



THE REPUBLIC OF UGANDA

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

Performance Review Report

FINANCIAL YEAR

2016/2017

Foreword

This agricultural sector annual performance report prepared by the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) covers the period July 2016 to June 2017. The report fulfills annual requirements under the Comprehensive African Agricultural Development Program (CAADP) and the New Partnership for African Development (NEPAD) commitments. This report was submitted to the Office of the Prime Minister (OPM) and Ministry of Finance, Planning and Economic Development (MoFPED) to constitute the agriculture chapter of the Government Annual Performance Report (GAPR) for the Financial Year (FY) 2016/17.

The MAIF performance report incorporates stakeholders' comments, observations and recommendations made during the Joint Agricultural Sector Annual Review (JASAR) for FY 2016/17. The report provides an assessment of the sector performance and the results of public spending during the FY 2016/17. It also highlights responses of MAAIF and Agencies to undertakings agreed to in the JASAR 2015 workshop.

The information presented covers the MAAIF structure and mandate, *Crops, Livestock; Fisheries* sub-sectors performance, *Agriculture Extension Services, Agriculture Infrastructure, Mechanization and Water for Agricultural production, Human Resource Management (HRM), National Agriculture Advisory Services (NAADS) and National Agriculture Research Organization (NARO)*. The document is an annual publication through which key statistical information derived from routine monitoring visits and administrative records of the Ministry Department and Agencies (MDAs) are disseminated.

The Ministry appreciates contributions of all stakeholders in implementation of the FY 2016/17 sector initiatives and the political leadership as well as the agricultural sector Development Partners for their guidance.

The Ministry welcomes constructive comments from stakeholders that aim at enhancing the quality of its future publications. At their convenience, readers are encouraged to send constructive comments to the under signed, and or the editorial team. This report can be down loaded from the Ministry website at www.agriculture.go.ug.

It is my sincere hope that the information in this publication is used to make informed decisions.

P. Wakabi
PERMANENT SECRETARY

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ACRONYMS

ACDP	Agriculture Cluster Development Project
ADB	African Development Bank
AFAAS	African Forum for Agricultural Advisory Services
AFALU	Association of Fishers and Lake Users
AFCA	Africa Fine Coffees Association
AgITT	Agriculture Technology Transfer
AGRA	Alliance for a Green Revolution in Africa
AIV	African Indigenous Vegetables
ASYCUDA	A utomated S ystem for C ustoms D Ata
ASWG	Agriculture Sector Working Group
ATAAS	Agriculture Technology and Agribusiness Advisory Services
AU	African Union
AU-IBAR	African Union Inter-African Bureau for Animal Resources
BAC	Bukalasa Agriculture College
BBW	Banana Bacterial Wilt
BUL	BIDCO Uganda Limited
CAADP	Comprehensive Africa Agriculture Development Programme
CAIIP	Community Agriculture Infrastructure Investment Program
CBPP	Contagious Bovine Pleura Pneumonia
CBSD	Cassava Brown Streak Disease
CDO	Cotton Development Organization
COCTU	Coordinating Office for the Control of Trypanosomiasis in Uganda
CoE	Centre of Excellence
COMESA	Common Market for East and Southern Africa
CSO	Civil Society Organization
CWD	Coffee Wilt Disease
CWD-R	Coffee Wilt Disease - Resistant
DAES	Directorate of Agriculture Extension Services
DDA	Dairy Development Authority
DfID	Department for International Development
DiFR/DFR	Directorate of Fisheries Resources
DRC	Democratic Republic of Congo
DSIP	Development Strategy and Investment Plan
EAAPP	East Africa Agriculture Productivity Project
EADD	East Africa Dairy Development Project
EEA	Enabling Environment for Agriculture
EURTTEP	European Union Regional Tsetse and Trypanosomiasis Eradication Project
FAO	Food and Agriculture Organization
FETF	Fisheries Enforcement Task Force
FEW	Field Extension Workers
FFB	Fresh Fruit Bunches
FFS	Farmer Field School

FIP	Framework Implementation Plan
FS	Frame Survey
FSSP	Fisheries Subsector Strategic Plan
FTI	Fisheries Training Institute
FVIP	Fishing Vessel Identification Plates
FY	Financial Year
GAfSP	Global Agriculture and Food Security Program
GAfSP	Global Agriculture and Food Security Program
GDP	Gross Domestic Product
GEF	Global Environment Fund
GEF	Global Environment Facility
GMO	Genetically Modified Organisms
GoU/GOU	Government of Uganda
Ha	Hectare
HQ	Headquarters
HRM	Human Resource Management
IAEA	International Atomic Energy Agency
ICT	Information Communication and Technology
IDA	International Development Agency
IDB	International Development Bank
IDB	Islamic Development Bank
IEC	Information Education Communication
IFAD	International Fund for Agricultural Development
IGAD	Inter Governmental Authority for Development
IITA	International Institute for Tropical Agriculture
IPC	Integrated Food Security Phase Classification
JASAR	Joint Agricultural Sector Annual Review
JICA	Japan International Cooperative Agency
JTC	Joint Technical Committee
KAFACI	Korea-Africa Food and Agriculture Cooperation Initiative
KASICA	Kawanda Silk Crafts Association
Kg	Kilogram
KOICA	Korea International Cooperative Agency
LAGBIMO	Lake George Basin Integrated Management Organization
LAKIMO	Lake Kyoga Integrated Management Organisation
LG/s	Local Government/s
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MBAZARDI	Mbarara Zonal Agricultural Research and Development Institute
MCC	Milk Collection Centre
MGLSD	Ministry of Gender Labor and Social Development
MLN/	Maize Leaf Necrosis/Disease
MoES	Ministry of Education and Sports
MoFPED	Ministry of Finance Planning and Economic Development
MoPS	Ministry of Public Service

MoU	Memorandum of Understanding
MPMPS	Meat Production Master Plan Study
MT/Mt	Metric Ton
MuZARDI	Mukono Zonal Agricultural Research and Development Institute
MWE	Ministry of Water and Environment
NAADS	National Agricultural Advisory Services
NaCoRI	National Coffee Research Institute
NaCRRRI	National Crop Resource Research Institute
NADDEC	National Animal Disease Diagnostic and Epidemiology Centre
NAEP	National Agriculture Extension Policy
NAES	National Agriculture Extension Strategy
NAGRC&DB	National Agricultural Genetic Resource Centre and Data Bank
NAITS	National Artificial Insemination Technology Strategy
NaLiRI	National Livestock Research Institute
NAP	National Agriculture Policy
NARL	National Agricultural Research Laboratories
NARO	National Agricultural Research Organization
NaSARRI	National Semi-Arid Resources Research Institute
NDP	National Development Plan
NEMA	National Environment Management Authority
NFP	National Fisheries Policy
NSC	National Sericulture Centre
NTR	Non Tax Revenue
OWC	Operation Wealth Creation
PACA	Partnership for Aflatoxin Control in Africa
PARIs	Public Agriculture Research Institutes
PASIC	Policy Action for Sustainable Intensification of Cropping
PMU	Project/Program Management Unit
PPP	Public Private Partnership
PRiDe	Promotion of Rice Development
SACCO	Savings and Credit Cooperative Organisation
SCAA	Specialty Coffee Association of America
SCAE	Specialty Coffee Association of Europe
SCAJ	Specialty Coffee Association of Japan
SLM	Sustainable Land Management
SNV	Netherland Development Agency
SOP	Standard Operating Procedures
SPS	Sanitary and Phyto Sanitary
TAD	Trans boundary Animal Diseases
TDS	Technology Development Sites
TPM	Top Policy Management
TUNADO	Uganda National Apiculture Development Organisation
TV	Television
UAE	United Arab Emirates

UBOS	Uganda Bureau of Standards
UCDA	Uganda Coffee Development Authority
UNDHS	Uganda National Demographic Household Survey
UDHS	Uganda Demographic Health Survey
UEAWCP	Uganda Egypt Aquatic Weed Control Project
UFFCA	Uganda Fisheries and Fish Conservation Association
UFPEA	Uganda Fish Processors and Exporters Association
UFROT	Uganda Fishing Industry Rescue Operation Team
UGX	Uganda Shillings
UMPCU	Uganda Meat Processors Cooperative Union
UNBS	Uganda National Bureau of Standards
UNHS	Uganda National Household Survey
UNICEF	United Nations International Children Education Fund
USA	United States of America
USAID	United States Agency for International Development
USD	United States Dollars
USPA	Uganda Silk Producers Association
VF	Vote Function
VODP	Vegetable Oil Development Project
WB	World Bank
WFP	World Food Program
WHO	World Health Organization
ZARDI	Zonal Agricultural Research and Development Institute

EXECUTIVE SUMMARY

Background

Implementation of the Comprehensive Africa Agriculture Development Programme (CAADP) and the New Partnership for African Development (NEPAD) protocols formulated under the aegis of the African Union and to which Uganda is a signatory, requires utilization of a mutual accountability tool in the form of national level Joint Sector Reviews (JSRs). The reviews provide a forum for collective multi stakeholders' assessments of sector performance and joint agreement on priority interventions for improvement in subsequent years. In line with this, Uganda's second National Development Plan (NDP) II for the Financial Years (FY) 2015/16-2019/20 implementation modalities oblige sectors to conduct comprehensive reviews based on **their annual performance reports**. Accordingly and in line with this requirement, the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) has in collaboration with agriculture sector stakeholders, been organizing Joint Agricultural Sector Annual Reviews (JASARs) since 2011 with 7 reviews conducted to date and the latest held on the 27th and 28th September 2017.

The mandate of MAAIF is to *support, promote and guide production of crops, livestock and fisheries so as to improve quality and increase quantity of agricultural produce and products for domestic consumption, food security and export*. The structure for the Ministry of Agriculture, Animal Industry and Fisheries in the Financial Year (FY) 2016/17 constituted; 4 directorates with 13 departments; 4 standalone departments and 3 specialized units as the main organizational entities of the Ministry. The MAAIF structure also includes 7 semi autonomous Agencies, 3 Agricultural Training Institutes (ATI), a National Farmers Leadership Center (NFLC) and District Agriculture Training Information Centres (DATICs) located in District Local Governments (DLG). In the FY 2016/17 overall sector performance is summarised as follows.

Budget Performance

Overall, the sector had an approved budget in FY 2016/17 of UGX 854.467Bn (Excluding Arrears). By the end of June 2017, UGX 722.629 Bn had been released, of which UGX 712.114 Bn was spent on the various activities of the different institutions in the sector. Most of the funds under the Government of Uganda (GoU) budget component were released by the Ministry of Finance, Planning and Economic Development (MFPED) to the various departments and agencies within the sector to the tune of 84.6 %. The Ministry and its agencies managed to absorb 98.5 % of the GoU funds for implementation of the various planned activities and outstanding commitments.

Trends and Progress Measured Against ASSP Outcome Indicators in FY 2016/17

In 2016/17, Uganda's economy expanded by 3.9%, lower than 4.7% achieved in the previous year and the target of 5.5%¹. The lower growth was attributed to the drought that the country experienced during the FY and the slowdown in execution of public investment^{1,2}. Furthermore, the country experienced a prolonged dry spell from March to August 2016 following an El Nino event in 2015/16. This led to widespread crop failure and reduced livestock production due to declining pasture and water conditions as drought persisted. Largely due to the drought, the growth of the agriculture sector fell from 2.8% in 2015/16 to an estimated 1.3% in 2016/17 and all sub-sectors of the agriculture sector registered a decline or no growth from the previous year. The growth of the industry and services sectors was also sluggish when compared to the previous FY due to a slowdown in the growth of some of the components of those

¹ 2017 Budget Speech

² UMF Country Report No 17/269

sectors.

The annual average food and non-food inflation rates increased during the FY under review. The rise in overall headline inflation was largely due to developments in the supply and demand for food in general and food crops specifically and as explained earlier, domestic supply was adversely affected by the prolonged dry spell in 2016. Food items includes food crops such as maize, beans, cassava, matooke and non food crop items such as meat, dairy products and processed foods.

The shilling opened the FY 2016/17 trading at an average official exchange rate of UGX 3,379 against the USD in July 2016 and closed at UGX 3,591 in June 2017, representing 6.3% depreciation. The depreciation of the exchange rate during the year was largely attributed to strengthening of the USD against the Uganda Shilling, the slow economic recovery in Europe, a major market for our export commodities and increased demand for domestic oil, manufacturing and telecom services. This development is important because, a weaker shilling would normally stimulate economic activity and it would be expected that farmers would therefore enjoy higher commodity and export prices. But Uganda's agricultural exports are *still* mainly in raw form and most primary goods do not command a high price in the international market.

Over the ASSP implementation period, the agriculture sector aims at achieving the following 3 outcomes:-

- Outcome 1 Increase productivity by farmers to at least 50% of the yields at research stations for the 12 priority commodities;
- Outcome 2 Transform subsistence farmers into enterprise farmers and transform smallholders farmers into commercial farmers;
- Outcome 3 Increase agriculture exports to at least USD 4Bn per year.

For outcome 1, The available data indicates progress in increasing rural incomes from agriculture as well as number and share of labour force employed in agriculture. UNHS 2016/17 also indicates that while the ASSP did not set a target for the contribution of agriculture to total GDP, it is theoretically expected that this should be declining relative to other sector contributions as the economy grows. The opposite seems to have taken place between 2015/16 and 2016/17 with agriculture share increasing instead from about 24% to an estimated 25%. For outcome 2, though there are no recent data for the FY 2016/17, for labour force in subsistence production, it can be deduced from available data that the proportion in subsistence production was higher in 2016/17. The agriculture sector grew by 1.3% in FY 2016/17 from 2.8% in FY 2015/16. As already mentioned above, the slower growth in the sector as a whole and in individual sub-sectors was due to drought. For outcome 3, on the basis of available data, the share of agricultural exports to total exports declined. This is expected given the poor performance of the agriculture sector in general and the cash crop subsector. The demand for Uganda's exports was low due to slow economic recovery in Europe and civil conflicts in some parts of the Eastern African region¹. The ratio of agricultural exports to agriculture GDP at current prices also declined from 23.4% to 19.3%.

The performance per subsector was follows.

Crop Subsector (12 Commodities)

1) Coffee

The cumulative volume of exports for the period July 2016 to June 2017 was 4,186,606 60-kilo bags (3,188,810 bags of Robusta and 997,796 bags of Arabica) compared to 3,556,692 bags in 2015/16, representing an increase of 18%. The performance of coffee exports for the FY 2016/17 was 112% of the projection. The cumulative value of exports realized was USD 490 million (Robusta USD 350 million;

Arabica USD 140 million) compared to USD 351 million (Robusta USD 249; Arabica USD 102) for the previous FY, a 40% rise over the previous period. The export value performance was 99% of the projection.

During the FY, a total of 54,544 MT of seeds comprising of 50,504 MT of Robusta and 4,04 MT of Arabica were distributed to 556 nursery operators spread across the five coffee growing regions. This represents a total of 285 million coffee seedlings generated and out of this, 172 million were distributed and planted by 521,540 coffee farming households spread across the five regions in the 96 coffee growing districts. Generally, seedlings generation capacity increased from 44 million in FY 2012/13 to 285 million in FY 2016/17. The seedlings planted has also increased from 13 million in FY 2012/13 to 104 million in FY 2016/17 assuming a survival rate of 70%.

2) Cotton

Cotton lint production increased from 27,950 MT in FY 2016/17 as compared to 20,339 MT that was produced in FY 2015/16. The quantity of lint exported was 25,994 MT in FY 2016/17 as compared to 19,242 MT that was exported in FY 2015/16. The value of lint exported was USD 41.64 Million in FY 2016/17 as compared to USD 25.81 million in FY 2015/16. Approximately, 1,956 MT of Lint were consumed locally in FY 206/17 compared to 1,097 MT that was consumed in FY 2015/16.

3) Tea

Tea production trends in Uganda were 65,900 MT in 2014; 67,000 MT in 2015 and 69,000 MT in 2016 showing consistent increment over the years.

4) Cocoa

Cocoa production trends were: 19,430 MT in 2013; 22,010 MT in 2014; 24,008 MT in 2015 also representing a consistent increment over the years.

