementation with the National Public Sector M&E Policy (2013) for Ministries' Departments and Agencies (MDAs) to build results-based M&E systems with steps as outlined in Fig 3. MAAIF will establish a step-wise process for an enduring M&E system based not only on outputs but also outcome and impact under the USSIMS.

Fig. 3: Visualization of Working of an Integrated Information Management System



The USSIMS will link to the already existing MIS in MAAIF and will host a main repository that will be fed by data from seed companies, research institutions, districts and also non-state actors. The data will respond to data needs by both users at the district and national level. It will have a review module to respond to queries from Uganda Bureau of Statistics (UBOS) and other MIS in an interactive interface.

6.3 Evaluation

The NSS will be evaluated at mid-term and final evaluation will be carried out at the end. Joint evaluation will be conducted by implementers and independent external evaluators at both evaluations. The recommendations of the end of NSS evaluation will be used to design the NSS II. Annual joint reviews will be conducted by MAAIF and the information will be used to improve implementation of NSS.

6.4 Results framework

Table 6.1 presents an overview of the results framework for the NSS by component

During NSS implementation period, this M&E framework will assist the sector, government and

other stakeholders/partners in monitoring and evaluating the performance against agreed NSP goals, objectives and targets, GoU commitments to the CAADP the UN Sustainable Development Goals (SDGs Goal 2) and identify the factors which contribute positively or negatively to the agricultural service delivery outcomes. Thus, through analysis and interpretation of M&E data and information, the sector will be able to discern the patterns in trends of the tracked indicators on DSIP inputs, activities, outputs, outcomes and impact so that policy makers and key stakeholders can take timely corrective actions in implementation targets, processes, techniques and approaches.

There is a large number of diverse stakeholders, programmes, and interventions involved in the implementation of the NSS at national and sub-national levels. This requires a harmonized M&E approach that can ensure that not only similar data is collected but also reporting is streamlined in order to reduce on duplication of efforts, fatigue in reporting and publication of conflicting information. This results framework is prepared to address this.

The purpose of an M&E in the implementation of NSS is to facilitate the use of timely, relevant and comprehensive information for supporting coordination and strategic decision making at policy and programme management and implementation levels. The objectives are to (i) enhance the production of quality monitoring and evaluation data and information on NSP implementation and (ii) promote increased access, utilization and learning from monitoring and evaluation data and information for coordination and policy, strategic and programmatic decision making.

Similar Data is collected, processed and analysed in a systematic and coordinated manner, on the same indicators and parameters.

Table 6.1 Results Framework Summary

Strategic Objectives	Outputs	Intermediate Outcomes	Wider Impacts
To generate commercial and food nutrition security varieties	New farmer-and market preferred varieties developed	Changes in production and productivity at the farm level for new varieties	Improved food security and income in farming communities
To sustainably utilize and protect Uganda's PGRFA	- High yielding, climate-resilient varieties with farmer and market preferred traits. - Availability of enhanced germplasm resources	- High adoption new varieties leading to an increase in production and productivity - Availability of improved germplasm	Increase in production and productivity based on Uganda's heritage and crops with which Uganda has a high comparative advantage
To multiply high quality seed in the formal seed system	Increased production of quality seed (certified)	- Reduced importation of seed - Increased use of certified seed	High production and productivity
To enhance the production of quality seed within the informal seed system	Increased production of quality declared seed	Reduced use of farm saved seed	High production and productivity
To strengthen seed distribution and marketing to enhance commercialization of quality seed	Increased seed outlets in proximity with seed buyers and farmers	Increased availability of seed to farmers at lower transaction costs making it cheaper	High production and productivity

Strategic Objectives	Outputs	Intermediate Outcomes	Wider Impacts
To strength the seed quality control system along the value chain	• Clear regulations and enforcement systems in place • Quality seed developed for regional and international markets	• High quality seed availed to farmers • Increased uptake of improved seeds by farmers • Seed users confidence and satisfaction increased • Enhanced national competitiveness in seed trade	Enhanced food security and income
To develop human resources for seed sector development	• More seed scientists and technicians trained and available to enhance development of seed sub-sector • Skills transferred to all seed players along the seed value chain	• Improved performance of the seed sub-sector • Increased income of farming households from crop related activities as a result of extension services	Strengthened national seed value chain
To establish seed sector in competitive information movement system (SIIMS)	• NSS monitored and evaluated • Increased use of evidence from program evaluations to formulate, refine, adopt, and implement evidence-based policy.	• Enhanced integration of the seed sub-sector that brings all data together for planning and improvement of the sector	Increase in income and employment opportunities from use of information on where to invest

To enhance national competitiveness in regional and international seed trade to contribute to economic growth (outputs, unlimited to outcome, with inputs need to be projected)

7. Impact

NSS is designed to achieve four strategic objectives. Given that seed is the foundation for crop production, the implementation of the strategies and activities will create impact in a number of areas in the agricultural sector including: (i) ensuring wealth creation and food security (ii) employment opportunities (iii) contributing to conservation of plant genetic resources and adapting to adverse impact of climate change, and (iv) contributing in gender and youth integration, among others.

7.1 Wealth creation and food and nutrition security

Implementation of the National Seed Strategy will enhance the use of new varieties which will contribute significantly to: increased output for home consumption, improved food and nutrition security, increased household incomes, increased supply and reduced food prices that will increase real incomes and make food more affordable to the poor. Increase in sales of quality seed will contribute significantly to poverty reduction. Women will have more time to engage in livelihood activities as they use labour saving technologies. As of 2011, Uganda's seed industry sold an estimated \$25 million in seeds and planting materials. The volume of seeds produced expanded by 25% per year in the past decade. We project an increase in seed sales of at least 20% per year amounting to \$60 million by 2022/23.

7.2 Employment generation

An effective seed sector will largely depend on more efficient value chains involving lower marketing margin, increased fulltime employment and income will arise from increased post-harvest storage, processing, value addition, marketing, transportation, packaging and handling. This will provide incentives or a competitive agro-based industry. These agro industries will produce diversified food products, thus improving nutrition security. Additionally, as youth and women get involved in strategic activities, it will create employment.

7.3 Biodiversity conservation and climate change

The rich agro-biodiversity of Uganda is vital to the development of new farmer-and market- preferred varieties to sustain a competitive seed sector. Continuous use of traditional and other genetic resources for the development of diverse varieties in different regions by public, private and community entities will contribute to the on-farm maintenance of local diversity. Development and promotion of small-scale and local seed businesses in each agro ecological zone as envisaged under the NSS will contribute to reducing genetic erosion and external dependence. In the context of climate variability, the NSS focuses on developing and promoting “climate-smart” crop varieties (pests, drought, and heat tolerant, etc.). The promotion of “climate-smart” seed varieties will encourage farming communities to adopt productivity enhancing technologies such as integrated pest management to better adapt to adverse effects of climate change and variability. This will have impact on stabilizing food production and reducing risks to farming communities. Farmers' ability to adapt to climate change depends in part on their access to alternate crops and varieties. Relaxing controls on variety introduction and enhancing the capacity of the seed industry can help farmers' to access suitable crops and varieties from other countries with comparable climates.

7.4 Gender and youth integration

The NSS envisages gender and youth integration, empowering them as members of farmer groups and/or local seed businesses. Most members of these groups are female and male youths (18-35 years of age). An efficient seed sector will encourage such groups to benefit from improving production methods using appropriate technologies and inputs. Youth farmers may also select other income generating activities such as (seed multiplication, oxen-ploughing and providing contract agricultural services e.g crop protection, marketing, transport, processing, etc. This will improve efficiency along the entire seed value chain. The employment generated as a multiplier effect will also provide additional employment opportunities to women particularly in post-harvest handling and marketing. Many program activities, such as demonstrations, some training, and agro-inputs dealer recruitment, will benefit from 20% to 40% of women and youth respectively, depending on the activity.