5) Vegetables Oil Crops

In 2016 alone, the oil palm development activities in Kalangala (nucleus estate and smallholders) produced 106,867 MT of oil palm fresh fruit bunches from which 27,198 MT of crude palm oil was produced valued at USD 24.5 million. The private sector partners, Oil Palm Uganda Limited and BIDCO Uganda Limited also paid Government of Uganda income and value added tax worth UGX 157.4 billion. A total of 120 (M=88 F= 32) smallholder oil palm farmers with mature oil palm farms benefited from the commercial loan have paid back UGX 537,426,281, and the loan is completed.

6) Rice

Rice production decreased by 0.33% from 238,190 MT in 2015 to 237,390MT in 2016. Most of the rice is consumed locally. The area under rice cultivation increased by 1.9% from 95,277 Ha in 2015 to 97,140 Ha in 2016. The volume of Rice exported was only 22.2% (52,754 MT) of total production in 2015 as compared to 57,053 MT in 2014.

7) Maize

Maize production increased from 2,812,920 MT in 2015 to 2,912,540 MT in 2016. The Volume of export for Maize was 358,308 MT registered in 2015. There was an increase in area planted under maize from 1,125,168 Ha (2015) to 1,137,410 Ha in 2016. Maize export volumes also increased from 134,903MT in (2014) to 358,308MT in (2015, valued at USD 42.565M and USD 90.897M. (MAAIF Stat. Abstract, 2015/2016).

8) Beans

Beans production output increased from 1,079,943 MT in 2015 to 1,104,770 MT in 2016. While the area planted under beans increased from 674,290 Ha in 2015 to 683,120 Ha in 2016. The export volumes for beans and other pulses increased from 39,483 MT (2014) to 157,152MT in 2015, valued at USD 26.050M (2014) and USD 62.693M (2015) respectively.

9) Cassava

Cassava production increased from 2812 MT in 2014 to 2983 MT in 2015, while MAAIF established a cassava seed system and cassava propagation base for 1000 farmers where 40 mother gardens of NASE14 were established in Kiryadongo, Masindi, Hoima and Buliisa.

10) Banana

Banana production output trends were: 4,574,470 MT in 2014; 4,623,370 MT in 2015 and 4,530,880 MT in 2016. The decrease in production in 2016 was due to the prolonged dry spell which affected the major banana producing areas in South Western Uganda.

11) Fruits and Vegetables

Vegetable production and productivity increased (compilation of statistics was still ongoing).

12) Irish Potatoes

There was a slight increase in potato production, from 173,092 MT in 2015 to 173,610 MT in 2016 with the highest output achieved in 2012 (185,100 MT).

13) Pests and Diseases Control

Despite high prevalence levels of FAW infestation in the first season of 2017, its damage was contained at 16.5% except for Karamoja where the damage was >50% due to limited presence of pesticide stockists; a reduction in BBW prevalence from 7.8% in 2016 to 6.3 % in 2017; MLN prevalence is currently at 2.5% down from 3.4% in 2015/16 FY; a reduction in coffee twig Borer prevalence from 38.9% in 2015/16 to 22.7% in 2016/17 FY while the Bronze Bug has affected all LGs in in South-Western, Central and eastern Uganda are all affected and pest prevalence amongst eucalyptus plantations is at >70%.

14) Crop Inspection and Certification

A number of guidelines were developed including; the Agricultural Chemicals and (Control) Act 2006 and Seed and Plant Act 2006; an inspection and Certification Manual; as well as SOP for false codling moth all awaiting approval by TPM. The counterfeit products are emerging in the market and are difficult to detect because the approved labels are scanned and reproduced making them very similar to the approved labels. There was reduction of repackaged products constituting 3% of the total quantity impounded as compared to last FY 2015/16, as result of improved enforcements and inspections coupled with court prosecutions. There was also improved compliance by the flower farms towards conformity to EU required standards as result of sensitization, regular inspections and audits by Inspectors. The acreage under seed crops 25,265 Ha increased by 20.6% compared to FY2015/16 largely due to more land allocated to seed crop production. There was also improved compliance to seed regulations as result of regular inspections and enforcements while 23 crop varieties were approved by Variety Release Committee and released for commercialization. There was an increase of 29.5% phytosanitary certificates issued and horticultural exports were about 6,193,451 kg equivalent to USD 15,483,627.50 while there was improved enforcement by working with Agriculture Police.

15) Food and Nutrition Security

The national food security analysis report of January 2017 indicated that the number of food secure households reduced from 83% to 69% of the national population. This was classified as being minimally food insecure (**Phase one**), this population has access to a stable food security and access to a variety of adequate food both from household stocks and markets. However, 26% of national population was facing stressed food insecurity (**Phase two**), accessing minimum adequate food consumption and employing insurance strategies; and 5% of the population was found to be in crisis (**Phase three**), this population had widening food consumption gaps with deteriorating dietary diversity and high malnutrition rates. The Uganda Demographic and Health Survey (UDHS, 2016) indicated that 29% of children below five (5) years are stunted (short-for-age). Stunting ranges from a high rate of 41% in Toro region to a low rate of 14% in Teso region. The report also indicated that stunting is higher in children from rural areas (30%) as compared to children in urban areas (24%).

16) Fisheries Subsector

Under capture fisheries, the FY witnessed continued decline in fish production from 396,205 MT in 2015 to 389.244 MT in 2016 with decreases in total fish production caused by increased enforcement by the Fisheries Protection Force. Small pelagic fishes have continued to emerge as predominate catch while the main commercial species caught included Nile perch, Tilapia and Mukene on all major water bodies. In the year 2016, exports of various fish products to international markets decreased from 18,785 MT in 2015 to 16,168 MT in 2016. This resulted in decline in value from 123.117 million USD in 2015 to 88,970 million USD in 2016. Over 50 potential fish breeding areas identified and demarcated in collaboration with NaFIRRI.

Under aquaculture, a comparison of production figures for 2014 and 2015 shows that aquaculture production grew by 8.4%, although this fell short of the set target of 15% per annum. The growth resulted in a total increase in yield for both fish ponds and fish cages to an estimated 120,360 MT. The estimated number of farmers involved in aquaculture has increased from 15,000 in FY 2015/16, to 16,200 farmers in FY 2016/2017, it's important to note that these number are evenly distributed through the country. Currently these farmers own 27,000 ponds and 3,500 fish cages which produced about 120,360 MT in 2016. This earned fish farmers UGX 47.26 Bn in 2016 as compared to UGX 43.6 Bn. in 2015.

Livestock Subsector

1) Policies, Bills and Regulations

The DAR finalized national stakeholder consultations on the draft Animal Feeds Bill, Animal feeds standards were not enforced; Pastoralism & Rangelands Management policy (PRMP) awaiting presentation to TPM; the Dairy policy was not drafted; the draft Meat Development Bill was not revised; the First draft Hides and Skins Development Policy was formulated and presented to Department of Animal production (DAP) for comments.

2) Meat and Meat Products

Beef exports declined significantly from 54,906 Kg in 2015 to 18,314 Kgs in 2016, pork from 7,086 Kgs to 2,067 Kgs, dressed chicken increased from 21,765 Kgs to 32,538 Kgs while eggs significantly increased from 833,907 Kgs to 2,994,160 Kgs in 2015 and 2016 respectively.

3) Milk and Milk Products

Records indicate that milk and milk product exports increased significantly, for example milk from 1.9m Kg in 2015 to 6.8m Kg in 2016 while ghee and milk powder increased from 1.9m Kg to 3.7m Kg in 2016 and butter and butter oil as well as casein also registered increases.

4) *Apiary*

In FY 2016/2017, a total of 132 beehives, 10 overalls, 10 pairs of gloves, 10 pairs of gumboots, 3 sets of hive tools and smokers were procured and distributed to the districts of Masaka, Lwengo and Kalungu. 24 Entomologists/Project Focal Persons were trained in farm-based bee reserves management. A total of 440 beneficiary beekeepers were trained, of which 30% were women and youth. This was under the Farm-Based Bee Reserve Establishment Project (FBBEP). A total of 18 honey samples were collected, analysed for pesticide residues. The honey analysis results were submitted together with National Residue Monitoring Plan (NMRP) for Uganda to EU as a requirement to maintain Uganda on list third countries allowed to export honey into the EU market.

5) *Silk*

There are about 2,300 farmers with mulberry gardens and about 210 farmers actively rearing silkworms and producing cocoons in 12 districts in western, central and eastern Uganda. 3.6 tons of mulberry planting materials were produced at the National Sericulture Centre and distributed to 6 farmer groups in Luwero and Mubende districts. On average 18 acres of mulberry were planted in the 2 districts.

6) *Hides and Skins*

Exports of wet blue hides and skins that had registered declines in 2015 increased from 8m Kgs to 12.7m Kgs in 2016 and 1.5m Kgs to 2.8m Kgs in 2016 respectively. However, chrome tanned leather volumes declined from 1.1m Kgs to 1m Kgs in the same period.

7) *Pest, Vectors and Diseases*

A number of outbreaks were investigated including FMD, Rabies, African Swine Fever (ASF), Anthrax, Brucellosis, CBPP, Lumpy skin disease, black quarter and were followed by provision of vaccines in addition to sensitization as appropriate.

8) *Veterinary Regulation and Enforcement*

A Draft Veterinary Practitioners Bill, Draft Standard Methods, guidelines and procedures for Quarantine of Animals and Regulation of Animal products; Draft Policy on Regulation of Veterinary Medicines, Biologicals, chemicals and devices were formulated or reviewed during the FY and are to be presented to stakeholder for consultation. MAAIF also inspected, approved and registered a number of animal and animal handling and processing establishments engaged in production for local and export markets.

Agricultural Extension

During the FY 2016/2017, the institutional processes to mainstream the agricultural extension services into the Ministry's and Local Governments' administrative, planning and budgeting frameworks were undertaken. The Vote Function of DAES became operational and the departmental program codes were also created. Two more Technical officers were posted to the Directorate on assignment of duties to operationalize the Division of Skills Management. This increased the technical manpower to 18 out of the required 34 approved in the structure. Effective 2016/2017 the DAES started receiving budget allocation.

The National Agricultural Extension Policy (NAEP) 2016 was approved by Cabinet and launched in December, 2016, National Agricultural Extension Strategy (NAES) 2015/16-2020/21 approved by Cabinet

and launched in December, 2016; Principles for the National Agricultural Extension Bill 2017 approved by TPM in June 2017; National Agricultural Knowledge Management and Communication Strategy approved by TPM in June 2017; Agro Processing and Marketing Strategy for Rice and Maize approved by TPM in June 2017; DAES guidelines and standards for the regulation and quality assurance of the Agricultural extension services developed and approved by TPM; Strategy for youth involvement in Agriculture developed and approved by TPM in June 2017 and The Accreditation Guidelines developed and approved by MAAIF TPM.

The DAES Collaborated with the World Bank and developed a Solutions Finder Database used to share knowledge captured. USAID Feed the Future EEA provided support during the development of: principles, guidelines, standards and ethical code of conduct of agricultural extension service providers. DAES also negotiated with IFAD to restore funding for ATAAS that was withdrawn following the reform of agricultural extension to support mobility and capacity building of recruited extension staff in local governments. The funding was restored to the tune of USD 8.1 million

4,236 Demonstrations established in February to June, 2017 in all the 116 districts and 1,396 sub-counties. Engaged more than 20 FM Radios and 5 Television Stations (UBC, STAR, WBS, NBS and DELTA) and publicized agricultural programs MAAIF is implementing. The Ministry constructed storage facilities for Farmers Groups as pilot demonstration centers in Masindi and Jinja

Agricultural Infrastructure and Water for Agricultural Production

35 Valley tanks of 174,750 cubic meters of water constructed; 945 acres of bush clearing/opened for agriculture; 38 farm roads of 136Km opened by ministry equipment; Low bed carrier and pick up double cabin procured; Water User Associations (WUAs) trained in Doho and Mubuku irrigation Schemes. 3 Medium Scale Irrigation Schemes were rehabilitated under FIEFOC project, Agoro irrigation schemes in Lamwo, Doho in Butaleja, Mubuku in Kasese were completed and the Olweny Irrigation scheme in Dokolo/Lira is still under construction.

Human Resource Management

The restructuring exercise was concluded and the new Ministry structure was approved. Out of **886** approved establishment, **572** positions have been filled, representing **64.56%** and out of the **340** vacant positions reported in FY 2015/2016, **50** were filled in **FY 2016/2017** within the available resources. Out of the **314** vacant positions **60** positions are already with Public Service Commission (PSC) for filing. To improve linkages and collaboration with stakeholders, MAAIF conducted monthly Agriculture Sector Working Group (ASWG) meetings on a regular basis. These were informed by meetings of the Top Policy Management (TPM) team that includes MAAIF HQ senior management, Agencies, Development Partners and other key stakeholders.

Arrangements to establish a National Agricultural College are in advanced stages while the World Bank and GoU, under Skills Development Project, are supporting Bukalasa Agricultural College (BAC) to become a National Centre of Excellence in Agricultural training. MAAIF supported the Fisheries Training Institute (FTI) and Bukalasa Agricultural College (BAC) to review their curricula in line with the NDP II, ASSP and the Skilling Uganda initiative. The draft curricula have been submitted to Top Policy Management for approval.

Construction of the new MAAIF office in Kampala was cancelled following GoU new policy on construction of Government offices to be in one designated area for efficiency and ease of communication. MAAIF also conducted a number of short and long term training for senior and middle level staff in line with the 3

Year Capacity Building Plan. Furthermore, MAAIF has analysed and costed all vacant posts against available wage at DLGs and Sub County levels to guide recruitment and provided technical guidance and overall monitoring of the recruitment of 3,062 District Local Government extension staff out of 5,000 approved positions

MAAIF Agencies

National Agriculture Research Organization (NARO)

During the FY 2016/17, progress was made in plant variety and animal breeding genetic improvement; developing improved animal and crop management practices; plant and animal health management; product development and diversification along the value chain; fisheries; forestry; climate smart agriculture; agro-machinery and cross-cutting research areas. A total of 162 technological innovations were generated. Some of these technological innovations are ready for commercialization and dissemination, and twelve (12) products are ready for patenting. NARO has delivered on all targets set against the key performance indicators for the FY 2016/17. A number of principal outcomes were registered during the FY 2016/2017, some of which are highlighted hereafter: -

1) Spurred Technology Uptake Through Increased Knowledge Dissemination

The NARO-led activities conducted under component 2 led to increased awareness and understanding of NARO's undertakings and technologies developed and available for uptake by various end-user categories. This increased knowledge gain continues to spur uptake of NARO's technologies hence increasing its visibility and that of its development partners that support its research and development projects. The events and avenues used to boost dissemination of the technologies included, but were not limited to the adaptive trials and demos at ZARDIs and district levels, the agricultural and trade show held in July, world food day show in October and agricultural dissemination conference in November 2016; then the World Bank Open Day in May and Agritec show in Nairobi held in June 2017.

2) Increased Productivity and Production

- a) Much as the project impact study is not yet conducted, it is anticipated that farmers who gained knowledge from the above-mentioned and other sources in NARO; and those who accessed quality seed, livestock dry-season feeding technologies and SLM-smart agriculture technologies and applied it as recommended, had and will have increased productivity of their enterprises.
- b) There is increased productivity on the farmers' fields as a result of developing and implementation of sustainable land management technologies such as tree planting, water harvesting and irrigation, terraces and contour bands, rehabilitation of degraded water sheds and grazing lands; generating informative soil erosion hazard maps, and passing bylaws.
- c) Additionally, the release and commercialization of higher yielding, disease/pest resistant/tolerant and better adaptable varieties for crops commodities such as sorghum, cassava, green grams and others has contributed to the increase in productivity in the country.
- d) There is increased production resulting from an increased availability of improved NARO technologies through early generation seed production which is accessed by seed companies (Breeder seed), community seed multipliers and farmer groups (Foundation seed).

3) Increased Human Health

There has been an increase in human health as a result of release and commercialization of bean varieties with enhanced amounts of iron (Fe) and Zinc (Zn), which are very essential for human health especially among pregnant women and children.

4) Labour Saving Technologies

There is a reduction in drudgery through the development of labour saving machinery such as the light-weight rice thresher and hydraulic ram pump technologies by NARO's Agricultural Engineering Institute at NARL-Namalere. There is increased knowledge about use of appropriate irrigation and water management technologies through guidelines that were developed and disseminated to farmers. There is also better Agro-processing of fish with the development of the NARO PAH-safe fish smoking kiln prototypes.

5) Increased Knowledge (Patenting IP)

- a) There has been an increase in knowledge through novel scientific findings generated through competitive grant scheme (CGS) which have presented an opportunity for the first time in NARO to patent and protect intellectual property rights. This is likely to contribute towards internal financing of NARO research.
- b) There is an increase in knowledge and understanding on fisheries production management through provision of updated information such as draft policy brief for management of the Kariba weed, geo-referenced information and map for fish breeding areas, appropriate harvesting technologies, efficiency of *Mukene* fishing rig and performance of floating and submerged light attraction technologies.
- c) There is also an increase in knowledge and understanding on Invasive Alien Species (IAS) including the deadly *Parthenium hysterophorus*, *Salvinia molesta* and the Fall Army Worm (FAW) through provision of appropriate and updated information to the stakeholders. This has boosted awareness levels amongst farming communities leading to sustained destruction of the invasive species from both public and private lands by the informed citizenry.

6) Increased Efficiency Through Enhanced Research Capacity

- a) There is a noteworthy enhanced research capacity within NARO resulting from support for long term capacity building interventions, which have contributed to the pool of resources already available to deliver on the mandate of NARO. The PhDs have added capacity in the fields of Agriculture and Natural Resources, Entomology, Plant breeding and Pathology, Knowledge Management, Aquaculture and Veterinary Tropical Diseases.
- b) There is also an enhanced research capacity as a result of construction of 22 buildings within the PARIs, which has contributed to an improved working environment for NARO scientists and technicians. Basic research laboratory analysis is now handled within the institutes cutting back on the time and resources spent on travel to major analysis centres overseas.

National Agriculture Advisory Services (NAADS)

During the FY 2016/17 (July, 2016 to June, 2017), the NAADS Secretariat procured and distributed various agricultural inputs, planting materials (seeds/seedlings) and stocking materials. These outputs were conducted in line with the national, zonal and district priority and specific commodities as well as the agricultural inputs requirements identified under Operation Wealth Creation (OWC).

- 1) Under food security, 11m Kgs of maize, beans, sorghum, Simsim, rice and cow peas expected to cover an acreage of approximately 1m acres were delivered to an estimated 4m farming households. It is expected that with survival of 645,453 acres, the annual yield will be in the region of 0.9m Kgs;
- 2) Under promotion of strategic crops, 183m seedlings and suckers expected to cover 367,488 acres were delivered to an estimated 763,429 farming households. It is expected that 239,256 acres will survive with anticipated revenue of UGX 2 Tn annually;

- 3) 40 tractors and matching implements to support strategic interventions in the dairy value chain for pasture development were delivered and distributed in 9 DLGs in South Western Uganda;
- 4) 4,414 dairy heifers were delivered and distribution on going in 115 DLGs; 118 beef bulls procured and distributed in 17 DLGs; 3,194 improved goats (boar/savannah) delivery and distribution completed in 23 DLGs; 15,500 Kuroliers birds procured and with poultry materials delivered to special interest groups (women and youth groups);
- 5) 26 Artificial Insemination (AI) Kits procured delivered to 22 District Local Governments and KCCA;
- 6) 2,975,518 tilapia fingerlings, 1,605,233 cat fish fingerlings and 81,551 mirror cap fingerlings procured and distributed in 59 DLGs and 212,560 Kgs fish feeds procured and delivered in 59 DLGs
- 7) Delegated procurement of 3,000 young bulls for fattening to the National Enterprise Corporation (NEC) Katonga under the Meat Export Support Services (MESS) Project; and
- 8) Delegated procurement for design and construction of holding grounds and quarantine stations for slaughter stock at National Enterprise Corporation (NEC) Katonga (Gomba DLG) under the Meat Export Support Services (MESS) Project.

CHAPTER ONE: BACKGROUND

1.1 Introduction

Uganda is signatory to the Comprehensive Africa Agriculture Development Programme (CAADP) and the New Partnership for African Development (NEPAD) programme all formulated under the aegis of the African Union (AU). Implementation of these continental programmes require utilization of a mutual accountability tool in the form of national Joint Sector Reviews (JSRs). The reviews provide a forum for collective multi stakeholders' assessments of sector performance and mutual agreement on priority interventions for subsequent improvement. It is in this context that Uganda' second National Development Plan (NDP) II for the Financial Years (FY) 2015/16-2019/20 implementation modalities, oblige sectors to conduct comprehensive reviews based on ***their annual performance reports***. Accordingly, and in line with this requirement, the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) has in collaboration with agriculture sector stakeholders been organizing Joint Agricultural Sector Annual Reviews (JASARs) since 2011 with 7 reviews conducted to date with the latest held on the 27th and 29th September 2017.

This document is fulfillment of the NDP II implementation requirements and in that regard, captures and presents an overview of the performance of the Ministry, Departments and its Agencies for the FY 2016/17. The document is composed of four sections that include; an introduction; overall sector performance presented at macro level; detailed sub sector, department and agency performance at outputs level and an overall conclusion.

1.2 MAAIF Structure and Mandate

1.2.1 MAAIF Mandate

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.*

1.2.2 MAAIF Structure

The structure for the Ministry of Agriculture, Animal Industry and Fisheries in the Financial Year (FY) 2015/16 constituted; 4 directorates with 13 departments; 4 standalone departments and 3 specialized units as the main organizational entities of the Ministry described hereafter as follows.

- 1) **Directorate of Animal Resources**, with 3 departments namely: -
 - a) Animal Health;
 - b) Animal Production;
 - c) Entomology.

- 2) **Directorate of Crop Resources**, with 3 departments namely: -
 - a) Crop Inspection and Certification;
 - b) Crop Production;
 - c) Crop Protection.
- 3) **Directorate of Fisheries Resources**, with 3 departments namely: -
 - a) Aquaculture Management and Development;
 - b) Fisheries Control, Regulation and Quality Assurance;
 - c) Fisheries Resource Management and Development (Natural Stocks).
- 4) **Directorate of Agricultural Extension Services** with 2 departments namely: -
 - a) Agricultural Extension and Skills Management;
 - b) Agricultural Investment and Enterprise Development.
- 5) **4 Stand Alone Departments** namely: -
 - a) Finance and Administration;
 - b) Agricultural Policy and Planning;
 - c) Agricultural Infrastructure and Water for Agricultural Production;
 - d) Human Resource Management.
- 6) **3 Specialized Units** namely: -
 - a) Procurement and Disposal of Public Assets Unit;
 - b) Internal Audit Unit;
 - c) ICT Unit.
- 7) **2 Agricultural Training Institutions (ATIs)** namely: -
 - a) Bukalasa Agriculture College (BAC);
 - b) Fisheries Training Institute (FTI).
- 8) **7 Semi-Autonomous Agencies** namely: -
 - a) Coordinating Office for the Control of Trypanosomiasis in Uganda (COCTU);
 - b) Cotton Development Organization (CDO);
 - c) Dairy Development Authority (DDA);
 - d) National Agricultural Advisory Services (NAADS);
 - e) National Agricultural Genetic Resource Centre and Data Bank (NAGRC&DB);
 - f) National Agricultural Research Organization (NARO);
 - g) Uganda Coffee Development Authority (UCDA).

1.3 Institutional Composition of the Agriculture Sector

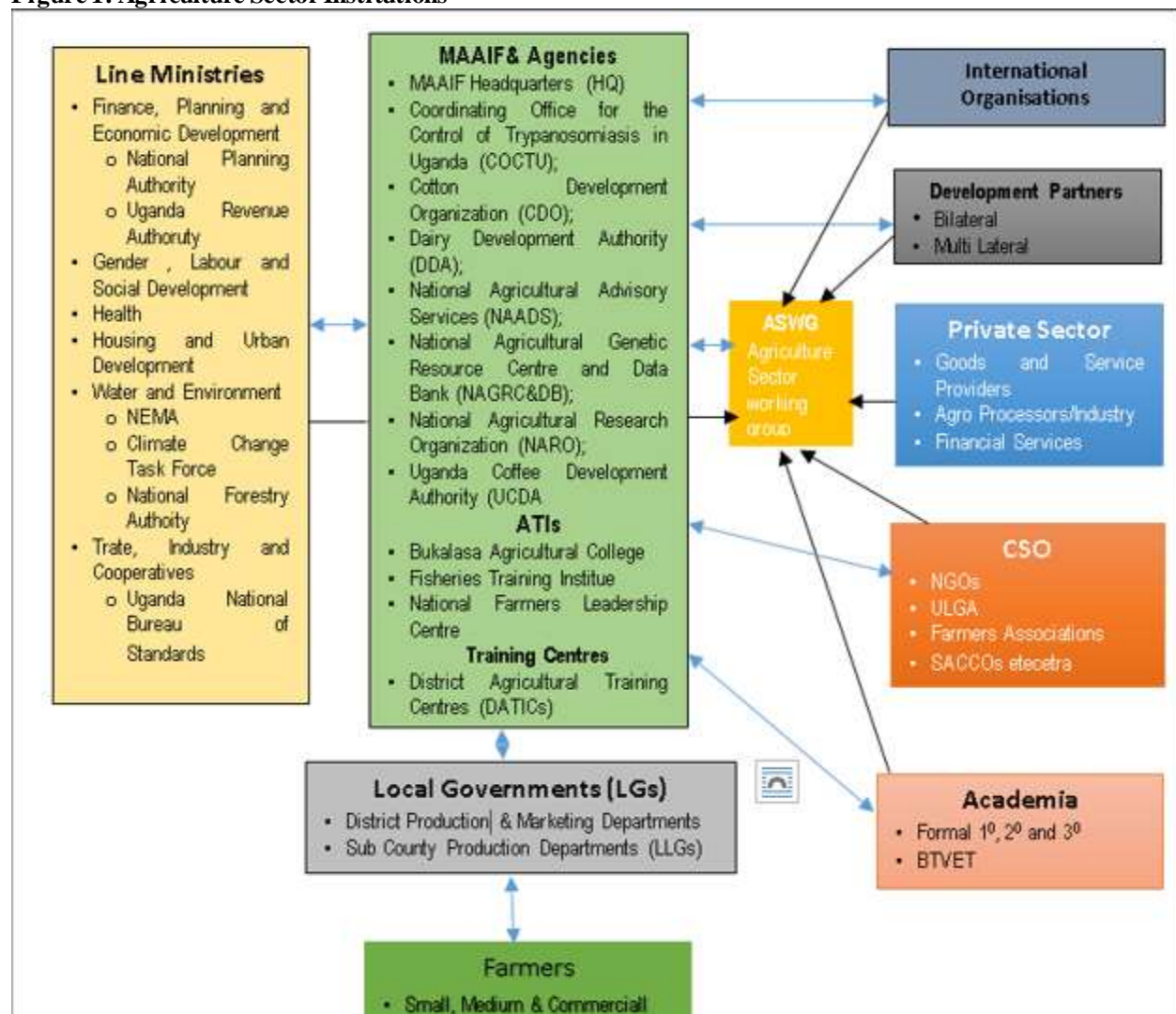
The agriculture sector is composed of the following institutions: -

- 1) MAAIF its Agencies, Departments, Agriculture Training Institutes and District Agricultural Technology and Information Centres (DATICs) located in District Local Governments;

- 2) Other line ministries including; Finance, Planning and Economic Development, Gender, Labor and Social Development, Health, Trade, Industry and Cooperatives, Public Service, Local Government, Water and Environment, Works and Transport, Lands, Housing and Urban Development among others;
- 3) Local Government (LG) Production Departments;
- 4) The Private Sector;
- 5) Development Partners;
- 6) Civil Society Organisations (CSO);
- 7) International and Regional Organizations;
- 8) Academia;
- 9) Farmers (Small, Medium and Commercial)

The institutions and relationships with MAAIF and public agriculture institutions are depicted in the figure presented hereafter.

Figure 1: Agriculture Sector Institutions



Source: MAAIF 2017

1.4 Document Structure

The report is presented as follows: -

- 1) The executive summary presents a synthesis of the report featuring where possible outcomes and impact of the sector performance;
- 2) Chapter 1 presents the background including an introduction of the context, an overview of the MAAIF mandate and structures;
- 3) Chapter 2 presents overall agriculture sector performance that covers trends and progress of achievements measured against the NDP II indicators as well as those in the Agriculture Sector Strategic Plan (ASSP) 2015/16-2019/20. The narrative focuses on outcome and where available impact or intermediate result level achievements;
- 4) Chapter 3 covers 3 categories of agriculture sector performance as follows; the first covers crop, livestock, fisheries and agricultural extension services. The second category includes performance of departments of Human Resource Management (HRM) and Agriculture Infrastructure, Mechanization and Water for Agricultural Production (AIMWfAP). The third category covers performance under the MAAIF Agencies of National Agriculture Research Organization (NARO) and National Agriculture Advisory Services (NAADS). In assessing performance, the presentation reviews, mandates, functions, achievements against targets, challenges and actions taken to mitigate them, collaborative partnerships, response to JASAR 2016 issues and recommendations as well as plans for the FY 2016/17; and
- 5) Chapter 4 presents overall sector performance featuring the highlights of Sub Sector, Departmental and Agency performance arising from the review of the entire agriculture sector.

CHAPTER TWO: OVERALL SECTOR PERFORMANCE

2.1 Budget Performance

Overall, the sector had an approved budget in FY 2016/17 of UGX 854.467Bn (Excluding Arrears). By the end of June 2017, UGX 722.629 Bn had been released, of which UGX 712.114 Bn was spent on the various activities of the different institutions in the sector. Most of the funds under the Government of Uganda (GoU) budget component were released by the Ministry of Finance, Planning and Economic Development (MFPED) to the various departments and agencies within the sector to the tune of 84.6 %. The Ministry and its agencies managed to absorb 98.5 % of the GoU funds for implementation of the various planned activities and outstanding commitments.

Table 1: Overview of Sector Budget Performance 2016/17

Budget Classification		Annual App Budget 2016/17 in UGX Bn.	Releases by June 2017 in UGX Bn	Expenditure by June 2017 in UGX Bn	% Budget Released	% Budget Spent	% Releases Spent
Recurrent	Wage	72.771	54.352	54.360	74.7	74.7	100.0
	N-Wage	136.928	121.728	122.780	88.9	89.7	100.0
Development	GoU	391.979	388.486	388.233	99.1	99.0	99.9
	Ext. Fin	221.745	133.017	120.860	60.0	54.5	90.9
Total GoU		601.678	564.566	565.373	93.8	94.0	100.1
Total GoU (MTEF) + Ext Financing		823.424	697.583	686.232	84.7	83.3	98.4
	Arrears	0.657	0.657	0.655	100.0	99.7	99.7
Total Budget		824.467	698.239	686.887	84.7	83.4	98.4
A.I.A Total		30.387	25.046	25.822	82.4	85.2	103.3
Grand Total		854.467	723.285	712.769	84.6	83.4	98.5
Total Vote Budget Excluding Arrears		853.810	722.629	712.114	84.6	83.4	98.5

Source: MAAIF 2016

2.2 Trends and Progress Measured Against ASSP Outcome Indicators 2015/16

2.2.1 Macro Level Performance of the Economy

This section reviews the country's economic performance during FY 2016/17 in terms of growth, inflation and exchange rate. All these affects and are affected by the performance of agriculture sector growth and exports.

2.2.1.1 Economic Growth

In 2016/17, the economy expanded by 3.9 %, lower than 4.7 % achieved in the previous year and target of 5.5 %³. The slower growth was due to the drought that the country experienced during the year and the slowdown in execution of public investment⁴. The country experienced a prolonged dry spell from March to August 2016 following an El Nino event in 2015/16. This led to widespread crop failure and reduced livestock production due to declining pasture and water conditions as drought persisted⁵. Largely due to the drought, the growth of the agriculture sector fell from 2.8% in 2015/16 to an estimated 1.3% in 2016/17 and all sub-sectors of the agriculture sector registered a decline or no growth from the previous year (Table 1). The growth of the industry and services sectors was also sluggish when compared to the previous year due to a slowdown in the growth of some of the components of these sectors.

Table 2: Performance of the Economy in 2015/16 and 2016/17

Sector	FY 2015/16	FY 2016/17
Real GDP growth (%)	4.7	3.9
Agriculture	2.8	1.3
o/w Cash crops	7.9	-0.4
o/w Food crops	1.3	1.4
o/w Livestock	2.8	1.6
o/w Forestry	4.7	1.2
o/w Fisheries	4.8	2.2
Industry	4.7	3.4
Services	5.9	5.1

Source: Ministry of Finance Planning and Economic Development, 2017. Background to the Budget 2017/18

2.2.1.2 Inflation

Figure 2 depicts the inflation indices for food and non-food items and how they contributed to headline inflation in 2015/16 and 2016/17. Food crops include items such as maize, beans, cassava, matooke (bananas), millet, etc., all food include food crop items and other food but non-crop items such as meat, dairy products, processed food etc. Non-food items include utilities, fuel, clothing, footwear, beverages, transport, etc.