8. Strategy Cost

The total budget for the proposed five-year strategy is Uganda Shillings (UGX) 87.53 billion to be funded from government appropriation and internally generated resources, private sector and development partners' contributions. The activities are designed according to an implementation matrix, for which budget estimates are generated, based on past experience and estimates of current costs. The strategy is anticipated to start in 2019 and close in 2023. Based on the evidence generated through this strategy and the increased capacity for collective learning for policy process formulation and program design and implementation, it is envisaged that by the end of the strategy, MAAIF will have built a credible case for a sustained increase in annual budget support from the Ministry of Finance, Planning and Economic Development (MoFPED) to implement programs under the NSP and to provide the public services required to transform the agricultural sector from subsistence to commercial production. Table 8.1 summarises the additional funding required to implement the strategy on top of the already existing budget resources for the implementing state bodies. The detailed budget is presented in Annex 2.

Table 8.1: Summary of cost by component and year (000 UGX)

	Year 1	Year 2	Year 3	Year 4	Year 5	Total for 5 Years
Component 1: Strengthening Research	12,976,101	4,516,040	3,151,390	1,889,640	1,473,400	24,006,480
Component 2: Strengthening the seed value chain	10,873,800	7,463,000	6,453,000	5,473,000	4,943,000	35,205,800
Component 3: Seed Quality Control	6,308,060	3,714,300	2,754,300	1,858,300	1,382,300	16,017,260
Component 4: Seed knowledge and information mechanisms	2,036,600	1,347,000	1,272,000	1,272,000	1,272,000	7,199,600
TOTAL FOR ALL COMPONENTS	32,237,670	17,040,340	13,630,690	10,492,940	9,070,700	82,472,340
3% M&E	967,130.1	511,210.2	408,920.7	314,788.2	272,121	2,474,170
Adjustment for Inflation 5%	-	877,578	701,981	540,386		2,587,086
GRAND TOTAL	33,204,800	18,429,128	14,741,591	11,348,115	9,809,962	87,533,596

ANNEX 1: RESULTS FRAMEWORK

COMPONENT 1: STRENGTHENING RESEARCH AND DEVELOPMENT FOR THE SEED SUB-SECTOR

NSP Objectives and Strategies Outcome Indicators	Unit of measure	Baseline	Cumulative target value					Frequency of data collection	Data sources/ methodology	Responsibility for data collection	Remarks
			Year 1	Year 2	Year 3	Year 4	Year 5				
Objective 1.1: To generate new commercial and food security varieties											
Strategy 1.1.1: Supporting the public and private sector to develop and promote new commercial, food and nutrition security varieties											
Number of new varieties developed	Variety	BLS						Annually	NARO reports	NARO	Data disaggregated by crop
Number of new developed, released and registered in the National List	Variety	175						Annually	National Variety List	NSCS	
Number of registered new varieties in use	Variety	TBR						Annually	NSCS SQCC data (USSIMS)	N SCS	
Amount of national funds allocated to plant breeding	UGX	BLS						Annually	MAAIF reports	MAAIF	
Number of private companies breeding own varieties	Company	0						Annually	NARO reports	NARO	Data disaggregated by crop
Strategy 1.1.2: Operationalize the PVP Act 2014											
Number of Varieties protected under PBR	Variety	0						Annually	PVPO	Registrar of PVPO	Data disaggregated by crop
Strategy 1.1.3: Strengthen processes for new variety evaluation, release and registration to promote regional harmonization											
Number of companies supported in maize breeding and other commercially viable crops	Companies	0						Annually	Companies list	NARO	Data disaggregated by crop after maize
Strategy 1.1.4: Facilitate community-based seed producers to access basic seed											
Number of ZARDIs producing and supplying basic seed	No.							Seasonally	NARO reports	NARO	Data disaggregated by crop
Number of LSBs receiving basic seed	No.							Seasonally	Planting returns	NARO	Data disaggregated by crop
Strategy 1.1.10: Enhancing the cooperation with international crop development centres including the Consultative Group for International Agricultural Research (CGIAR) to access new varieties											
Number of new varieties acquired through cooperation with international crop improvement development centres	Variety	BLS						Annually	NARO reports	PGRC	

NSP Objectives and Strategies Outcome Indicators	Unit of measure	Baseline	Cumulative target value					Frequency of data collection	Data sources/ methodology	Responsibility for data collection	Remarks
			Year 1	Year 2	Year 3	Year 4	Year 5				
Objective 1.2: To sustainably utilise and protect Uganda’s national plant genetic resources from destruction by natural and human activities and unauthorised access											
Strategy 1.2.1 Strengthen the mapping and creation of registers at national level and within communities											
Number of biodiversity registers	Varieties	BLS						In 1 st Year	Survey	NARO	PGRC to lead effort
Strategy 1.2.2 Develop a new law to protect and preserve indigenous knowledge of local varieties and effectively protect community intellectual property rights											
The Traditional Variety Protection Act	Act	0						In 2 nd Year	MAAIF Document	MAAIF	
Strategy 1.2.3 Promoting and building capacity of farmers and community groups including those led by women or youth to conserve varieties that have a high food security value											
Number of high food security crops conserved by community groups	Variety	BLS						Annually	NARO and PGRC reports and NSCS SQCC data	NSCS	Data disaggregated by crop
Strategy 1.2.4 Enhance the development of community seed banks											
Number of functional community seed banks	Community seed bank	BLS						Annually	NARO	ZARDIS	Data disaggregated by crop and agro-ecological zone

COMPONENT 2: STRENGTHENING THE CAPACITY OF KEY SEED PLAYERS ALONG THE SEED VALUE CHAIN

NSP Objectives and Strategies Outcome Indicators	Unit of measure	Baseline	Cumulative target value					Frequency of data collection	Data sources/ methodology	Responsibility for data collection	Remarks
			Year 1	Year 2	Year 3	Year 4	Year 5				
Objective 2.1: To multiply and market high quality seed under the formal seed system.											
Strategy 2.1.1 Create an opportunity for all companies to access affordable credit for seed production and multiplication											
Number of seed companies accessing low interest credit	Seed companies							Annually	Companies		
Strategy 2.1.2 Create a Mechanism for seed demand articulation											
A methodology for actual seed demand articulation developed	Methodology	BLS						Seasonally	NSB Audit	MAAIF UBOS	Data disaggregated
Objective 2.2 Enhance the production of quality seed within the informal seed system											
Strategy 2.2.1: Promoting and building capacity of farmers, community groups and local seed businesses to produce and market quality seed with the focus on crops and varieties that have a high food security value;											

NSP Objectives and Strategies Outcome Indicators	Unit of measure	Baseline	Cumulative target value					Frequency of data collection	Data sources/ methodology	Responsibility for data collection	Remarks
			Year 1	Year 2	Year 3	Year 4	Year 5				
Amount of quality seed of food security crops produced and marketed by farmers, community groups and local seed businesses	MT	BLS						Annually	NARO for varieties NSCS informal system data	NSCS NARO	Data disaggregated
Number of new improved climate-smart varieties adopted	Variety	BLS						Annually	NSCS database	NSCS	Data disaggregated
Strategy 2.2.2 Strengthen participatory variety selection to enhance adoption of new varieties											
Number of farmer and market preferred varieties selected and adopted	Variety	BLS						Annually	NSCS database	NSCS	
Strategy 2.2.3 Strengthening systems for emergency seed supplies in case of localised or natural calamities to ensure availability of good quality seed											
Amount of buffer stock of quality seed adequately stored for emergencies	MT	BLS						Annually	OPM data	OPM	Data disaggregated
Strategy 2.2.4 Promoting improved affordable and gender friendly technologies to support seed multiplication and post-harvest handling											
Number of appropriate technologies promoted and adopted	Technology	BLS						Annually	AEATREC reports	ZARDIs SSES	
Strategy 2.2.5 Promoting local seed selection and preservation methodologies											
No of local preservation methodologies	methodologies	0						Annually	Survey	PGRC	Data per district
Objective 2.3 Strengthening seed distribution and marketing to enhance commercialisation of quality seed											
Strategy 2.3.1: Support seed companies to market seed in appropriate packages to promote the use of certified seed by all farmers											
Number of seed companies marketing seed in appropriate and affordable packages by all farmers	Seed company	BLS						Quarterly	NSCS database	NSCS	
Strategy 2.3.2: Support seed marketing outlets in remote areas by encouraging establishment of a network of seed stockists											
Number of stockists	Seed stockists	BLS						Annually	USTA survey	USTA	
Objective 2.4 To enhance national competitiveness in regional and international seed trade to contribute to economic growth											
Strategy 2.4.1 Enhancing the capacity of Phytosanitary services to issue relevant plant health certificates in line with regional and international standards											
Number of SPS certificates issued	Certificate	BLS						Annually	SPS database	MAAIF	SPS data

NSP Objectives and Strategies Outcome Indicators	Unit of measure	Baseline	Cumulative target value					Frequency of data collection	Data sources/ methodology	Responsibility for data collection	Remarks
			Year 1	Year 2	Year 3	Year 4	Year 5				
Strategy 2.4.2 Strengthening institutional coordination to ensure effective boarder control services and provide efficient facilities at principal boarder points											
Number of facilities installed	Facilities	BLS						Annually	SPS Database	Ministry of Internal Affairs MAAIF, MTIC	SPS data
Strategy 2.4.3 Promotion of awareness of regionally harmonized seed standards											
Percentage of stakeholders aware of standards	Percentage aware	TBD						Annually	SPS Database	MAAIF	Data disaggregated

COMPONENT 3: STRENGTHING THE QUALITY CONTROL SYSTEM ALONG THE SEED VALUE CHAIN

NSP Objectives and Strategies Outcome Indicators	Unit of measure	Baseline	Cumulative target value					Frequency of data collection	Data sources/ methodology	Responsibility for data collection	Remarks
			Year 1	Year 2	Year 3	Year 4	Year 5				
Objective 3.1: To strengthen the seed quality control system along the value chain											
Strategy 3.1.1 Ensuring enforcement of all regulations regarding seed production, storage, chemical application and residues on the market in conformity with international standards											
Evidence of availability of appropriate regulations	Regulations	TBD						Once in Two years	Inventory database	MAAIF	Calibrated dataset
Strategy 3.1.2 Strengthening and enforcing existing seed certification (quality control, seed testing, labelling, etc.) for locally produced and imported seed											
Evidence of availability of appropriate regulations	Regulations	TBD						Once in Two years	Inventory database	MAAIF	Calibrated dataset
Strategy 3.1.3 - Establishing procedures of accreditation for field inspection, sampling, testing and labelling											
Number of inspectors accredited.	Entity 0							Annually	NSCS database	NSCS	Facilities data
Number of functional NSCS accredited laboratories for seed testing and number of samplers for seed sampling	Entity 0							Annually	NSCS database	NSCS	Facilities data
Strategy 3.1.3 Strengthen the quality management of seed companies and national seed laboratories											
Number of seed laboratories with ISTA quality management system	Seed testing laboratory	1						Annually	NSCS database	NSCS	Facilities data
Number of seed companies with quality management system	Seed companies	BLS						Annually	USTA data	USTA	Facilities data

NSP Objectives and Strategies Outcome Indicators	Unit of measure	Baseline	Cumulative target value					Frequency of data collection	Data sources/ methodology	Responsibility for data collection	Remarks
			Year 1	Year 2	Year 3	Year 4	Year 5				
Strategy 3.1.4 - Establishing public/private partnership for seed quality control											
Number of seed companies in public/private partnership with government for seed quality control	Seed company	0						Annually	NSCS database	NSCS	
Strategy 3.1.5 - Encouraging all registered seed companies and other seed merchants to join seed associations for purposes of self-regulation to ensure seed quality											
Number of registered seed companies subscribing to USTA	Subscriptions	1						Annually	NSCS database	NSCS	
Number of registered seed companies and other Seed merchants	Seed merchants	BLS						Annually	USTA/NSCS	USTA/NSCS	
Strategy 3.1.6 - Develop modalities for seed certification of horticultural crops, industrial crops, forestry and other plant species which have no variety maintenance											
Modalities in place	Modalities and their definitions for plant species	0						Annually	NSCS database	NSCS	Disaggregate data by crop group
Objective 3.2: To ensure quality control along the value chain for Quality Declared Seed											
Strategy 3.2.1 Develop regulations and standards for quality declared seed											
Regulation in place	Regulations							In 1 st Year	NSCS database	MAAIF	
Strategy 3.2.2 - Establishing a delegated and decentralised system at zonal and/or district level for seed inspection for Quality Declared Seed											
Number of functional zonal centres and districts accredited for seed inspection and certification of QDS	Zonal centres	TBD						Annually	NSCS database	NSCS	Zonal and district data
Strategy 3.2.3 - Establishing seed traceability system for Quality Declared Seed											
A decentralized inspection system	No. of QDS growers registered per district	TBD						Annually	NSCS database	NSCS	Zonal and district data
Strategy 3.2.4 - Providing for listing of traditional and participatory bred varieties											
Number of varieties per crop group	Varieties	TBD							NSCS database	NSCS	Zonal data

COMPONENT 4: ENHANCING KNOWLEDGE AND INFORMATION MANAGEMENT FOR THE SEED SUB-SECTOR

NSP Objectives and Strategies Outcome Indicators	Unit of measure	Baseline	Cumulative target value					Frequency of data collection	Data sources/ methodology	Responsibility for data collection	Remarks
			Year 1	Year 2	Year 3	Year 4	Year 5				
Objective 4.1: Develop human resource for the seed sector development											
Strategy 4.1.1 - Supporting the development of seed science centres at tertiary institutions including seed research, training and accreditation purposes											
Number of tertiary institutions participating in building skills and human resources in seed science and knowledge	Tertiary institution	1						Annually	MAAIF /AGRA Reports	MAAIF	Data disaggregated per qualification
Number of diploma and degree graduates of agricultural science trained in seed science	Graduate	BLS						Annually	MAAIF reports	MAAIF/DLG	
Number of graduates of seed science from participating tertiary institutions	Graduate	BLS						Annually	MAAIF /AGRA Reports	MAAIF	
Percentages of graduates of seed science recruited at NARO	Graduate	BLS						Annually	MAAIF / NARO Reports	MAAIF/NARO	
Percentages of graduates of seed science from participating tertiary institutions that are retained at Seed Companies	Graduate	BLS						Annually	USTA survey	USTA	
Percentages of graduates of seed science from participating tertiary institutions that are recruited by seed companies	Graduate	BLS						Annually	NSB survey	NARO-CSO	
Strategy 4.1.2 – Empower communities to appreciate and acquire knowledge and its relation to enterprise development											
Number of extension staff with requisite seed knowledge	No. of staff							Annually	DAES	MAAIF reports	Extension service data
Strategy 4.1.3 Promote adult literacy and seed business skills training to enhance men, women and youth participation in seed business											
Percentages of women participating in seed businesses	% women							At evaluation	NSB survey	NSCS and consultant	
Percentages of youth participating in seed businesses	% youth							At evaluation	NSB survey	NSCS and consultant	
Objective 4.2 – Establishing a Seed Sector Integrated Information Management System											
Functional MIS	MIS							3 rd Year	MAAIF		System report