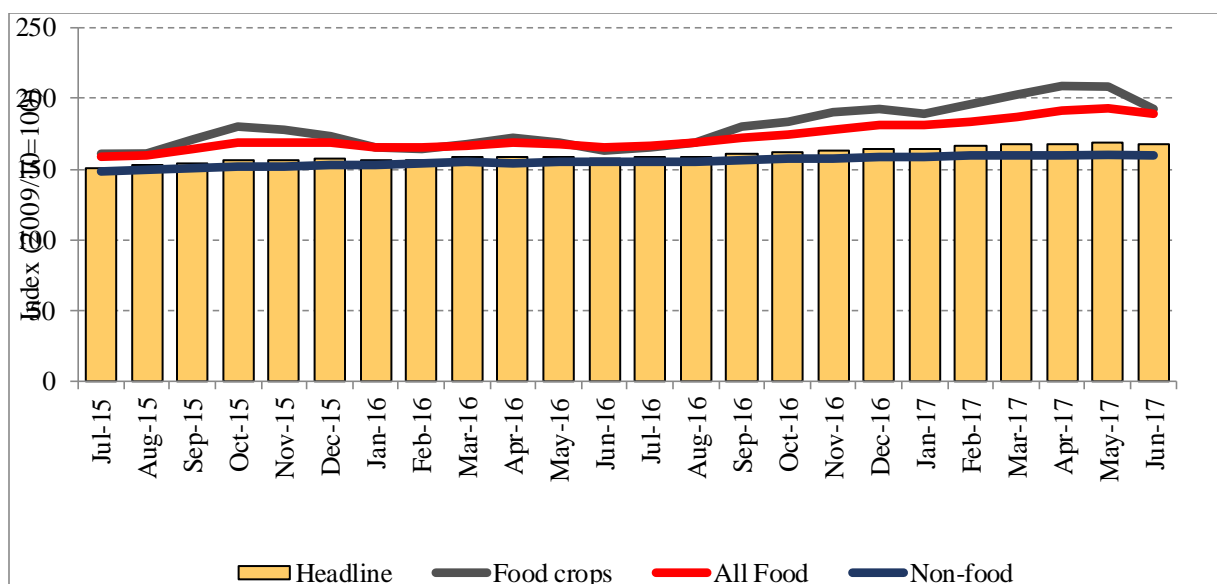
Figure 2 indicates that the primary cause of the rise in inflation was developments in the supply and demand for food in general and food crop items in particular. As explained above, the domestic food supply was adversely affected by drought.

Figure 2: Uganda Headline Inflation and Inflation Indices for 3 Components

³ 2017 Budget Speech

⁴ UMF Country Report No 17/269

⁵ 2017 National Food Security Assessment Report



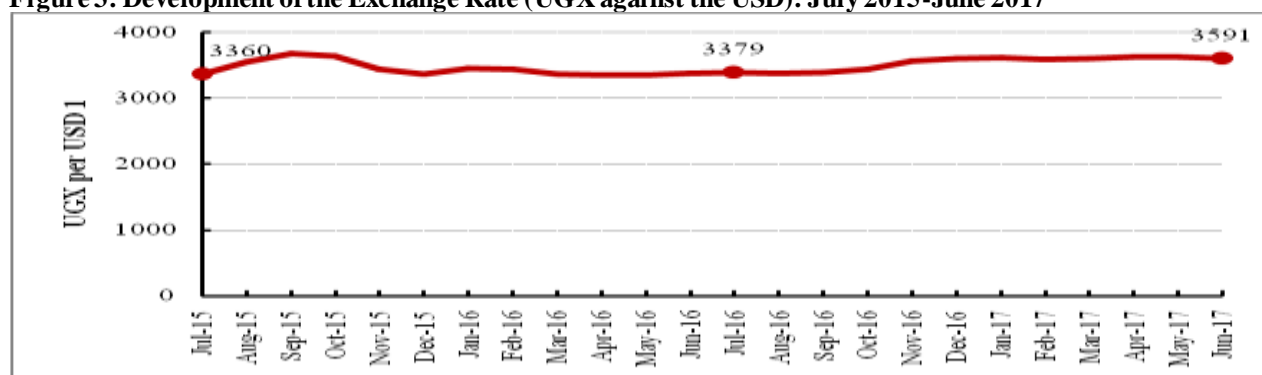
Source: UBOS 2017

The implication is that the agriculture sector must implement structural policies to strength the country's capacity to produce and store food and to make food production more resilient to weather shocks. Policies such as investment in irrigation and crop storage, pest and disease control and improvements in food marketing system are already included in the ASSP.

2.2.1.3 Exchange Rate

The shilling opened the financial year 2016/17 trading at an official midrate of UGX 3,379 against the USD in July 2016 and closed at UGX 3,591 in June 2017, representing 6.3 % depreciation. The figure 3 below shows the development of the exchange rate between July 2015 and June 2017.

Figure 3: Development of the Exchange Rate (UGX against the USD): July 2015-June 2017



Source: Bank of Uganda 2017

The depreciation of the Uganda shilling was largely attributed to the strengthening of the USD against the Uganda Shilling, the slow economic recovery in Europe, a major market for our export commodities and increased demand from domestic oil, manufacturing and telecom services³. A weaker shilling would normally stimulate economic activity, and, farmers would enjoy higher export prices. But Uganda's agricultural exports are mainly in raw form, and primary goods do not command a high price in the international market.

2.2.2 Progress of ASSP Impact Indicators

The overall goal of the ASSP is to contribute to ASSP contributes to “poverty reduction, increased food security and availability of quality food to Ugandans”. The ASSP M&E Logical Framework Matrix identifies the following indicators to track the sector’s contribution to this goal: -

1. %age change in the proportion of rural population below the poverty line;
2. Agricultural GDP growth rate;
3. Labour productivity; and
4. %age of children under five years of age who are undernourished.

The data in the sources specified in the ASSP is either not up-to-date or unavailable. Where possible other sources are used, with their most recent data.

Table 3: Indicators and Progress Achieved

Indicator	Recommended Data Source	Progress in 2016/17
%age change in the proportion of rural population below the poverty line	UNHS	30.8% of the rural population is living below the national poverty line (UNHS 2016/17) compared to 22.4% in 2012/13 (UNHS 2012/13). This represents an increase of 8.4 %age points. The number of poor people increased from 6.8 million to 10million
Agricultural GDP growth rate	UBOS	The 2017/18 Background to the Budget put the 2015/16 sector growth rate at 2.8% and estimated it at 1.3% for 2016/17. This is far below the ASSP target of 6% per year
Labour productivity in agriculture	UBOS	No data
%age of children under five years of age who are undernourished	UDHS	Child underweight prevalence in 2016 was 10.5%, having fallen from 13.8% in 2011.

Source: UBOS 2017

The increase in poverty was attributed to the worsening situation of crop farmers mainly due to the severe drought and the devastating effect of the fall army worm on crop production, with consequent increase in food prices and reduction in calorie intake⁶. The decline in sector growth was also partly due to drought and the pest.

2.3 Overall Sector Performance and Progress in FY 2016/17

This section provides an overview of the sector performance against the ASSIP performance indicators for FY 2016/17 and progress on implementation of recommendations in the JASAR 2015/16.

Over the ASSP period, the agriculture sector aims at achieving the following three outcomes: -

- Outcome 1 Increase productivity by farmers to at least 50% of the yields at research stations for the 12 priority commodities;
- Outcome 2 Transform subsistence farmers into enterprise farmers and transform smallholder farmers into commercial farmers; and
- Outcome 3 Increase agriculture exports to at least USD4 billion per year.

⁶ UNHS 2016/17

The ASSP recommended sources of data were the UNHS and UBOS annual Statistical Abstract. Alternative sources of data as shown in the table below were used because the former sources were not up-to-date with the data requirements.

Table 4: Outcome 1: Increase Productivity By Farmers To at least 50% of the yields at research stations for the 12 priority commodities

Indicator	Data source	Progress
1.1 Level of household agricultural income	SDG2 Strategic Review Report, 2017	The average annual income from agriculture (from crops, livestock, poultry and their related products) increased from UGX 859,562 in 2013/14 to UGX. 1,138,879 in 2015/16
1.2 %age of labour force in agriculture	SDG2 Strategic Review Report, 2017	In 2013/14, the rural labour force employed in agriculture was 8.1 million people (or 73% of total rural labour force). This increased to 11.4 million (or 74.7%) in 2015/16. The share of females in rural agricultural activities increased from 78% in 2013/14 to 82% in 2015/16.
1.3 %age change in agricultural contribution to total GDP	2017 Background to the Budget 2017/18	The share increased from 23.7% in 2015/16 to a projected 25.0% in 2016/17

The available data indicates progress in increasing rural incomes from agriculture as well as number and share of labour force employed in agriculture. UNHS 2016/17 also indicates that While ASSP did not set a target for the contribution of agriculture to total GDP, it is theoretically expected that this should be declining relative to other sector contributions as the economy grows. The opposite seems to have taken place between 2015/16 and 2016/17 with agriculture share increasing instead from about 24% to an estimated 25%.

Though there are no recent data for 2016/17 for labour force in subsistence production, it can be deduced from indicator 1.2 that the proportion in subsistence production was higher in 2016/17. The agriculture sector grew by 1.3% in FY 2016/17 from 2.8% in FY 2015/16. As already mentioned above, the slower growth in the sector as a whole and in individual sub-sectors was due to drought.

Table 5: Outcome 2: Transform Subsistence Farmers into Enterprise Farmers and Transform Smallholders Farmers into Commercial Farmers

Indicator	Recommended Data Source	Progress
2.1 %age change in the labour force in subsistence production	UNHS	The UNHS 2012/13 showed that the size of the labour force in subsistence production was 6 million. There is no data for 2016/17
2.2 %age annual growth in agricultural value added	2017 Background to the Budget 2017/18	The agriculture value added at constant 2009 prices increased from UGX 12,267 billion in 2015/16 to an estimated UGX 12,428 billion in 2016/17. This represents a real growth rate of 1.3%.

Based on available data, the share of agricultural exports in total exports declined. This is expected given the poor performance of the agriculture sector in general and the cash crop subsector as indicated in Table 3 above. The demand for Uganda's exports was low due to slow economic recovery in Europe and civil conflicts in some parts of the Eastern African region¹. The ratio of agricultural exports to agriculture GDP at current prices also declined from 23.4% to 19.3%.

Table 6: Outcome 3: Increase Agriculture Exports to at least USD4 billion Per Year

Indicator	Recommended Data Source	Progress
3.1 Value of agricultural exports	2016 UBOS Statistical Abstract; Bank of Uganda	The value of agricultural exports declined from about USD 1.335 billion in 2015 (UBOS 2016 Statistical Abstract) to an estimated USD 1.235 billion
3.2 %age change in ratio of agricultural exports to total exports	2016 UBOS Statistical Abstract; Bank of Uganda	In 2015, the ratio of the value of agricultural exports to total exports was about 59%. Based on the Bank of Uganda data for 2016 exports, this fell to 42%. This implies a 17 % point decline
3.3 %age change in ratio of agricultural exports to agriculture GDP	2017 Background to the Budget 2017/18; Bank of Uganda	The Agricultural GDP at current prices (in USD) was USD 5.71 billion in 2015/16 and USD 6.40 billion in 2016/17. Thus, agricultural exports as share of agriculture GDP fell from 23.4% to 19.3% respectively.

CHAPTER THREE: SUB SECTOR PERFORMANCE

This chapter presents an overview of sub sector performance for the 3 Directorates of Crops, Livestock, Fisheries and the Directorate for Agricultural Extension Services. In addition, it presents performance reviews from NARO and NAADS Agencies as well as from the departments of Agriculture Infrastructure, Mechanization and Water for Agricultural Production (AIMWfAP) and Human Resource Management (HRM).

3.1 Crop Sub Sector Performance

3.1.1 Introduction

The Directorate of Crop Resources constitutes of three (3) departments namely; Crop Production, Crop Protection and Crop Inspection and Certification each headed by a Commissioner. Two of MAAIF's agencies namely Coffee Development Authority (CDA) and Cotton Development Organization (CDO) are directly linked to the Directorate.

Table 7: Development Projects under the Directorate in 2016/17

S/N	Project	Department	Funding	Responsible Officer
1	Support for Tea & Cocoa seedlings	Crop Production	GoU	Mr. Alex Lwakuba
2	Vegetable Oil Development Project Phase 2		GoU & IFAD	Ms. Connie Masaba
3	Rice Development Project (PRiDe)	Crop Production	GoU & JICA	Ms. Beatrice B. Byarugaba
4	Agriculture Cluster Development Project (ACDP)	Directorate of Crop Resources	GoU & WB	Mr. Stephen Ojangole / Mr. Henry Opolot
5	Commercialization of Agriculture in Northern Uganda	Crop Production	GoU & FAO	Mr. Peter Abong
6	Uganda Multi-sectoral Food Security and Nutrition Project	Crop Production	GoU & GAFSP	Mr. Paul Mwambu/ Mr. Alex Bambona
7	Banana Livelihoods Diversification Project	Crop Production	GEF	Ms. Rebecca Nanjala / Mr. Steven Biribonwa
8	Uganda-China South to South Cooperation Phase II	Crop Production	GoU, Republic of China and FAO	Dr. James Tumwine
9	Northern Uganda Farmers' Livelihoods Improvement Project	Crop Production	GoU & JICA	Dr. James Tumwine
10	Agriculture Technology Transfer (AgriTT): Cassava Value Chain Development Project	Crop Production	GoU & DFID	Ms. Daisy Eresu
11	Enhancing National Food Security through increased Rice Production in Eastern Uganda	Crop Production	GoU and IDB	Mr. Peter Abong
12	Potato Commercialization Project	Crop Production	GoU	Mr. Alex Lwakuba
13	Crop Pests and Diseases Control Phase 2	Crop Protection	GoU	Mr. Stephen Byantwale

Source: MAAIF 2017

This report focuses on the performance of the Directorate based on the recurrent and development activities implemented through its departments, agencies and projects during the Financial Year (FY) 2016/2017. The report outlines the mandate and functions of the Directorate, subsector performance, challenges and mitigation strategies, responses to issues and recommendations from the last Joint Agriculture Sector Review (JASAR) 2016.

3.1.2 Mandate of the Directorate

The mandate of the Directorate is the promotion of crop production, value addition and marketing, crop pests and disease control; enforcement of regulations and standards on agricultural chemicals, plant health and seed quality, food and nutrition security and the promotion of sustainable use of natural resources.

3.1.3 Functions of the Directorate

The functions of the Directorate of Crop Resources are to: -

1. Provide technical guidance for formulation and implementation of policies, plans and strategies in crop production, marketing, protection, inspection and certification.
2. Support, supervise and monitor;
3. Sustainable market oriented production
4. Crop pests and diseases control
5. Plants and plant products quality and safety
6. Primary processing and value addition of crop products
7. Improved food and nutrition security

3.1.4 Priority and Strategic Commodity Development

The performance of the Directorate of Crop Resources is presented in respect of specific priority and strategic crop commodities, crop protection, crop inspection and certification as well as food and nutrition security activities. The commodities include: coffee, tea, rice, maize, beans, cassava, Potatoes, bananas, Fruits and Vegetables, cotton, oil palm, oil seeds and cocoa. The crop protection activities under review include pest and disease control whereas the crop inspection and certification activities include quality assurance on agricultural inputs, agricultural imports and exports.

3.1.4.1 Coffee

The coffee development interventions implemented over the last three years has started yielding results as demonstrated by the increase in coffee production from 4.5 million in FY 2015/16 to 5.4 million in FY 2016/17 and projected to increase to 6.2 million in FY 2017/18. This increment has been achieved through promotion of coffee replanting through distribution of coffee seedlings in collaboration with OWC, continuous sensitization and building the capacity of private sector players who are key implementing partners at all levels of the value chain. The key challenge that needs to be urgently addressed is the survival rates of the seedlings planted, containment of pests and diseases and mitigation of the impact of climate change.