ANNEX 2: DETAILED STRATEGY COST TABLE

Components objectives, strategies and activities	Output Assumptions	number of units	Unit	unit cost (000) UGX	total cost for 5 years (000) UGX	Year 1	total cost for year 1 (000) UGX	Year 2	total cost for year 2 (000) UGX	Year 3	total cost for year 3 (000) UGX	Year 4	total cost for year 4 (000) UGX	Year 5	total cost year 5 (000) UGX
COMPONENT 1: RESEARCH AND DEVELOPMENT															
Objective 1.1: To generate new commercial and food security varieties															
Strategy 1.1.1 - Supporting and promoting development and use of new varieties for production and marketing of improved varieties and quality seed;															
1.1.1.a	Strengthen the link between farmers and NARO through increased involvement of NARO in dissemination of its own technology.														
1.1.1.a.1	Institutionalize farmer visits to research adaptation trials	120	visits	2,000	240,000	24	48,000	24	48,000	24	48,000	24	48,000	24	48,000
1.1.1.a.2	Support ZARDIs to establish PVS fields	750	PVS	200	150,000	150	30,000	150	30,000	150	30,000	150	30,000	150	30,000
1.1.1.a.3	Establish an effective communication strategy to reach all farmers	30	consultancy days	1,960	58,800	30	58,800		-		-		-		-
1.1.1.a.4	Institutionalize a framework of cooperation between NGOs and—Researcher s through MoUs to promote the uptake of new varieties of crops in specific areas through the extension service	10	MoU	350	3,500	Five	1,750		-	Five	1,750		-		-
1.1.1.b	Increase number of demonstration fields set up by seed companies	300	demo plots	2,000	600,000	60	120,000	60	120,000	60	120,000	60	120,000	60	120,000
1.1.1.c	Organize biannual Regional Agricultural Trade Fairs.	90	trade fairs	50,000	4,500,000	18	900,000	18	900,000	18	900,000	18	900,000	18	900,000

Components objectives, strategies and activities		Output Assumptions	number of units	Unit	unit cost (000) UGX	total cost for 5 years (000) UGX	Year 1	total cost for year 1 (000) UGX	Year 2	total cost for year 2 (000) UGX	Year 3	total cost for year 3 (000) UGX	Year 4	total cost for year 4 (000) UGX	Year 5	total cost for year 5 (000) UGX
1.1.1.e	Provide human and material support for NARO plant breeding at NARIs															
1.1.1.e.1	Appoint a breeder per crop	One breeder per each for 15 crops	15	crop breeders	120,000	1,800,000	15	1,800,000								
1.1.1.e.2	Strengthen the breeding team with other scientists (pathologist+ agronomist)	Two 2 persons at each of the 3 NARI centers	Six	2 persons per 3 centres for 12 months in 5 years.	1,080	388,800	Six	77,760	Six	77,760	Six	77,760	Six	77,760	Six	77,760
1.1.1.e.3	Provide One vehicle (pick up) per breeder	One per crop program	10	Pickup	140,000	1,400,000	10	1,400,000		-		-		-		-
1.1.1.e.4	Provide equipment and consumables for laboratory, plant pathology and food science	One per NARI	Three	Lab set	1,750,000	5,250,000	Three	5,250,000		-		-		-		-
1.1.1.e.5	Establish analytical laboratory personnel for plant health and food science	Two per NARI at 3 centers	Six	Two persons per three centres for 12 months in 5 years	800	288,000	Six	57,600	Six	57,600	Six	57,600	Six	57,600	Six	57,600
1.1.1.e.6	Construct screen houses	One per NARI and ZARDI	12	screen house	84,000	1,008,000	12	1,008,000		-		-		-		-
1.1.1.e.7	Upgrade weather stations at NARO Centres	One per NARO Centre and satellite sub-station	55	set	12,000	660,000	27	324,000	28	336,000		-		-		-
Sub-total						16,347,100		11,075,910		1,569,360		1,235,110		1,233,360		1,233,360
Strategy 1.1.2 - Operationalize the Plant Variety Protection Act 2014																
1.1.2.a	Support plant Breeders Association to address issues related to breeders' rights & development PVP regulations.	1 month consultancy per year	150	days	1,960	294,000	30	58,800	30	58,800	30	58,800	30	58,800	30	58800

Components objectives, strategies and activities		Output Assumptions	number of units	Unit	unit cost (000) UGX	total cost for 5 years (000) UGX	Year 1	total cost for year 1 (000) UGX	Year 2	total cost for year 2 (000) UGX	Year 3	total cost for year 3 (000) UGX	Year 4	total cost for year 4 (000) UGX	Year 5	total cost for year 5 (000) UGX
1.1.2.b.2	Develop PVP regulations and develop procedures	2 months consultancy in year 2	60	days	1,960	117,600		-	60	117,600		-		-		0
1.1.2.c	Sign a MoU between PBA and NARO to regionally monitor implementation of PVP Act	One MoU	1	MoU	-	3,500	One	3,500		-		-		-		0
Sub-total						415,100		62,300		176,400		58,800		58,800		58800
Strategy 1.1.3 Strengthen processes for new variety evaluation, release and registration to promote regional harmonization																
1.1.3.a	support to orphaned crops and start supporting the entry of private breeding in maize and other commercially profitable crops															
1.1.3.a.1	NARO provides parental materials of maize to seed companies	Companies receiving materials	Three	seed companies	50,000	150000			One	50000	One	50000	One	50000		
1.1.3.a.2	Authorize NARO to provide exclusive rights for crop varieties to seed companies and charge royalties	NARO collects royalties	One	fees structure	0	0		0		0		0	One	0		0
Sub-total						150,000		0		50000		50000		50000		0
Strategy 1.1.5 - Supporting the development of food security crop varieties through public breeding programmes																
1.1.5 a	MAAIF and NARO establish list of 10 priority crops (ALL FOOD SECURITY CROPS) and reviews this list annually	10 crops identified	One	list	0	0	One	0		0		0		0		0

Components objectives, strategies and activities	Output Assumptions	number of units	Unit	unit cost (000) UGX	total cost for 5 years (000) UGX	Year 1	total year 1 (000) UGX	Year 2	total Cost for year 2 (000) UGX	Year 3	total cost for year 3 (000) UGX	Year 4	total cost for year 4 (000) UGX	Year 5	total cost for year 5 (000) UGX
Strategy 1.1.6 -Strengthening modalities for coordination of public and private research and extension service providers for effective transfer and dissemination of seed related technologies															
1.1.6.a	Produce Seed production manuals per crop translated into the 5 main local language groups and disseminate to end users. Establish a Resource Centre at every NARI, ZARDI and Satellite Stations (55) for dissemination of agricultural technologies (related to seed).	4000	manuals	50	200,000	800	40,000	800	40,000	800	40,000	800	40,000	800	40,000
1.1.6.b	55 Technology parks	55	tech parks	20,000	1,100,000	15	300,000	40	800,000	-	-	-	-	-	-
1.1.6.c	Annual meeting	Five	meetings	20,000	100,000	one	20,000	one	20,000	one	20,000	one	20,000	one	20,000
	Sub-total				1,400,000		360,000		860,000		60,000		60,000		60,000
Strategy 1.1.7 -Reviewing variety evaluation, release and registration processes to promote regional harmonisation effective release and popularisation of new varieties															
1.1.7.a	Review the Release and Registration procedures	one	review meeting	10000	10000	one	10,000								
1.1.7.b	Approve procedures for variety release	one	procedure	0	0	one	0		0		0		0		0
	Sub-total				10000		10000								
Strategy 1.1.8 -Promote community based seed producers to access basic seed to be subsequently multiplied for seed production															
1.1.8.a	Decentralize basic seed production to the ZARDIs	three	ZARDIs	1,200,000	3,600,000	one	1,200,000	one	1,200,000	one	1200000				