3.1.4.1.1 *Performance for FY 2016/17*

1) Production

The volume of coffee produced increased from 4.5 million in FY 2015/16 to 5.4 million in FY 2016/17 an increase of 21%. This is on the account of the coffee planted in FY 2013/14 which have started yielding in FY 2016/17 leading to increased procurement, exports and closing stock.

2) Volume of Exports

The annual targeted volume of coffee for exports for the FY 2016/17 was 3.9 million 60-kilo bags of coffee. The cumulative volume of exports for the period July 2016 to June 2017 was 4,186,606 60-kilo bags (3,188,810 bags of Robusta and 997,796 bags of Arabica) compared to 3,556,692 bags in 2015/16, an increase of 18%. The performance of coffee exports for the FY 2016/17 was 112% of the projection.

The increase in volume of exports was attributed to the newly planted coffee coming into production. This was compounded by good flowering and bean development of the main crop in Central and Eastern regions that resulted into a good harvest during the Financial Year.

3) Value of Exports

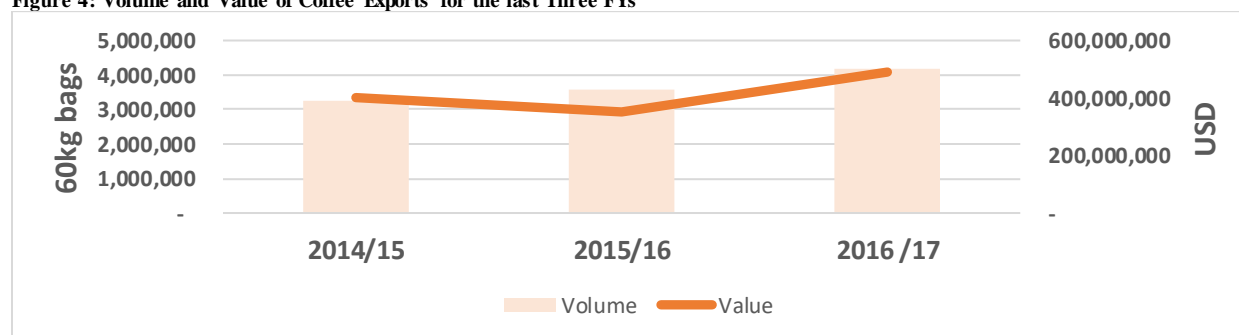
The projected value of coffee exports for the FY was USD 478 million. The cumulative value of exports realized was USD 490 million (Robusta USD 350 million; Arabica USD 140 million) compared to USD 351 million (Robusta USD 249; Arabica USD 102) for the previous FY, a 40% rise over the previous period.

Table 8: Coffee Production, Exports and Stocks in FY 2016/17

	2015/16	2016/17	%age Change
Quantity of coffee exported (Million 60 kg bags)	3.556	4.187	18%
Quantity of coffee consumed locally (Million 60 kg bags)	0.231	0.238	3%
Value of coffee exports (USD Million)	351	490	40%
Closing Stocks (Million 60 kg bags)	0.674	0.969	44%
Quantity of coffee produced (Million 60 kg bags)	4.462	5.390	21%

Source: UCDA 2017

Figure 4: Volume and Value of Coffee Exports for the last Three FYs



The export value performance was 99% of the projection. The marginal drop in actual value realized compared to projection was on account of a lower unit value of \$ 1.95 per kilo compared

to a projection of \$2.2 per kilo. Nonetheless, the unit price was higher than the previous year. The price recovery on the global market was more pronounced in Robusta.

4) Seedling Distribution and Plantings

Table 9: Seedlings Distributed by Region in FY 2016/17

Region	ROBUSTA		ARABICA		TOTAL BY REGION	
	Amount	Beneficiaries	Amount	Beneficiaries	Amount	Beneficiaries
Central	23,326	262	-	-	23,326	262
Eastern	9,700	86	-	-	9,700	86
Northern	3,100	27	50	1	3,150	28
Western	8,688	85	1,710	11	10,398	96
South-Western	5,690	67	2,280	17	7,970	84
Grand Total	50,504	527	4,040	29	54,544	556

Source: UCDA 2017

During the FY, a total of 54.544 MT of seeds comprising of 50.504 MT of Robusta and 4.04 MT of Arabica were distributed to 556 nursery operators spread across the five coffee growing regions. The table 10 above shows the number of seedlings distributed disaggregated by region.

5) Multiplication of Coffee Wilt Disease Resistant (CWD-R) Materials

UCDA Supported 105 CWD-R Nursery operators with 173,150 CWD-R seedlings to establish mother gardens.

Table 10: CWD-R Nursery Operators Supported in the FY 2016/17

FY	Nurseries Supported with Equipment's	Mother Gardens Established	Mother Bushes Established
2014/15	79	151	125,700
2015/16	99	193	176,900
2016/17	65	23	173,150

Source: UCDA 2017

6) Inputs Distribution

The Authority supported 23 nursery operators with 25 rolls of shade nets for propagation of WCD-R Plantlets, 49 nurseries were supported with 9,900 Kg of polyethene pots. All the regions except Northern were supplied with 2,987 litres and 400,000 sachets of Imidacloprid pesticides respectively for control of Black Coffee Twig Borer (BCTB) and 6,234 acres of coffee gardens were sprayed.

7) Seedlings Generation and Distribution

A total of 285 million coffee seedlings were generated and out of this, 172 million were distributed and planted by 521,540 coffee farming households spread across the five regions in

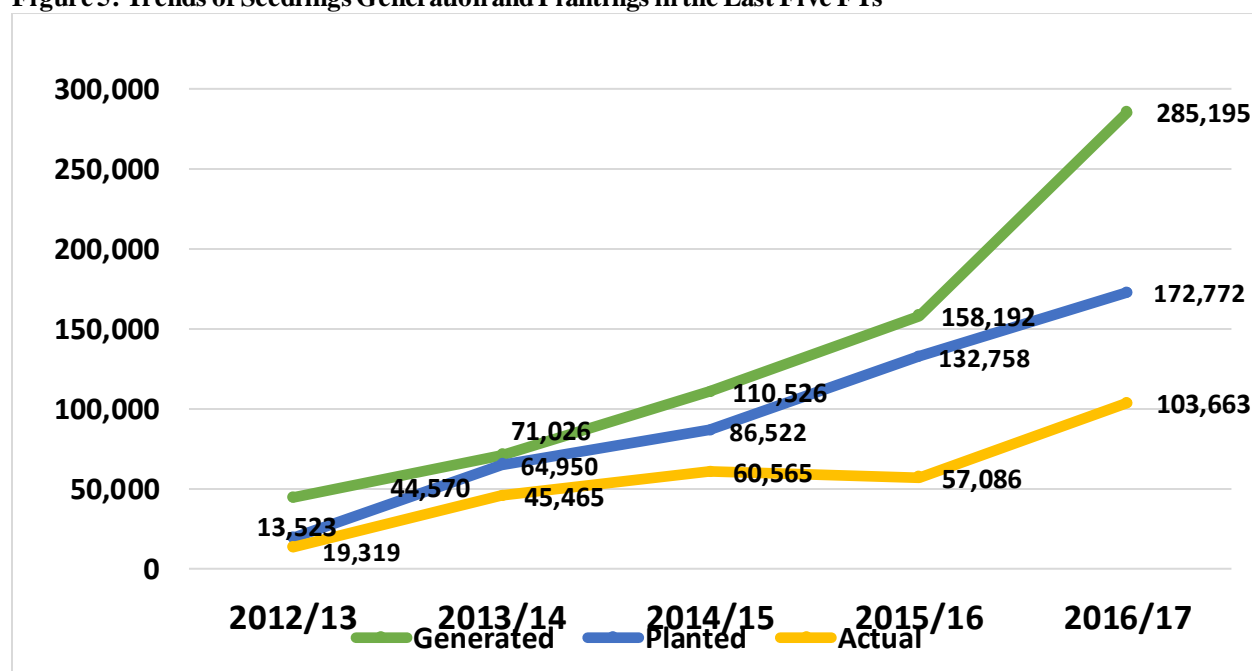
the 96 coffee growing districts (table 12 below).

Table 11: Seedlings Generation and Planting by Farmers in FY 2016/17 by Region

NO	REGION	GENERATED		TOTAL GENERATED	PLANTED		TOTAL PLANTED
		SEP-NOV 2016	MAR-MAY 2017		SEP-NOV 2016	MAR-MAY 2017	
1	CENTRAL	32,150,146	52,413,000	97,609,647	32,150,146	35,334,609	67,484,755
2	WESTERN	22,529,071	40,490,800	79,255,718	21,510,105	22,598,718	44,108,823
3	SOUTH WESTERN	14,185,407	23,045,000	51,793,353	14,185,407	10,760,000	24,945,407
4	EASTERN	10,326,406	25,699,500	47,564,064	10,326,406	21,760,164	32,086,570
5	NORTHERN	1,010,314	6,810,607	8,972,329	1,010,314	3,136,315	4,146,629
	TOTAL	80,201,344	148,458,907	285,195,111	79,182,378	93,589,806	172,772,184

Source: UCDA 2017

Figure 5: Trends of Seedlings Generation and Plantings in the Last Five FYs



Source: UCDA 2017

Generally, seedlings generation capacity increased from 44 million in FY 2012/13 to 285 million in FY 2016/17. The seedlings planted has also increased from 13 million in FY 2012/13 to 104 million in FY 2016/17 assuming a survival rate of 70% (Figure 5).

8) Key issues addressed in FY 2016/17

a) Registration of Coffee Farmers

UCDA conducted a pilot coffee farmers registration exercise in Mukono and Buikwe Districts. In Mukono a total of 30,085 farmers were registered, out of whom 49 were companies/cooperatives/farmer groups. Of the remaining ones, 12,628 or 42% of farmers were female. Namuganga Sub-county had the highest number of coffee farmers with a proportion of

14% followed by Nakisunga (13%), Nabbaale (10%), Kimenyedde (10%), Ntenjeru (9%), Kyampisi (9%), and Kasawo Sub County (9%). In Buikwe, a total of 23,119 farmers have so far been registered in the ongoing exercise.

b) Revision of the Coffee Law

The Principles for review of the Coffee Law were approved by Cabinet, while the Minister of Agriculture issued drafting instructions to the Attorney General/Solicitor General. Drafting of the Bill is complete and has been forwarded to the Minister for onward submission to Cabinet for authorization to have the Bill published in the Uganda gazette and tabled in Parliament for debate and enactment. UCDA also conducted a training on Regulatory Impact Assessment (RIA) and produced a RIA report on the proposed Coffee Bill 2017.

c) Seedlings Survival Rate Verification

UCDA also conducted a joint seedlings survival rate verification exercise with OWC, ISO and DLGs. Overall the field assessment found that about 42% of the coffee seedlings supplied to farmers during the September – November 2015 and March – May 2016 planting seasons had survived.

As a result, a demand driven approach was adopted to increase the efficiency and effectiveness of the replanting program and farmer preparedness exercises were conducted to sensitize farmers on the proper practices to observe during planting of coffee seedlings. Parish chiefs were co-opted into the process and trained to collect data on farmers intending to plant per season as well as support the distribution of seedlings during planting. Below is a map showing the national performance.

9) Planned actions Versus achieved outputs

Table 12: Key Interventions, Planned Actions and Achieved Outputs

Key Intervention Areas	Planned Outputs	Performance: Achieved Against Planned	Explanation of Performance
Production, Research & Coordination	Raise 100 million seedlings; 80 million Robusta and 20 million Arabica	Raised 285.65 million Seedlings comprising 242.42 million Robusta and 42.78 million Arabica. Distributed 50.504 MT of Robusta and 4.040 MT of Arabica seed	Above target seedlings raised to meet the new target to raise 300 million coffee seedlings in line with the plan to produce 20 million bags of coffee by 2025.

Key Intervention Areas	Planned Outputs	Performance: Achieved Against Planned	Explanation of Performance
	Coffee planted in all coffee growing areas	<ul style="list-style-type: none"> Seedlings planted in 12 months 172.772 million coffee seedlings valued at UGX 51.8bn benefitting 514,421 households country wide. (Sep – Nov 16) - 79.182 million seedlings in 78 Districts. Seedlings planted (March- May 17) 93.589 million seedlings in 96 districts. 	<ul style="list-style-type: none"> Above Target as a result of the revised 2020 Strategy. New allocation based on demand from Districts, as recommendation from the seedlings Verification report.
	Distribute 100,000 CWD-R plantlets to at least 285 CWD-R Nursery operators	Procured and distributed 148,100 CWD-R seedlings to 105 Nursery operators	Above target due to availability of plantlets from other CWD-R Nurseries.
	Procure 500,000 tissue culture seedlings	<ul style="list-style-type: none"> Contract of generating 500,000 tissue culture seedlings is running behind schedule; However, a total of 347,720 plants are expected from the current in-vitro- cultures by end of October and 584,280 by end of December 2017 	These targets are based on the current status of the cultures in the Laboratory, as assessed by the Tissue Culture Contract Management Team jointly with the FICA Ltd.
	Procure weaning and hardening services for 440,000 tissue culture seedlings	<ul style="list-style-type: none"> 29,000 CWD-R seedlings weaned and hardened at FICA. 305,680 plantlets are expected from embryo germination, this includes the losses that might occur. 	The weaned and hardened seedlings to be handed over to UCDA for allocation to Nursery operators in Sept– Nov 17 planting.
	Support 30 CWD-R mother gardens with capacity to produce 10,000 cuttings in the 2 nd year of production	Supported 23 mother gardens with nursery equipment for infrastructure development.	The underperformance was due to lack of adequate CWD-R seedlings generated through tissue culture
	Facilitate 31 District Coffee Platforms to hold coffee shows	Facilitated 30 District Coffee Platforms to carry out coffee activities.	Below target was due to postponement of main activity to coincide with the UCDA 25 years anniversary celebrations
Coffee Development in Northern Uganda	Raise 4 million coffee seedlings and 10,000 banana suckers	<ul style="list-style-type: none"> Distributed 2.604 MT of seed raising 5.208 million seedlings. 6,000 Banana suckers raised 	Seedlings above target due to availability of seed
	Establish 18 Technology Development sites in 18 sub counties.	18 TDS established in Gulu (3), Nwoya (2), Oyam (3), Apac (2), Kole (2), Kaberamaido (1), Amolatar (1) Dokolo (2) Lira (1) and Alebtong (1)	On target due to extended rains received.

Key Intervention Areas	Planned Outputs	Performance: Achieved Against Planned	Explanation of Performance
	18 FarmerField Schools sessions conducted	<ul style="list-style-type: none"> Conducted 17 FFS benefitting 255 participants (16 females and 239 males). 2 Farmer tours carried out – farmers visited Western and Eastern Regions 	Below target FFS conducted due to minimal interest by farmers in new districts
Quality Assurance	3.9 million bags of coffee inspected and loaded for exports	4,185,701 bags inspected and loaded for export. (Robusta: 3,243,269 bags and Arabica: 942,432 bags)	Exports above the target by 12% and higher by 14.9% compared to same period FY 2015-16 (3,562,779 bags) attributed to new coffee trees coming into production
Value Addition and Generic Promotion	Showcase Uganda coffee in 6 local trade fairs	<p>Promoted domestic coffee consumption at 13 local trade fairs and events:</p> <ul style="list-style-type: none"> Coffee stakeholders meeting, 24th UMA trade Fair, The International coffee day, World Food Day Celebrations, Agricultural exhibition week, Coffee technology expo, JASAR conference, NUCAFE Coffee festival, Jinja Agricultural show, Kyankwanzi NRM retreat, Inspire Africa coffee week, Uganda Media Centre and Kibinge farmers Exhibition (Bukomansibi district) 	The number of shows increased due to local demand
	Penetration to new markets	Exported 158,822 bags of coffee to the Asia pacific region compared to 156,178 bags the previous FY	This is due to the promotional efforts in the region and the introduction of a new brand of Ugandan coffee on the Chinese market (Crane Specialty Coffee) leading to increased sales and presence on the Chinese coffee market.
	Promote Uganda Coffee in 5 International coffee events	Promoted Uganda Coffee in 5 International coffee events (African Fine Coffees Conference and Exhibition (AFCA), Addis Ababa Ethiopia: Specialty Coffee Association of America (SCAA), Seattle Washington U.S.A.: Specialty Coffee Association of Japan (SCAJ), Tokyo Japan: Specialty Coffee Association of Europe (SCAE), Budapest Bulgaria and Korea Coffee Expo, Seoul South Korea.	