Components objectives, strategies and activities		Output Assumptions	number of units	Unit	unit cost (000) UGX	total cost for 5 years (000) UGX	Year 1	total cost for year 1 (000) UGX	Year 2	total cost for year 2 (000) UGX	Year 3	total cost for year 3 (000) UGX	Year 4	total cost for year 4 (000) UGX	Year 5	total cost for year 5 (000) UGX
1.1.8.b	Support to LSBs, farmer organisations and farmer groups in the production planning (request seed 6 months in advance)	LSB, Farmers, Organisations, and Farmers, Groups with annual seed production plans	150	LSBs	2,000	300,000	100	200,000	50	100,000						
Sub-total						3,900,000		1,400,000		1,300,000		1200000		0		0
Strategy 1.1.9 -Enhancing the cooperation with international crop development centres including the Consultative Group for International Agricultural Research (CGIAR to access new varieties)																
1.1.10.a	Facilitate scientists to participate in annual international crop development fora	five scientists attending international fora	25	scientists	12,600	315,000	5	63,000	5	63,000	5	63,000	5	63,000	5	63,000
1.1.10.b	Organize one international development forum in the 3rd year of NSS implementation	one International development forum	one	Forum	60,000	60,000		-		-	one	60,000		-		-
Sub-total						375,000		63,000		63,000		123,000		63,000		63,000
TOTAL COMPONENT 1 (A)						22,597,200	-	12,971,210	-	4,018,760	-	2,726,910	-	1,465,160	-	1,415,160
Objective 1.2: To sustainably utilize and protect national plant genetic resources (from PGRFA)																
Strategy 1.2.1 -Strengthen the mapping and creation of registers at national level and within communities																
1.2.1.a	Establish biodiversity registers at CGB															
1.2.1.b	Conduct sensitization meetings	14 Communities aware of importance of registration of traditional varieties	14	Community groups	5,880	82,320		-	Four	23,520	Five	29,400	5	29,400		-

Components objectives, strategies and activities		Output Assumptions	number of units	Unit	unit cost (000) UGX	total cost for 5 years (000) UGX	Year 1	total cost for year 1 (000) UGX	Year 2	total cost for year 2 (000) UGX	Year 3	total cost for year 3 (000) UGX	Year 4	total cost for year 4 (000) UGX	Year 5	total cost for year 5 (000) UGX
1.2.1.c	Undertake capacity building and development of community Biodiversity registers	14 community registers in place	14	registers	8,120	113,680		-	Four	32,480	Five	40,600	Five	40,600		-
1.2.1.d	Carry out training in participatory monitoring of Biodiversity Registers	14 community Biodiversity registers yearly up to date	14	registers updated	5,880	82,320		-	Four	23,520	Five	29,400	Five	29,400		-
1.2.1.d	Develop procedures for the registration of traditional varieties	Procedures approved by NSB	one	procedures	0	0		0	one	0		0		0		0
1.2.1.e	Undertake sensitization workshops	Stakeholder aware of traditional varieties registration	one	workshop	140000	140000		0	one	140000		0		0		0
Sub-total						418,320	-	-	14	219,520	15	99,400	15	99,400	-	-
Strategy 1.2.2 Develop a new law to protect and preserve indigenous knowledge of local varieties and effectively protect community intellectual property right																
1.2.2.a	supporting the drafting of the PGREF Bill	1 Stakeholder Workshop	one	workshop	20,000	20,000	one	20,000		0		0		0		0
1.2.2.b	Send Bill to Parliament	Bill becomes an Act	one	Act	-	-		-	one	0		0		0		0
1.2.2.c	Establish clear rules for the import and handling of GMO seed samples Review procedures on Standard Material Transfer Agreement on genetic resources	Approved procedures in place	one	Procedures	-	-		-	one	0		0		0		0
1.2.2d		Approved procedures in place	one	Procedures	-	-		-	one	0		0		0		0

Components objectives, strategies and activities		Output Assumptions	number of units	Unit	unit cost (000) UGX	total cost for 5 years (000) UGX	Year 1	total cost for year 1 (000) UGX	Year 2	total cost for year 2 (000) UGX	Year 3	total cost for year 3 (000) UGX	Year 4	total cost for year 4 (000) UGX	Year 5	total cost for year 5 (000) UGX
1.2.2.e	Enact Traditional Varieties Protection Bill	Bill approved by parliament	1	Bill	-	-		-		-		-	1	-		-
Sub-total						20,000	1	20,000	3	-	-	-	1	-	-	-
Strategy 1.2.3 -Promoting and building capacity of farmer and community groups including those led by women or youth to conserve crop varieties that have a high food security value																
1.2.3.a	Link LSBs, Farmer Organisation and Farmer groups including for youth and women to Genetic Resources Centre	PROVIDED FOR IN 1.1.1 a														
1.2.3.b	Link conservation to seed business and target high food security value crops	50 LSBs and 14 CGBs selling conservation seed	50	LSB	2800	140000	10	28000	10	28000	10	28000	10	28000	10	28000
1.2.3.c	Undertake specialised training of farmers on-farm conservation aspects	14 gene bank custodian farmers trained	14	farmers	5880	82320		0	Four	23520	Four	23520	4	23520	Two	11760
1.2.3.d	Organize diversity fairs	one Fair per agroecological zone	14	fairs	3920	54880		0	Four	15680	Four	15680	4	15680	Two	784
1.2.3.e	Facilitate farmer exchange/ cross-site visits	one annual cross -site visit per gene bank	14	visits	1400	19600		0	Four	5600	Four	5600	4	5600	Two	2800
1.2.3.f	Carry out training in participatory monitoring	14 Community gene banks annually monitored by the communities	14	gene banks	1120	15680		0	Four	4480	Four	4480	4	4480	Two	2240

Components objectives, strategies and activities		Output Assumptions	number of units	Unit	unit cost (000) UGX	total cost for 5 years (000) UGX	Year 1	total cost for year 1 (000) UGX	Year 2	total cost for year 2 (000) UGX	Year 3	total cost for year 3 (000) UGX	Year 4	total cost for year 4 (000) UGX	Year 5	total cost for year 5 (000) UGX
1.2.3..g	Undertake field trials and establish demonstration fields for conservation varieties	1 per gene bank per year	14	trials	2800	39200		0	4	11200	Four	11200	4	11200	2	5600
	Sub-total					351,680		28000		88480		88480		88480		58240
Strategy 1.2.4 -Supporting the development of community seed banks																
1.2.4.a	Establish a network of community seed banks under the coordination and technical support of PGRC.	Community Gene Banks at LSB at least 1 per agroecological zone														
1.2.4.a.1	Hold sensitisation meetings	14 Communities and DAO fir staff aware of importance of conservation	14	meetings	5,880	82,320		-	Four	23,520	Five	29,400	Five	29,400		-
1.2.4.a.2	Facilitate community-scientist negotiations	14 Communities supporting in situ conservation of national genetic heritage	14	community groups	3,920	54,880		-	Four	15,680	Five	19,600	Five	19,600		-
1.2.4.a.3	Construct CGB facilities	14 CGB facilities built	14	community gene banks	19,600	274,400		-	Four	78,400	Five	98,000	Five	98,000		-
1.2.4.a.4	Establish CGB management structures	14 CGB management structures operational	14	community gene banks	7,840	109,760		-	Four	31,360	Five	39,200	Five	39,200		-
1.2.4.a.5	Set up seed production and distribution mechanisms	14 CGBs with working seed production and distribution	14	community gene banks	10,080	141,120		-	Four	40,320	Five	50,400	Five	50,400		-
	Sub-total					662,480		-		189,280		236,600		236,600		-

Components objectives, strategies and activities	Output Assumptions	number of units	Unit	unit cost (000) UGX	total cos for 5 years (000) UGX	Year 1	total cost for year 1 (000) UGX	Year 2	total cost for year 2 (000) UGX	Year 3	total cost for year 3 (000) UGX	Year 4	total cost for year 4 (000) UGX	Year 5	total cost for year 5 (000) UGX
Total For Component (B)					1,452,480		48,000		497,280		424,480		424,480		58,240
COMPONENT 2 STRENGTHENING THE CAPACITY OF KEY PLAYERS ALONG THE SEED VALUE CHAIN TO ACHIEVE AN EFFECTIVE AND EFFICIENT SEED SUB-SECTOR															
Objective 2.1: To multiply and market high quality seed under the formal seed system.															
Strategy 2.1.1 Create an opportunity for all companies to access affordable credit for seed production and multiplication															
2.1.1.a	Engage financial institutions including SACCOs to extend credit to seed companies and agro-dealers as well	15	meetings	1000	15000	Three	3000	three	3000	three	3000	three	3000	three	3000
Strategy 2.1.2 Create a mechanism for seed demand articulation															
2.1.2.a	To develop a methodology that captures seasonal seed need for all crops	one training workshop	one	50,000	50,000	one	50,000								
2.1.2.b	Conduct regular seed demand estimation.	(annual meetings)	30	5000	1,500,000	six	30000	six	300000	six	300000	six	300000	six	300000
2.1.2.c	Establish multi stakeholder platforms to standardize messages	2 (once every two years)	Two	30,000	60,000	0	0	one	30,0000		0		0	One	30,0000
Sub-total					1,625,000	seve	353,000	7	333,000	6	303,000	6	303,000	7	333,000
Objective 2.2: To increase the availability of and access to quality seed of preferred varieties to complement those produced under the informal seed system.															
Strategy 2.2.1 -Promoting and building capacity of farmers, community groups and local seed businesses to produce and market quality seed with the focus on crops and varieties that have a high food security value;															