Key Intervention Areas	Planned Outputs	Performance: Achieved Against Planned	Explanation of Performance
	Train 20 Youth to participate in the Inter-University Barista Championships	Conducted the inter-university Barista competitions held at Kyambogo University with 20 competitors from 5 universities. Trained 20 (3 female) students in barista skills	Trained 20 youth on Barista Skills

Source: MAAIF 2017

10) Implementation Challenges

Table 13: Challenges

CHALLENGES	PROPOSED SOLUTION	RESPONSIBILITY
Lean staff (38 RCEOs and 5 RMs) to cover all the 96 coffee growing districts	Recruitment of Extension staff and linkages with District staff and Parish Coffee Development Agents	UCDA
Operationalization of SOP not fully effective, especially low levels of participation by LGs due to inadequate funding support at the LG level	Review of the SOP to enhance the participation of the LGs in the seedlings generation, procurement, distribution and planting by farmers	UCDA, MAAIF-DAES, DLGs
Effects of climate change that cause high mortality rate on seedlings planted	Conduct demonstrations on water harvesting using water reservoirs, solar irrigation pumps and use of simple irrigation technologies.	UCDA, MAAIF-DAIMWAP
Emergency of pests and diseases	<ul style="list-style-type: none"> Continued surveillance to control and mitigate the impact of pest and diseases Collaborative linkage with farmers and undertake frequent surveillance 	UCDA, DLG Extension Staff, Farmers
Inadequate preparedness of farmers prior to receipt of seedlings for planting	Hold pre-planting seasons regional meetings and strengthen the role of the Parish Coffee Development Agent in the seedlings distribution and plantings	UCDA, OWC, DLG and PCDAAs
The current coffee regulations not covering farm level activities constrain enforcement at this level.	Fast track the enactment of the National coffee Bill 2017 and review coffee regulations	UCDA, MAAIF
Harvesting of immature coffee by farmers at an earlier time	This will be minimized by increasing the sensitization on practices through timely enforcement of the coffee regulations, further engagement of the agriculture police and OWC	UCDA
Increasing numbers of mobile hullers located in rural areas that processing wet coffee and operating without license	Training of the processors on the coffee regulations and quality control targeting the mobile processors in the next FY.	UCDA
The roasting of inferior coffee, use of poor materials and inferior roasted coffee products that dominates the rural markets.	Review of the coffee regulations to strengthen inspections, quality assurance and control function of UCDA	UCDA
Slow adoption of value addition technologies along the coffee value chain	This can be improved through providing support to acquisition of simple technologies, increasing awareness on benefits of adding value, benchmarking on value addition and developing relevant policies	UCDA
Inadequate funding to meet the high targets as per policy directive to implement Coffee 2020 strategy	Developed a Coffee 2020 Roadmap with 9 key transformative initiatives. A detailed five year costed implementation plan is being developed	UCDA

CHALLENGES	PROPOSED SOLUTION	RESPONSIBILITY
	and will form the basis for lobbying for funding for the coffee sector.	
Weak institutional capacity for coffee-specific research due to low funding	Actualize the National Coffee Research Agenda	UCDA, NaCORI
Development of protocols for tissue culture propagation	Coordinate with NaCORI, MAAIF, academia and private sector	UCDA, MAAIF, NaCORI

Source: MAAIF 2017

11) Key Stakeholders

UCDA works closely key stakeholders such as; NaCORI, OWC, DLGs, MAAIF-DAIMWAP and Private Sector Player among others.

3.1.4.2 Cotton

3.1.4.2.1 Performance overview

Cotton lint production increased from 27,950 MT in FY 2016/17 as compared to 20,339 MT that was produced in FY 2015/16. The quantity of lint exported was 25,994 MT in FY 2016/17 as compared to 19,242 MT that was exported in FY 2015/16. The value of lint exported was USD 41.64 Million in FY 2016/17 as compared to USD 25.81 million in FY 2015/16. Approximately, 1,956 MT of Lint were consumed locally in FY 2016/17 compared to 1,097 MT that was consumed in FY 2015/16.

1) Key issues addressed in FY 2016/17

Cotton Development Organization (CDO), in collaboration with the private sector (Cotton Ginners) under their Association; the Uganda Ginners and Cotton Exporters Association (UGCEA) implemented several activities to support cotton production.

The activities were aimed at: -

- Improving access to quality production inputs (Cotton planting seed, fertilizers, pesticides, spray pumps & herbicides) for cotton farmers. The inputs were availed to farmers at reduced prices and in some cases on credit;
- Improving access to extension services for mobilizing and training cotton farmers on the recommended agronomic practices for cotton production. The training was mainly based at demonstration gardens established at village/parish level; and
- Promoting mechanization of land opening. This was done by offering tractor hire services at reduced rates per acre.

The Cotton sub-sector activities were categorized under six broad interventions, namely: -

- Provision of planting seed;
- Seed multiplication;

- c) Farmer mobilization for cotton production;
- d) Provision of cotton targeted extension services;
- e) Provision of production inputs; and
- f) Mechanization of land opening.

2) Planned Actions and Achieved Outputs

The following table 7 consolidates planned interventions, actions and achieved outputs during the FY 2016/17 under review.

Table 7: Interventions, Actions and Outputs

Interventions	Planned actions/ targets	Performance outputs/ intermediate outcomes	Remarks
Provision of cotton planting seed to farmers	Organize and coordinate distribution of quality cotton planting seeds to farmers in 60 cotton growing districts in Eastern, Northern, West Nile, Mid-West & Central and Western Regions.	About 1,615 MT of seed were supplied to farmers in 60 districts in Eastern, Northern, Karamoja, West Nile, Mid-West and Western Regions. 50 MT of seed were supplied to farmers in 6 hard-to reach districts of Kabong, Zombo, Adjumani, Moyo, Yumbe & Ntoroko. Approx. 190,000 acres were planted to cotton.	Activities were implemented with support from Ginners.
Seed multiplication	Organize and mobilize seed growers to establish about 8,000 acres under seed multiplication in selected areas in Apac, Amuru, Pader, Kitgum, Alebtong, Dokolo, Rubirizi, Amolatar, Buliisa, Hoima, Masindi and Serere Districts which are expected to produce 3,000 MT of certified seed.	Approximately 7,500 acres were established under seed multiplication in selected areas in Apac, Amuru, Pader, Kitgum, Alebtong, Dokolo, Rubirizi, Amolatar, Buliisa, Hoima, Masindi and Serere Districts. Uganda Prison Services (UPS) undertook large scale cotton production in 24 districts where a total of 2,359 acres were planted. A total of 3,179 MT of fuzzy cottonseed were produced for planting in 2017/18.	Changes in weather patterns affected land opening and crop establishment.
Farmer mobilization and sensitization to increase cotton production and productivity	Organize establishment of 3,700 demonstration plots for training farmers on the recommended agronomic practices for increasing production and quality	About 3,760 demonstration plots were established and used to training farmers on cotton agronomy. In addition, 6 extension messages on planting, crop management, indicative price and post-harvest handling of cotton and destruction of cotton stalks after harvesting were	The increased interest in cotton growing in all the 60 districts necessitated establishment of more demonstration plots for intensive training of cotton farmers. Changes in weather patterns affected land opening, crop establishment and overall

Interventions	Planned actions/ targets	Performance outputs/ intermediate outcomes	Remarks
		<p>broadcast in 10 languages using local radios.</p> <p>Over 11,190 training sessions were conducted for over 90,370 farmers including members of 168 women groups and 103 youth groups.</p> <p>An estimated 190,000 acres were planted to cotton Nation-wide and a total of 68,543 MT of seed cotton (equivalent to 151,071 bales of lint) were produced contributing over Sh.136 billion to household incomes.</p>	crop performance. The early on-set of the dry spell in November/December 2016 contrary weather forecasts, further affected the crop that was planted in September 2016.
Cotton targeted extension services for farmers	Organize and coordinate the training and deployment of 350 Field Extension Workers (FEWs).	<p>225 Field Extension Workers were trained and deployed in the 60 cotton growing areas in Eastern, Northern, West Nile, Mid-West and Western Regions.</p> <p>Improved extension services in the 60 cotton growing districts for mobilizing and training cotton farmers on good agriculture practices.</p>	Fewer extension workers were trained because the UGCEA employed less people due to financial constraints.
Provision of production inputs	Organize and coordinate procurement and distribution of production inputs to farmers in the 60 cotton growing districts.	<p>About 27 MT of fertilizers, 730,900 units (one-acre packs) of pesticides, 2,077 spray pumps and 1,823 litres of herbicides were supplied to farmers in the 60 districts.</p> <p>Improved access to quality and affordable production inputs for cotton farmers.</p> <p>Members of 168 women groups and 103 youth groups in Lango, Acholi, West Nile, Karamoja, Busoga, Bugisu, Teso, Pallisa, Mid-West and Western Regions were among the cotton farmers who accessed production inputs.</p>	Inputs were procured by UGCEA and availed at reduced prices and in some cases on credit.
Mechanization of land opening	Organize tractor hire services for cotton farmers and monitor use of ox ploughs distributed in previous seasons in Eastern, Northern, West Nile, Mid-West & Central and Western Regions.	<p>Approx. 3,967 acres were ploughed by tractors, 22,439 acres were ploughed by oxen for cotton and 23,838 acres were ploughed by oxen for other crops in 2016.</p> <p>In addition, approximately 2,062 acres were ploughed by tractors,</p>	Ploughing was greatly hampered by intermittent drought.

Interventions	Planned actions/ targets	Performance outputs/ intermediate outcomes	Remarks
		<p>9,000 acres were ploughed by oxen for cotton and 11,000 acres were ploughed by oxen for other crops in 2017.</p> <p>Farmers accessed tractor hire services and also used oxen to plough their land.</p> <p>Members of 168 women groups and 103 youth groups in Lango, Acholi and West Nile Regions accessed tractor hire services and animal traction for land opening.</p>	

Source: CDO 2017

3) Implementation Challenges

The major challenge was unpredictable weather patterns (early on-set and prolonged dry spell) due to the prevailing Climate Change.

4) Key Stakeholders

Implementation of activities in the Cotton sub-sector continues to be spearheaded by CDO; MAAIF's agency with the mandate to promote production, monitor marketing and processing of cotton. This is done in collaboration with the private sector (Cotton Ginners) under their umbrella association; Uganda Ginners and Cotton Exporters Association (UGCEA). UGCEA provided financial support for procurement and processing of planting seed, for salaries and facilitation of extension workers, procurement and distribution of production inputs and tractor hire services.

Government of Uganda supports CDO to strengthen cotton research, concentrate on seed multiplication and provide technical support as well as monitoring and supervising the Cotton Production Support Program activities.

Other key stakeholders include the Cotton Research Program under NARO, the farmers who grow the crop, ginners/lint exporters who gin and sale the lint, oil millers who produce edible oil and cotton seed cake from cotton seeds and textile and cotton manufacturers who add value to the lint.

3.1.4.3 Oil Palm and Oil Seeds

3.1.4.3.1 Performance overview

1) Achievements Under Oil Palm Development in Kalangala

a) 6,500 hectares have been planted by the nucleus estate (100% achieved);

- b) 4,424 hectares planted by the smallholder farmers (94% achieved);
- c) Smallholder's net incomes are now at USD 1,384 per hectare per year (92% of target) where 1,810 farmers are participating in the smallholder oil palm scheme with 36% female;
- d) 27,198 tons of crude palm oil are produced per year in Kalangala (91% of target);
- e) Under KOPGT financial self-sufficiency is at 56%; and
- f) 250kms of farm roads constructed (81% of target).

2) Achievements Under Oil Seeds Development Component

The project is in 56 districts of Northern Uganda, West-Nile, Eastern and Lango regions and the following represents the achievements in the FY under review.

- a) Mill capacity utilization has reached 39 (46% of target);
- b) Sunflower yield per hectare is at 1.3 tons per hectare (77% of target);
- c) Soybean yield per hectares at 0.9 tons per hectare (82% of target); and
- d) 3,183 farmer groups have received extension services from the project (54% of the target) farmers have received UGX 3.04 billion in production credit from financial institutions (100% of the target).

3) Key Issues Addressed in FY 2016/17

The oil palm consolidation and expansion activities have continued in Kalangala with a total of 10,864 hectares planted of which 6,440 hectares form the nucleus estate established and managed by OPUL and, 4,424 hectares of land planted by the smallholder farmers in 6 blocks on Bugala Main Island, and the outlying islands of Bunyama and Bubembe. So far, a total of 1,810 farmers are participating in the smallholder oil palm scheme with 36% female.

The project has supported the smallholder farmers with garden establishment and maintenance loans of up to UGX 43.5 billion and so far, the smallholders have paid back UGX 11.7 billion. By June 2017, a total of 952 smallholder farmers were harvesting fresh fruit bunches from 3,021 hectares of mature oil palm gardens. 54 farmers (18 are women) across the 6 oil palm blocks have completed payment of the loan principle.

In 2016 alone, the oil palm development activities in Kalangala (nucleus estate and smallholders) produced 106,867 MT of oil palm fresh fruit bunches from which 27,198 MT of crude palm oil was produced valued at USD 24.5 million. The private sector partners, Oil Palm Uganda Limited and BIDCO Uganda Limited also paid Government of Uganda income and value added tax worth UGX 157.4 billion.

In this line linking farmers to commercial financing, the project partnered with Uganda Development Bank who extended development loan to farmers with mature palms wined off from the development loan with UGX 500,000,000 at an interest of 10% towards bulk purchase of fertilizer. A total of 120 (M=88 F= 32) smallholder oil palm farmers with mature oil palm farms benefited from the commercial loan have paid back UGX 537,426,281, and the loan is completed.

The project supported promotion of savings by smallholder oil palm farmers in partnership with the Programme for Financial Services in Rural Areas (PROFIRA). The smallholder oil palm farmers in Kalangala were supported to form their own SACCO; Ssesse Oil Palm Growers (SOPAG) SACCO. To date the SACCO has 421 members (272 males and 149 females) with a share capital of UGX. 50 million, savings of UGX. 47million, outstanding loan portfolio of UGX. 108 million and a recovery rate of UGX. 91.8%.

Under the oil seeds component, the project implemented a three pronged approach; (i) taking on 5 additional private service providers who brought on board a total of 1,080 groups (ii) engagement of higher level farmer organisations (HLFOs) and DLGs contributing 1,650 farmer groups, and (iii) expansion and extension of contracts for the 6 PSPs to contribute 946 new farmer groups. Implementation of the three strategies has resulted in direct engagement of 2,724 additional farmer groups and 62,652 households since December 2016. This is equivalent to 46.1% of the 136,000 targeted households to be reached by the project under the oil seeds component and 46.2% for the targeted number of farmer groups (i.e. 5,900).

4) Planned Actions and Achieved Outputs

Table 14: Interventions, Actions and Outputs

Interventions	Planned actions/ targets	Performance outputs/ intermediate outcomes	Remarks
Smallholder estate established in Kalangala (Hectares)	Plant 400 Hectares of oil palm in Kalangala	124 Ha planted. This increased total area planted by smallholder farmers to 4,424 Ha. The private sector partner planted 6,440 hectares so total area under oil palm in Kalangala is now 10,864 Ha.	Seedlings worth 276 Ha affected by blast disease in the nursery
Smallholders registered to benefit from oil palm investment	Register at least 100 farmers to benefit from the oil palm investment	10 farmers were registered. This increased the total number of farmers registered in Kalangala to 1,810 farmers (37% female)	Part of the 124 hectares planted was replacement planting in smallholder oil palm gardens earlier planted but with gaps
Smallholders supported to market their oil palm Fresh Fruit Bunches (FFB) to Oil Palm Uganda Limited (OPUL)	26,000 MT	24,303 MT valued at UGX 13.4 billion. This increased the total FFB harvested by smallholder farmers in Kalangala to 86,868 MT value at UGX 39 Billion	The productivity in the year was higher than projected
Loans disbursed to smallholder farmers for establishment and maintenance of the oil palm gardens	UGX 800 million	UGX 706 million were provided as maintenance loans to 553 smallholder farmers. This increased the total loans disbursed to smallholders for oil palm development activities to UGX 43.5 billion.	The project continued weaning off smallholder farmers who gardens matured had moved into "commercial" oil palm production.
Construct and/or maintain farm access roads (Bugala)	250 Km of roads maintained	Maintenance works were done on the existing 250 Km	No new roads were constructed due to breakdown of machinery

Interventions	Planned actions/ targets	Performance outputs/ intermediate outcomes	Remarks
Crude palm oil produced	Produces at least 25,000 MT of crude palm oil	27,198 MT @ year valued at USD 25.4 million	The crude palm oil target was surpassed due to the higher than projected yield
Land purchased for the nucleus estate in Buvuma	Purchase at least 1,000 Ha of land for the nucleus estate in Buvuma	644.4 Ha of land were purchased for the nucleus estate. This enabled the project to hand over 5,114 Ha to BIDCO to start preliminary activities for the nucleus estate.	The project invested in clearing of encumbrances on all acquired and to be able to hand over land to BIDCO.
Mill capacity utilization	50%	38.7%. By Hub, the highest mill capacity utilization was in Lira Hub (62%), followed by Northern Uganda Hub (48%), then Eastern Uganda Hub (27%) and the lowest was in West Nile Hub (17.8%).	New mills established in Lira Hub and West Nile reduced the average mill capacity utilization
Provide extension services to oil seed producers	Provide extension services to at least 4,000 oil seed producers.	A total of 3,183 oil seeds producers received extension services.	Recruitment of more service providers will enable the project to reach the overall targets of 5,900 groups by 2018
Provide Production credit to oil seeds producers	Provide at least UGX 3 billion credit to oil seed growers.	A total of UGX 3.04 billion was loaned out to oil seeds producers	A partnership established between the project and commercial banks has greatly improved access to production credit across the hubs.

Source: VODP 2017

5) Implementation Challenges

a) Oil Palm Expansion in Kalangala

- i) The smallholder farm roads are in a poor state. The road unit was recently rehabilitated but is not sufficient to cover the required work. The poor state of the roads has made evacuation of oil palm Fresh Fruit Bunches (FFB) difficult, increasing FFB delivery time over 48 hours, leading to an increase in the FFB rejection rate from 2% to 4%. Sustainability of the management of the road unit is also not yet fully resolved.
- ii) Delayed construction of landing site(s) and absence of ferry services to the outlying islands of Bunyama and Bubembe to enable bulk evacuation of FFB to the mill on Bugala Island in time.
- iii) Weak research capacity to support the expanding crop acreage and growing oil palm sub-sector in general for long term sustainability. There is need for Government to build local capability to handle current and future constraints to support the growing vegetable oil processing industry.
- iv) Low capacity by project partners, specifically NaSARRI and UNBS to achieve their targets. These have failed to fully utilize the available budgets for their related activities.

b) Oil Palm Expansion to Buvuma

- i) The land acquisition process in Buvuma has not been completed because of the long procedures involved; valuation of the interests of tenants on the land; agreement with land lords; and, facilitation of negotiations between land lords and tenants. This has delayed the handover of 6,500 hectares of land to the private sector and therefore delayed the start of the oil palm development activities in Buvuma.
- ii) Connecting ferry is very old with irregular services due to ferry breakdown. This negatively affects current activities implementation and will not cope with the increasing business on the Island.

c) Oil Seeds Development in 51 Districts spread across Eastern and Northern Uganda

- i. The recruitment of the 11 private sector extension service providers took a long time due to the required procurement processes requiring clearance by IFAD at different stages. This delayed the expansion of the project activities to cover all targeted districts on time. The project found that even after recruitment, the service providers had large capacity gaps in implementing their contracts in line with the project deliverables.
- ii. Delayed capacity building and engagement of DLG staff and sub-county based extension workers in oil seeds service provision may not only limit the number of beneficiaries but also long term services provision to oil seed producers.
- iii. Weather vagaries coupled with lack of irrigation systems at research institutions have limited increase in production of improved seed. Government should facilitate installation of irrigation infrastructure at research institutions to enable regular supply of breeder lines and foundation seed to seed multipliers.

d) Key Stakeholders

- i) **The private sector partners**, BIDCO Uganda Limited and Oil Palm Uganda Limited (OPUL). These provide market for all the fresh fruit bunches that are produced by the smallholder farmers in Kalangala district. OPUL also provides quality oil palm seedlings, fertilizers and technical support to the farmers. BIDCO purchases all the crude palm oil from Kalangala and produces a variety of products for the market including vegetable oil, soaps, lotions and cosmetics.
- ii) **Kalangala Oil Palm Growers Trust (KOPGT)**. This ensures that the smallholder oil palm farmers have access to the required inputs, technical and marketing services to enable the farmers to fully participate in the oil palm value chain. KOPGT disburses the loans and collects the returns from the farmers. KOPGT also represents farmers on the OPUL board.
- iii) **Kalangala Oil Palm Growers Association (KOPGA)**. This is an association that is comprised of all the registered oil palm farmers. KOPGA has leadership from the lowest levels (units), to the block levels. KOPGA is the voice of the farmers in Kalangala.
- iv) **Kalangala District Local Government**: This provides overall supervision of oil palm development activities. It is also mandated to ensure that oil palm activities do not have negative environmentally and social effects on the livelihoods of the people in Kalangala.

- v) **National Agriculture Research Organisation:** NARO conducts oil palm research including oil palm trials, pest and disease surveillance and yield trials.

Under oil seeds development, the project is providing support to different stakeholders to ensure effective value chains of sunflower, soybeans, ground nuts and sesame. The key stakeholders are: -

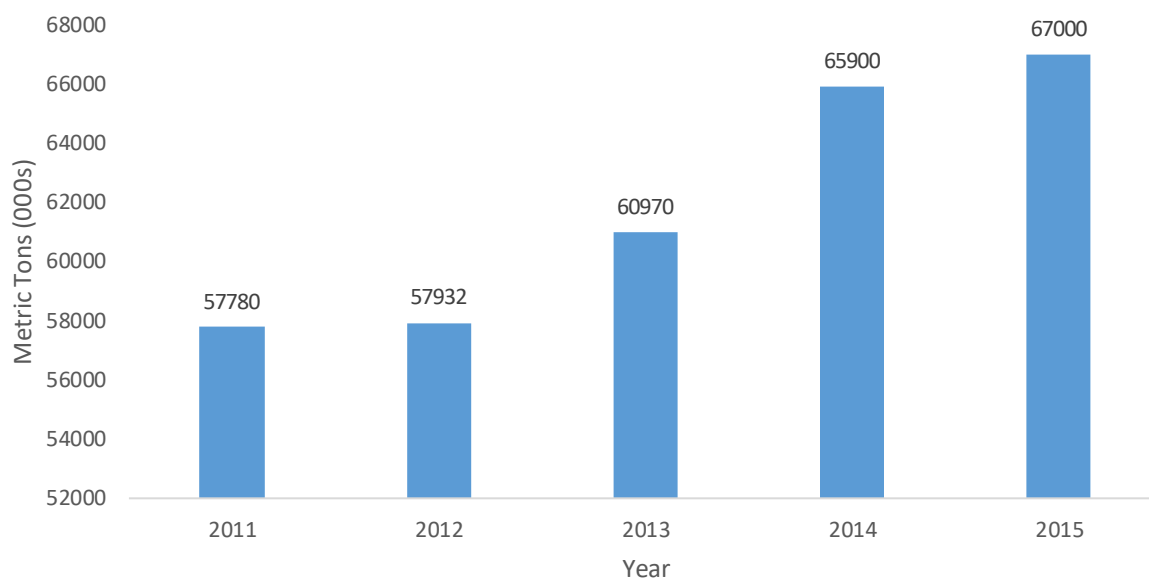
- i) **Smallholder farmers.** These produce the sunflower, soybean, ground nuts and sesame and supply the millers. The project has demonstrated recommended agronomic technologies, group dynamics, post-harvest technologies and value addition to them.
- ii) **Seed dealers.** These identify the seed demand and provide improved seed for purchase. The biggest seed dealers are Mukwano, Ngetta Tropical Holdings and Uganda Oil Seeds Producers and Processors Association (UOSSPA)
- iii) **Millers.** These buy the produce from the farmers. Some millers also provide inputs and other services at cost to the smallholder farmers. The total number of operational mills in Gulu hub is nine currently from only three before onset of project activities. In West Nile Hub, the current number of operational mills is 4 including Odokibo mission mill that resumed operation. In the Eastern Hub, the total number of mills operational are 11. Lira Hub is the more developed hub with large, medium and small scale mills across the hub. The biggest mills in Lira Hub are Mukwano, Nile Agro and Mt. Meru.
- iv) **Service providers.** The project recruited 11 pay for service providers to provide extension and value chain development support to the smallholder farmers. The project has 4 service providers in Eastern Uganda, 3 service providers in Lira Hub, 2 service providers in Gulu Hub and 2 service providers in West Nile Hub.
- v) **Financial institutions.** These provide financial literacy support services to the farmer groups and provide production credit for establishment, maintenance and post-harvest handling. The major financial institutions that have partnered with the project are Uganda Development Bank Limited, DFCU Bank, Opportunity Bank, FINCA Uganda, Post Bank Uganda, Pride Micro Finance and Micro Finance Support Centre and various Savings and Credit Cooperatives (SACCOs).
- vi) **National Agriculture Research Organisation.** These are carrying out research on improved oil seeds varieties focusing on yield, oil content, pest and disease resistance. The NARO is also training local seed businesses and is providing breeder and foundation seed which is multiplied by seed companies and organised farmer groups to increase access to seed.
- vii) **District Local Governments.** These supplement the efforts of the service providers but also provide technical backstopping and quality control.

3.1.4.4 Tea

3.1.4.4.1 Performance overview

Tea production trends in Uganda were 65,900 MT in 2014; 67,000 MT in 2015 and 69,000 MT in 2016.

Figure 6: Trends in Cocoa Production in Uganda 2011 to 2015



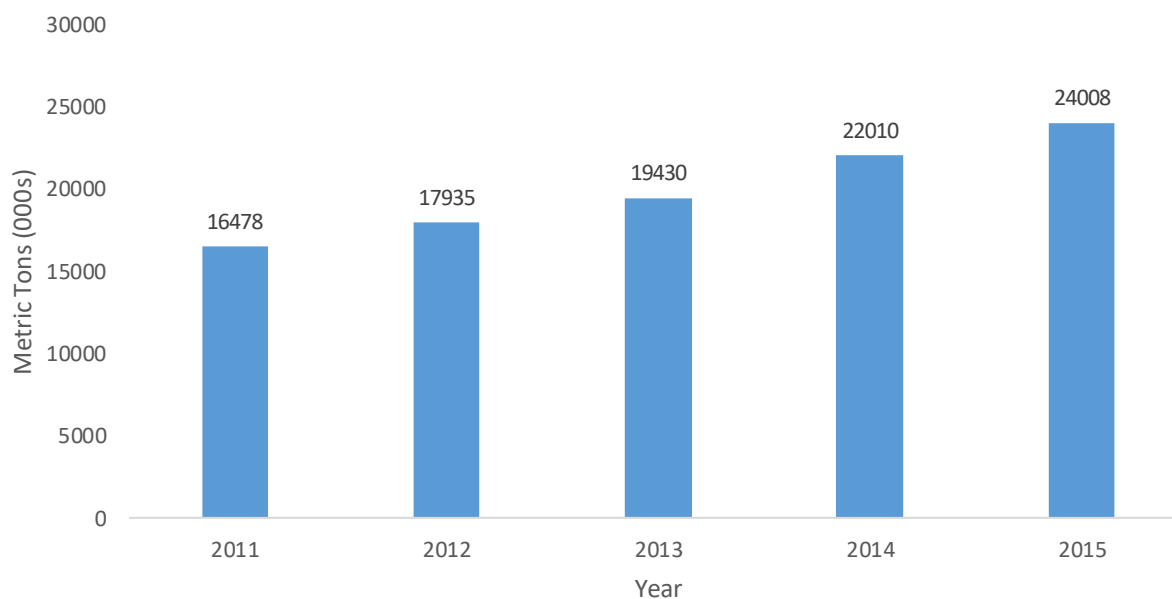
Source: MAAIF Statistical Abstract 2016

3.1.4.5 Cocoa

3.1.4.5.1 Performance overview

Cocoa production trends were: 19,430 MT in 2013; 22,010 MT in 2014; 24,008 MT in 2015.

Figure 7: Cocoa Production Trends in Uganda 2011 to 2015



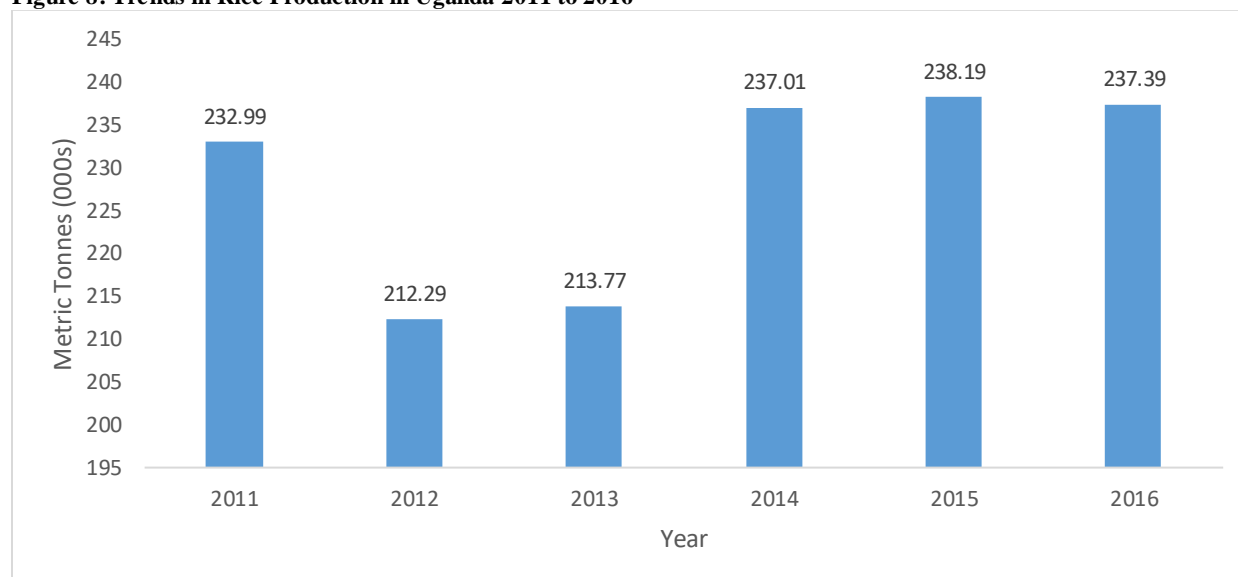
Source: MAAIF Statistical Abstract 2016

3.1.4.6 Rice

3.1.4.6.1 Performance for FY 2016/17

Rice production decreased by 0.33 % from 238,190 MT in 2015 to 237,390MT in 2016. Most of the rice is consumed locally. Area under rice cultivation has increased by 1.9 % from 95,277 Ha in 2015 to 97,140 Ha in 2016. The export volume of rice exported was only 22.2% of total production or 52,754 MT in 2015 as compared to 57,053 MT in 2014.

Figure 8: Trends in Rice Production in Uganda 2011 to 2016



Source: MAAIF Statistical Abstract 2016

1) Key Issues Addressed in FY 2016/17

The Rice industry is supported by the project on Rice Development (PRiDe), Enhancing National Food Security through Rice Production (ENRP) project, Agriculture Sector Development Project (ACDP) and Policy Action for Sustainable Intensification of Cropping Systems in Uganda (PASIC). All projects aim at improving production and productivity, value addition and marketing of rice in Uganda.

2) Planned Actions and Achieved Outputs

The industry reached its targeted increase in production but seems to fall short of the national needs during seasons affected by drought. The rice industry also had outstanding policy issues including the exemption of taxes on rice imports in the middle of the year following drought in the previous year. PASIC project has built capacity in regulatory services, initiated e-extension and supported completion of key MAAIF policies; PRiDe project started 08 demonstration sites as a kick starter for a new project. A new project NUTec Project started in Northern Uganda to support agribusiness for various crops especially rice. The project will provide low interest loans and capacity building. Various pre-feasibility studies for new irrigation schemes have been

completed. Korea Rural Cooperation (KRC) and KOICA supported Post harvest handling and processing activities- a strategy has been established and its implementation piloted in Jinja.