Components objectives, strategies and activities		Output Assumptions	number of units	Unit	unit cost (000) UGX	total cost for 5 years (000) UGX	Year 1	total cost for year 1 (000) UGX	Year 2	total cost for year 2 (000) UGX	Year 3	total cost for year 3 (000) UGX	Year 4	total cost for year 4 (000) UGX	Year 5	total cost for year 5 (000) UGX
2.2.1.a	Scale up number of LSB, Farmer Organisations and Farmer Groups involved in seed production and marketing	450 LSBs, Farmer Organisations and Farmers Groups established and functional nationwide	450	LSB	50,000	22,500,000	90	4,500,000	90	4,500,000	90	4,500,000	90	4,500,000	90	4,500,000
	Sub-total					22,500,000		4,500,000		4,500,000		4,500,000		4,500,000		4,500,000
Strategy 2.2.3 - Providing for emergency seed supplies in case of localised or national calamities to ensure continued availability of good quality seeds;																
2.2.3.a	Develop guidelines to supply seed in case of emergencies	Guidelines on emergency seed supplies adopted	30 days' consultancy	guidelines	1,960	58,800	1	58,800		0		0		0		0
2.2.3.b	Adopt appropriate MoUs with strategic stakeholders to build buffer stocks	MoU signed	one meeting	MoU	5,000	5,000	one	5,000		0		0		0		0
	Sub-total					63,800		63,800		0		0		0		0
Strategy 2.2.4- Promoting improved affordable and gender friendly technologies to support seed multiplication and post-harvest handling																
2.2.4.a	Strengthen women and youth groups by providing labour saving technologies such as ploughing and threshing equipment and transportation on credit.	LSBs equipped with appropriate labour saving technologies	150	LSB	56,000	8,400,000	100	5,600,000	30	1,680,000	20	1,120,000		-		-
2.2.4.b	AEATREC to identify, develop and test seed related low cost technologies.	Appropriate technologies identified, developed and tested	Five	technology	280,000	1,400,000		-	Two	560,000	one	280,000	Two	560,000		0

Components objectives, strategies and activities	Output Assumptions	number of units	Unit	unit cost (000) UGX	total cost for 5 years (000) UGX	Year 1	total cost for year 1 (000) UGX	Year 2	total cost for year 2 (000) UGX	Year 3	total cost for year 3 (000) UGX	Year 4	total cost for year 4 (000) UGX	Year 5	total cost for year 5 (000) UGX
2.2.4.c	ZARDIS to test and disseminate seed related low-cost technologies.	3	Technology	140,000	420,000		-	Two	280,000	One	140,000		0		0
2.2.4.d	Conduct national campaigns to educate farmers on use of quality seed and regulations using ICT.	5	Campaigns	20,000	100,000	one	20,000	one	20,000	one	20,000	one	20,000	one	20,000
2.2.4.e	Promote awareness on the different seed classes in Uganda using tools that effectively reach actors		Campaigns	10,000	50,000	one	10,000	one	10,000	one	10,000	one	10,000	one	10,000
Objectives 2.3 Strengthening seed Distribution and Marketing															
Strategy 2.3.1 strengthening seed distribution and marketing to enhance commercialization of quality seed															
2.3.1.a	Regulate packaging down to 1 kg	one	Regulation	0	0		0	Two	0		0		0		0
2.3.1.b	Support Seed Companies to assess economic viability of small packs, link to financial sources, appropriate	15	consultant days	1960	29400	15	29400		0		0		0		0
							29,400		0		0		0		0
Strategy 2.3.2- Supporting seed marketing outlets in remote areas by encouraging establishment of network of seed stockists;															

Components objectives, strategies and activities		Output Assumptions	number of units	Unit	unit cost (000) UGX	total cost for 5 years (000) UGX	Year 1	total cost for year 1 (000) UGX	Year 2	total cost for year 2 (000) UGX	Year 3	total cost for year 3 (000) UGX	Year 4	total cost for year 4 (000) UGX	Year 5	total cost for year 5 (000) UGX
2.3.2.a	Increase number of LSB seed dealers.	catered under 1.1.1														
2.3.2.b	Nominate village agents to collect village seed demand and submit it to Sub county township	5,000 villages count with seed agent	5000	villages visited	80	400000	1000	80000	1000	80000	1000	80000	1000	80000	1000	80000
	Sub-total					400,000		80,000		80,000		80,000		80,000		80000
Strategy 2.3.3 - Enhancing the capacity of Phytosanitary services to issue relevant plant health certificates in line with regional and international standards;																
2.3.3.a	Develop a strategic plan to build capacity for sanitary and phytosanitary services	Strategic plan approved	60	consultant days	1,960	117,600	60	117,600		0		0		0		0
2.3.3.b	Recognise phytosanitary tests from private accredited labs	Plant Protection and Health Act now recognise private accredited laboratory results for Phytosanitary certificates	one	Amendment	-	-	one	-		0		0		0		0
2.3.3.a	Undertake outreach on regionally harmonised standards	Stakeholders are familiar on regional seed standards	one	workshop	100,000	100,000	one	100,000		0		0		0		0
	Sub-total					217,600		217,600		0		0		0		0
Strategy 2.3.3 Strengthening Institutional coordination that ensures that effective border control services and provide efficient facilities, laboratories visual inspection kits, refrigerators at principal boarder points																
2.3.3.a	Hire qualified personnel and provide for minimum facilities at high risk entry points	provided for under NSS	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Sub total				0	0	0	0	0	0	0	0	0	0	0	0

Components objectives, strategies and activities	Output Assumptions	number of units	Unit	unit cost (000) UGX	total cost for 5 years (000) UGX	Year 1	total cost for year 1 (000) UGX	Year 2	total cost for year 2 (000) UGX	Year 3	total cost for year 3 (000) UGX	Year 4	total cost for year 4 (000) UGX	Year 5	total cost for year 5 (000) UGX
GRAND TOTAL COMPONENT 2															
35,205,800															
10,873,800															
7,463,000															
6,453,000															
5,473,000															
4,943,000															
COMPONENT 3 : SEED QUALITY CONTROL															
Objective 3.1 : To strengthen the quality control along the seed value chain															
Strategy 3.1.1 -Ensuring enforcement of all regulations regarding seed production, storage processing, chemical applications and residues on the Ugandan market to create an international reputation for the country as a good source of seed															
3.1.1.a	Review the legal framework to strengthen deterrent measures for those engaged in counterfeit seed	one	Review	50000	50,000	one	50000								
3.1.1.b	Establish enforcement mechanisms to fight against seed adulteration on the market	44	Training	20000	880000		0	11	220000	11	220000	11	220000	11	220000
Sub-total							50,000		220,000		220,000		220,000		220,000
Strategy 3.1.2 -Building and strengthening existing seed certification system and quality control for seed production, conditioning, and testing for locally produced and imported seed															
3.1.2.a	Repair laboratory infrastructure, water supply, internet connectivity and electricity backup generator at NSCS														
3.1.2.a.3	Restore water supply system	one	water system	100,000	100,000	one	100,000		-		-		-		-
3.1.2.a.4	Establish internet connectivity	one	internet service	56,000	56,000	one	56,000		-		-		-		-
3.1.2.a.5	Provide electrical backup generator	one	set	280,000	280,000	one	280,000		-		-		-		-

Components objectives, strategies and activities	Output Assumptions	number of units	Unit	unit cost (000) UGX	total cost for 5 years (000) UGX	Year 1	total cost for year 1 (000) UGX	Year 2	total cost for year 2 (000) UGX	Year 3	total cost for year 3 (000) UGX	Year 4	total cost for year 4 (000) UGX	Year 5	total cost for year 5 (000) UGX
3.1.2.b	Agricultural facilities for DUS														
3.1.2.b.1	Establish a mini-irrigation facility for 2Ha	one	irrigation facility	224,000	224,000	one	224,000		-		-		-		-
3.1.2.b.2	Construct a standard screen house.	one	screen house	84,000	84,000	one	84,000		-		-		-		-
3.1.2.b.3	Provide a tractor and accessories	one	tractor	210,000	210,000	one	210,000		-		-		-		-
3.1.2.b.4	Provide consumables for field work, fertilizers, etc	Five	assorted set	14,000	70,000	one	14,000	one	14,000	one	14,000	one	14,000	one	14,000
3.1.2.c	IT equipment and data processing unit														
3.1.2.c.1	Provide 7 laptops for inspectors	Seven	laptops	2,240	15,680	seven	15,680		-		-		-		-
3.1.2.c.2	Provide 8 desktops	Eight	desk tops	1,400	11,200	Eight	11,200		-		-		-		-
3.1.2.c.3	Provide 2 centralized heavy duty printers	Two	printer	5,600	11,200	Two	11,200		-		-		-		-
3.1.2.c.4	Provide 1 computer server to host USSIMS	one	server	14,000	14,000	one	14,000		-		-		-		-
3.1.2.c.5	Supply IT consumables	Five	assorted set	72,000	360,000	one	72,000	one	72,000	one	72,000	one	72,000	one	72,000

Components objectives, strategies and activities	Output Assumptions	number of units	Unit	unit cost (000) UGX	total cost for 5 years (000) UGX	Year 1	total cost for year 1 (000) UGX	Year 2	total cost for year 2 (000) UGX	Year 3	total cost for year 3 (000) UGX	Year 4	total cost for year 4 (000) UGX	Year 5	total cost for year 5 (000) UGX
3.1.2.d	NSCS Training Centre Facilities														
3.1.2.d.1	Provide equipment (photocopier, projector, flipcharts etc)	one	set	14,000	14,000	1	14,000		-		-		-		-
3.1.2.d.2	Develop and print workbooks and manuals (Authorisation)	1000	manuals	100	100,000	200	20,000	200	20,000	200	20,000	200	20,000	200	20,000
3.1.2.e	Field inspection equipment														
3.1.2.e.1	Provide 10 GPS	10	GPS hand sets	560	5,600	10	5,600		-		-		-		-
3.1.2.e.2	Provide Five digital cameras	Five	cameras	2,800	14,000	Five	14,000		-		-		-		-
3.1.2.e.3	Provide one minibus	Five	bus	140,000	140,000	one	140,000		-		-		-		-
3.1.2.e.4	Provide 5 double cabin pick up	One	vehicle	140,000	700,000	Five	700,000		-		-		-		-
3.1.2.e.5	Provide 5 motorcycle	Five	motor cycle	14,000	70,000	Five	70,000		-		-		-		-
3.1.2.e.6	Maintain NSCS equipment	Five	Equipment properly maintained	72,000	360,000	one	72,000	one	72,000	one	72,000	one	72,000	one	72,000
3.1.2.f	Laboratory equipment for ISTA Accreditation		repairs												
3.1.2.f.1	Develop inventory and technical specifications	Six	consultant days	1,960	11,760	one	11,760								

Components objectives, strategies and activities		Output Assumptions	number of units	Unit	unit cost (000) UGX	total cost for 5 years (000) UGX	Year 1	total cost for year 1 (000) UGX	Year 2	total cost for year 2 (000) UGX	Year 3	total cost for year 3 (000) UGX	Year 4	total cost for year 4 (000) UGX	Year 5	total cost for year 5 (000) UGX
3.1.2.f.2	Provide new equipment	1 set of equipment procured	one	set	350,000	350,000	one	350,000		-		-		-		-
3.1.2.f.3	Supply lab consumables for ISTA accreditation	1 set of consumable provided	Five	set	52,500	262,500	one	52,500	one	52,500	one	52,500	one	52,500	one	52,500
3.1.2.g	Increase NSCS technical staff by 10 persons	ten more staff incorporated to NSCS	10	10 persons for 5 years	1,800	3,240,000	one	648,000	one	648,000	one	648,000	one	648,000	one	648,000
3.1.2.h	Develop NSCS Quality Management system documentation	NSCS QMS documentation in place	30	consultant days	1,960	58,800	one	58,800		-		-		-		-
3.1.2.i	Extend tamper proof labels to 100% of certified seed (250,000) for 100,000 MT in 5Kg packages per year	250,000 tamper proof labels available	250000	tamper proof label	Three	750,000	one	750,000								-
Sub-total						7,512,740		3,998,740		878,500		878,500		878,500		878,500
Strategy 3.1.3 Establish procedures of accreditation for field inspection, sampling, testing and labelling																
3.1.3.a	Develop accreditation procedures for Field Inspection	Accreditation procedures approved by NSB	10	consultant days	1,960	19,600	10	19,600		0		0		0		0
3.1.3.b	Develop accreditation procedures for Seed sampling and labelling	Accreditation procedures approved by NSB	10	consultant days	1,960	19,600	10	19,600		0		0		0		0
3.1.3.c	Develop accreditation procedures for Seed Laboratory	Accreditation procedures approved by NSB	10	consultant days	1,960	19,600	10	19,600		0		0		0		0
3.1.3.d	Develop accreditation procedures for label printing	Accreditation procedures approved by NSB	10	consultant days	1,960	19,600	10	19,600		0		0		0		0

Components objectives, strategies and activities		Output Assumptions	number of units	Unit	unit cost (000) UGX	total cost for 5 years (000) UGX	Year 1	total cost for year 1 (000) UGX	Year 2	total cost for year 2 (000) UGX	Year 3	total cost for year 3 (000) UGX	Year 4	total cost for year 4 (000) UGX	Year 5	total cost for year 5 (000) UGX
	Sub-total					78,400		78,400		0		0		0		0
Strategy 3.1.4 - Strengthening the quality management systems of seed companies and national seed laboratories																
3.1.4.a	Require Seed Companies to have at least 1 seed technologist among its staff for registration as seed merchants	Regulations for registration updated	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.1.4.b	Provide external audit to Seed Companies Internal Quality Control twice a year.	23 Seed companies audited biannually	23		30,000	120,000	one	24,000	one	24,000	one	24,000	one	24,000	one	24,000
3.1.4.c	Extend development of QMS to all companies.	All companies with QMS in development	one	trainings on QMS	50,000	50,000	one	50,000								
3.1.4.e	Develop procedures to audit Accredited organisations	Accredited organisations regularly audited	10	consultant days	1,960	19,600	one	19,600		0		0		0		0
3.1.4.f	Recruit three (3) additional seed analysts at the National Seed laboratory	Analysts in National seed laboratory recruited	Three	3 analysts for 5 years	1200	216,000	one	43,200	one	43,200	one	43,200	one	43,200	one	43,200
Sub Total						405,600	4	136800	Two	67,200	Two	67,200	Two	67,200	Two	67,200
Strategy 3.2 - Establishing public/private partnership for seed quality control																
3.2.1	Accredit Private Companies and associations for Seed Quality Control and Certification.	11 Bodies accredited	11	Accreditation fees	28,000	308,000		0	Three	84,000	Three	84,000	Five	140,000		0

Components objectives, strategies and activities		Output Assumptions	number of units	Unit	unit cost (000) UGX	total cost for 5 years (000) UGX	Year 1	total cost for year 1 (000) UGX	Year 2	total cost for year 2 (000) UGX	Year 3	total cost for year 3 (000) UGX	Year 4	total cost for year 4 (000) UGX	Year 5	total cost for year 5 (000) UGX
3.2.2	USTA and MAAIF sign a MoU covering accreditation	MoU signed	one	MOU	0	5000	one	5000		0		0		0		0
	Sub-total					313,000	1	5000	3	84,000	3	84,000	5	140,000	0	0
Strategy 3.3 - Encouraging all registered seed companies and other seed merchants to join seed associations for purposes of self-regulation to ensure seed quality;																
3.3.1	Support all companies to be members of USTA (at registration).	All agree to be members of USTA	one	procedure revised	0	0	one	0		0		0		0		0
3.3.2	Mechanisms for coordination of purchasing seed	Mechanisms in place	one	Policy	0	0	one	0		0		0		0		0
3.3.3	USTA to define minimum requirements for Seed company to join	Minimum requirement defined by USTA	one	Standards	0	0	one	0		0		0		0		0
	Sub-total					0		0		0		0		0		0
Strategy 3.4 - Develop modalities for seed certification of horticultural crops, industrial crops, forestry and other plant species which have no variety maintenance;																
3.4.1	Establish procedures for quality control and certification of horticultural crops	Quality controlled Horticultural crop seeds available	15	Consultant days	1,960	29,400		-		-	15	29,400		-		-
3.4.2	Develop procedures for quality control and certification of Industrial crops	Quality controlled Industrial crop seeds available	15	Consultant days	1,960	29,400		-				-	15	29,400		-
3.4.3	Develop procedures for quality control and certification of forestry crops	Quality controlled forestry crop seeds available	15	Consultant days	1,960	29,400		-		-		-		-	15	29,400

Components objectives, strategies and activities		Output Assumptions	number of units	Unit	unit cost (000) UGX	total cost for 5 years (000) UGX	Year 1	total cost of year 1 (000) UGX	Year 2	total cost (000) UGX	Year 3	total cost of year 3 (000) UGX	Year 4	total cost for year 4 (000) UGX	Year 5	total cost for year 5 (000) UGX
3.4.4	Develop procedures for quality control and certification of vegetatively propagated crops	Quality controlled Vegetatively propagated crop seeds available	15	Consultant days	1,960	29,400		-	15	29,400		-		-		-
	Sub-total					117,600		-		29,400		29,400		29,400		29,400
Strategy 3.5-Providing for Quality Declared Seed class																
3.5.1	Develop regulations for QDS class	QDS Regulations approved by MAAIF	15	Consultant days	1,960	29400		-	15	29,400		-		-		
Strategy 3.6 - Establishing a delegated and decentralized system at zonal and/or district level for seed inspection for Quality Declared Seed.																
3.6.1	Provide Seed laboratory equipment to 9 ZARDIs plus 1 in North Substation + 3NARIs	13 laboratories furnished	13	Lab	168,000	2,184,000	Two	336,000	Five	840,000	Six	1,008,000		-		-
3.6.2	Accredit Seed laboratories at 9 ZARDIs plus 1 in North Substation + 3NARIs	13 laboratories accredited	13	Lab	56,000	728,000		-	Two	112,000	Five	280,000	Six	336,000		-
3.6.3	Deploy, 2 seed analysts per ZARDI and NARI	26 seed analyst authorised	26	Persons	108,000	2,808,000	14	1,512,000	12	1,296,000		-		-		-
	Sub-total					5,720,000		1,848,000		2,248,000		1,288,000		336,000		
Strategy 3.7 - Providing for listing of traditional and participatory breeding varieties																
3.7.1	NSCS develops procedures for the registration of LSBs, FOs, FGs through DAOs	Procedures developed	Two	Consultant days	1,960	3,920	Two	3,920		-		-		-		-

Components objectives, strategies and activities	Output Assumptions	number of units	Unit	unit cost (000) UGX	total cost for 5 years (000) UGX	Year 1	total cost for year 1 (000) UGX	Year 2	total cost for year 2 (000) UGX	Year 3	total cost for year 3 (000) UGX	Year 4	total cost for year 4 (000) UGX	Year 5	total cost for year 5 (000) UGX
3.7.2	Deploy official Seed inspectors at ZARDIs and NARI level	13	persons	1,200	936,000	13	187,200	13	187,200	13	187,200	13	187,200	13	187,200
	Sub-total				939,920	13	191,120	13	187,200	13	187,200	13	187,200	13	187,200
	GRAND TOTAL COMPONENT 3				16,017,260		6,308,060		3,714,300		2,754,300		1,858,300		1,382,300
COMPONENT 4: SEED SCIENCE KNOWLEDGE AND INFORMATION MANAGEMENT															
OBJECTIVE 4.1 Develop human resource for the seed sector development															
Strategy 4.1.1 - Supporting the development of seed science centres at tertiary institutions including seed research, training and accreditation purposes															
4.1.1.a	Provide incentives for tertiary institutions to train seed technologists	Three	students	20000	60,000	one	12,000	one	12,000	one	12,000	one	12,000	one	12,000
4.1.1.b	Support tertiary institutions to develop seed technology curriculum	Curriculum report	one	58,800	58,800	one	58,800								
	Sub Total				118,800	Two	70,800	one	12,000	one	12,000	one	12,000	one	12,000
Strategy 4.1.2 – Empower communities to appreciate and acquire seed knowledge and its relation to enterprise development															
4.1.2.a	Build the capacity of extension staff in seed knowledge	in service training for 1,000 sub counties	Shs. 50,000 per day per head for 5 days per year	1,250	6250000	one	1,250,000	one	1,250,000	one	1,250,000	one	1,250,000	one	1,250,000
4.1.3.a	Provide skills in seed business to farmers through LSBs, FOs and FGs.	225 LSBs	two day training	10,000	60,000	one	10,000	Two	20,000	one	10,000	one	10,000	one	10,000
	Sub Total				6310000	Two	1260000	Three	1270000	Two	1260000	Two	1260000	Two	1260000

Components objectives, strategies and activities	Output Assumptions	number of units	Unit	unit cost (000) UGX	total cost for 5 years (000) UGX	Year 1	total cost for year 1 (000) UGX	Year 2	total cost for year 2 (000) UGX	Year 3	total cost for year 3 (000) UGX	Year 4	total cost for year 4 (000) UGX	Year 5	total cost for year 5 (000) UGX
OBJECTIVE 4.2 Establishing the Seed Sector Information Management system															
Strategy 4.2.1 – Establishing a Seed Sector Integrated Information Management System															
4.2.1.a	Determine the data needs assessment for USSIMS	90 days		1960	176400	one	176,400								
4.2.1.b	Procure the necessary hardware				500,000	one	500,000								
4.2.1.c	Build the skills of NSCS staff on data management				29,400	one	29,400								
4.2.1.d	Provide IT equipment (server)				15,000			one	15,000						
4.2.1.e	Develop applications and portals				50,000			one	50,000						
Sub Total					770800	Three	705800	Two	65000	0	0	0	0	0	
	TOTAL FOR COMPONENT 4				7,199,600		2,036,600		1,347,000		1,272,000		1,272,000		1,272,000
	Total For All Components				82,472,340	-	32,237,670	-	17,040,340	-	13,630,690	-	10,492,940	-	9,070,700
	MONITORING AND EVALUATION (3%)				2474170.2		967130.1		511210.2		408920.7		314788.2		272121
	Contingency adjusted for 5% inflation				2,587,086	-	-	-	877,578	-	701,981	-	540,386	-	467,141
	ALL GRAND TOTAL				87,533,596	-	33,204,800	-	18,429,128	-	14,741,591	-	11,348,115	-	9,809,962

MINISTRY OF AGRICULTURE, ANIMAL INDUSTRY AND FISHERIES

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