3) Implementation Challenges

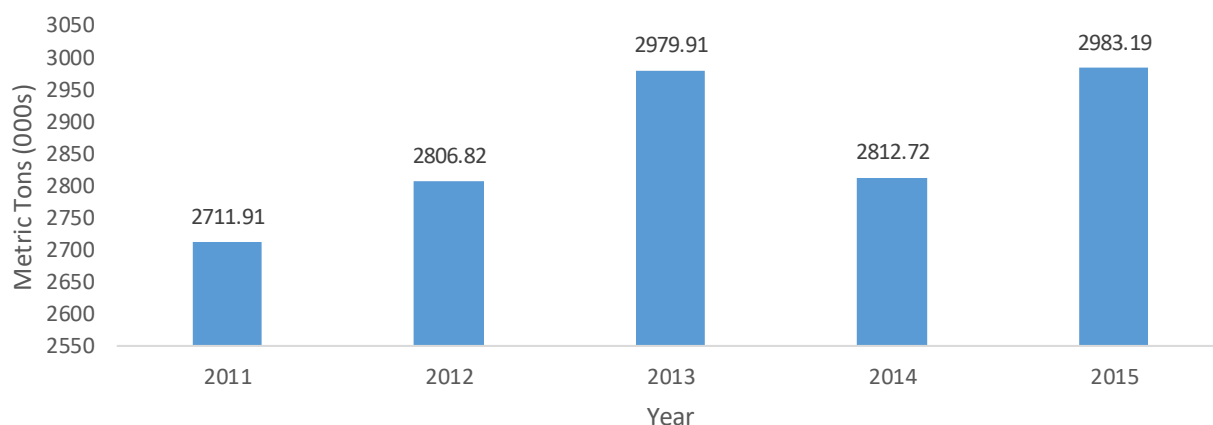
Drought was the major challenge.

3.1.4.7 Cassava

3.1.4.7.1 Performance for 2016/17

Cassava is one of the 12 priority commodities being promoted under ASSP (2015/16 – 2019/2020). Trends in Cassava production from 2011 to 2015 as indicated in the Fig 6 below.

Figure 9: Cassava Production Trends in Uganda 2011 to 2016.



Source: MAAIF Statistical abstract 2015/16

1) Key issues addressed in FY 2016/17

The key issues addressed include: -

- a) Increasing cassava production and productivity, provision of quality and clean planting materials to farmers for multiplication, intensifying pests and disease control interventions and value addition;
- b) Conducting regular inspection and certification of cassava mother gardens;
- c) The National Agricultural Research Organization (NARO) released new cassava varieties (NARO CASS I and NARO CASS II) tolerant to Cassava Brown Streak Disease (CBSD) and resistant Cassava Mosaic virus (CMV) disease; and
- d) Through the Agriculture Technology Transfer (AgriTT) Project, the Cassava commodity has been supported and the following outputs were achieved: -
 - i. Established cassava seed system and cassava propagation base for 1000 farmers whereby 40 Mother gardens of NASE14 were established in Kiryadongo, Masindi, Hoima and Buliisa.

- ii. A complete set of mechanized cassava production equipment was procured, namely: 130 Horse Power Mersey Ferguson; Moldboard plough, Rotary Tiller, Ridger, planter and Harvester;
- iii. An additional 450 acres of cassava fields were established in Hoima and Kiryandongo districts;
- iv. Five (5) community processing facilities were procured to promote value addition of cassava into High Quality Cassava Flour (HQCF). The beneficiaries were: Buliisa-Katwekambe Women's Group and Buliisa service station; Masindi-Kitooka Farmer Group; Hoima Kizirafumbi Cassava Farmer Group and Kiryadongo- American A Farmer Group;
- v. Bulindi Zonal Agricultural Research and Development Institute also received Cassava slicer;
- vi. Through a Public-Private Partnership, Farm Uganda Limited (located at Kinyara village, Kigumba Sub-county in Kiryadongo district) acquired a Batch Drier; and
- vii. In collaboration with Food Science Technology and Nutrition department-Makerere University, two incubatees were supported to process Cassava popped snack product.

2) Challenges in implementation

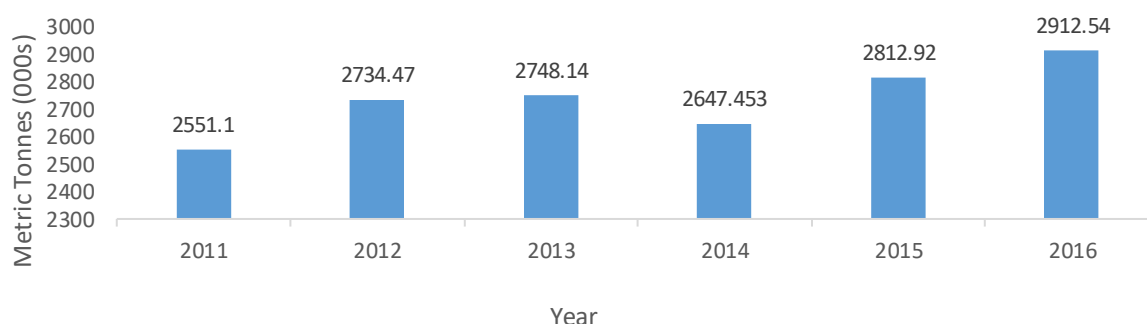
The major challenges include; prolonged dry spell and disease challenge (CBSD).

3.1.4.8 Maize

3.1.4.8.1 Performance Overview for FY 2016/17

Maize production increased from 2,812,920 MT in 2015 to 2,912,540 MT in 2016. The Volume of export for Maize was 358,308 MT registered in 2015. There was an increase in area planted under maize from 1,125,168 Ha (2015) to 1,137,410 Ha in 2016. Maize export volumes also increased from 134,903MT in (2014) to 358,308 MT in (2015, valued at USD 42.565Mn and USD 90.897Mn. (MAAIF Stat. Abstract, 2015/2016).

Figure 10: Maize Production Trends in Uganda 2011 to 2016



Source: MAAIF Statistical Abstract

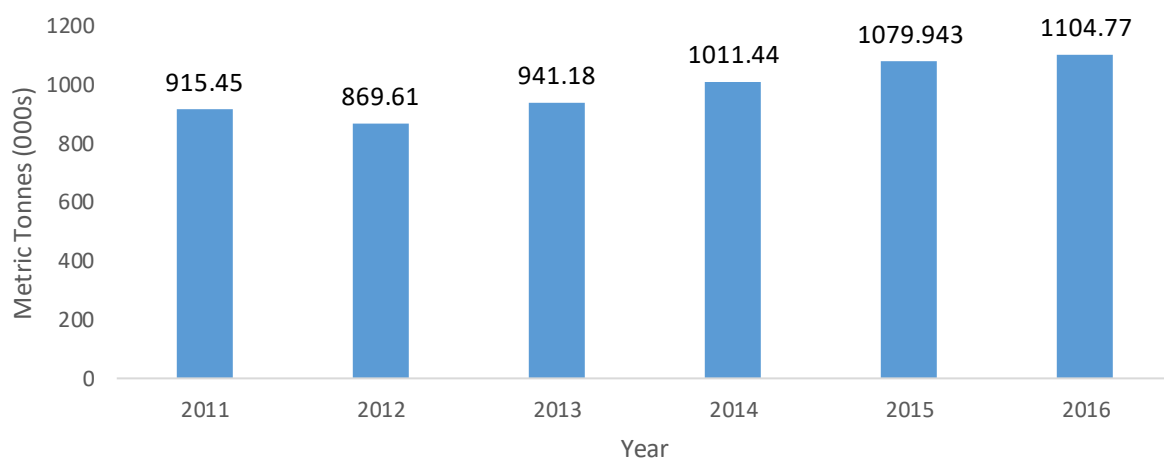
3.1.4.9 Beans

3.1.4.9.1 Beans performance for FY 2016/17

Beans production output increased from 1,079,943 MT in 2015 to 1,104,770 MT in 2016. This production increase contributed significantly to increase of pulses in the country. The area planted under beans increased from 674,290 Ha in 2015 to 683,120 Ha in 2016.

The export volumes for beans and other pulses increased from 39,483 MT (2014) to 157,152MT in 2015, valued at USD 26.050M (2014) and USD 62.693M (2015) respectively.

Figure 11: Beans Production Trends in Uganda 2011 to 2016



Source: MAAIF Statistical abstract

1) Key issues addressed in FY 2016/17

The key issues that were addressed during the FY under review were as follows: -

- a) Pests and disease control;
- b) Improving access to and use of fertilizers;
- c) Access to quality improve seeds;
- d) Improving extension services;
- e) Promoting mechanization;
- f) Supporting Post-harvest handling technologies;
- g) Support to processing and Value additions processing;
- h) Increasing access to high quality seed inputs like Rhizobia; and
- i) Strengthening mechanization.

2) Challenges in Implementation

The main challenge was the prolonged dry spell which was experienced in most parts of the country in the second half of 2016.

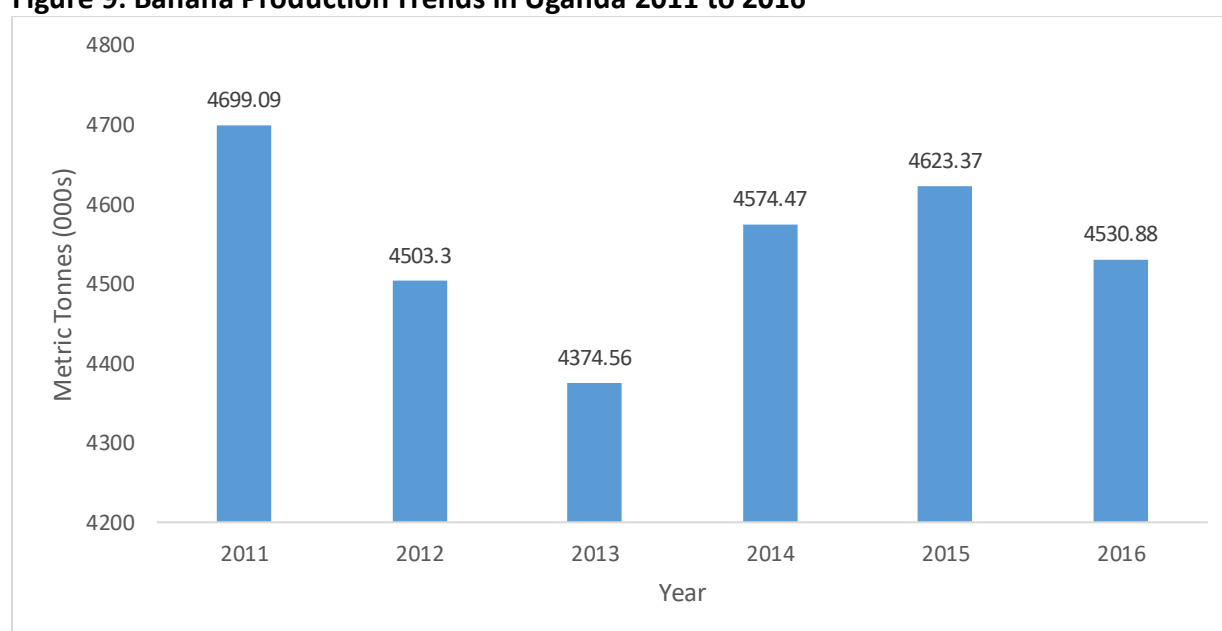
3.1.4.10 Banana

3.1.4.10.1 Performance Overview

1) Production

Banana production output trends were: 4,574,470 MT in 2014; 4,623,370 MT in 2015 and 4,530,880 MT in 2016. The decrease in production in 2016 was due to the prolonged dry spell which affected the major banana producing areas in South Western Uganda.

Figure 9: Banana Production Trends in Uganda 2011 to 2016



Source: MAAIF Statistical abstracts

2) Key issues addressed in FY 2016/17

Banana industry is supported by the Banana Livelihoods Diversification Project. The project's objective is to **Reducing vulnerability of banana producing communities to climate change through banana value added activities-Enhancing food security and employment generation** in 8 districts of Isingiro, Mbarara, Ntungamo, Bushenyi, Sheema, Rubirizi, Mitooma and Buhweju. The key issues addressed in 2016/17 included supply of clean banana planting materials to establish mother gardens. Also, banana processors were supported to upgrade the quality standards of their projects.

3) Planned actions Versus achieved outputs

Table 15: Interventions, Planned actions and Outputs

Interventions	Planned actions/ targets	Performance intermediate outcomes	outputs/ Remarks
Build resilience of banana producing communities through use of disease-free tissue culture planting materials	Supply disease free tissue culture banana planting materials to establish mother and demonstration gardens.	A total of 71,000 disease free banana plantlets have been produced and are ready for distribution in the September-December, 2017 rain season. 156 acres of banana mother gardens will be established in Isingiro, Mbarara, Ntungamo, Bushenyi, Sheema, Rubirizi, Mitooma and Buhweju.	The plantlets have been cleaned in laboratories and grown in Green-house in a bid to eliminate banana diseases such as Banana Bacterial Wilt.
Establish small scale banana processing for vulnerable communities to engage in oncome diversification through banana value addition.	Upgrade infrastructure and equipment of banana processing facilities (target)	Nine (9) banana processing facilities (banana wine, juice and chips/crisps) have been identified for upgrade. A needs assessment for the facilities was conducted, the needs have been reviewed and costed, Architectural designs have been made and construction will commence in September, 2017.	
Facilitate processing of banana products that meet National and International standards and increase marketing of banana products.	Establish Standard Operating Procedures (SOPs) and provide training on Good Hygienic Practices (GHPs) and Good Manufacturing Practices (GMPs) for banana processors. (separate SOP target & make the target for training clear, explanation for not achieving SOP)	Training on GHPS and GMPS was undertaken for 30 banana processors.	

4) Challenges in implementation

The efforts of improving the banana sub-sector are continuously hampered by prolonged dry spells that affect the country at large.

5) Key stakeholders

Operation Wealth Creation (OWC), NARO, Banana Processors, UNBS, UIRI, MTIC, MWE and Tissue Culture Industry (AGT Laboratories and Bio-Crops Ltd).

3.1.4.11 Potato (Irish)

3.1.4.11.1 Performance Overview for FY 2016/17

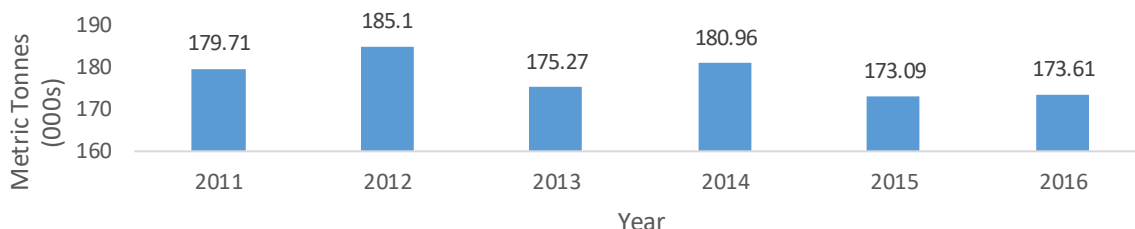
1) Production Trends

The trend in potato production indicates fluctuations in output. In the past five years, the highest output was achieved in 2012 (185,100 MT). records also indicate that there was a slight increase

in potato production, from 173,092 MT in 2015 to 173,610 MT in 2016.

It also important to note there is an increase in the fortified potatoe production due to its unique features.

Figure 10: Trends in Potato production in Uganda 2011 to 2016



Source: MAAIF Statistical abstract

2) Key issues addressed in FY 2016/17

The major issues addressed in potato sub-sector included improving the production and productivity as well as marketing of potato. Use of clean (disease free) seed potato, fertilizer application and good agronomic practices are the main factors to improved productivity in the potato industry.

3) Planned actions Versus achieved outputs

Table 16: Interventions, Planned Actions and Outputs

Interventions	Planned actions/ targets	Performance outputs/ intermediate outcomes	Remarks
Support commercial production of potato tubers	Establish and maintain at least 10 Farmer Field Schools	Maintained 12 Farmer Field Schools through providing technical support in potato production. The technologies introduced to farmers included planting of clean (disease free) seed and fertilizer application.	The Farmer Field Schools are located in the districts of Mityana, Kibaale, Kyegegwa, Kisoro, Kabale and Kanungu.
	Conduct learning and sharing events among potato producers	Conducted an Inter-district learning and sharing event to exchange knowledge and skills among potato farmers and also strengthen networks across districts.	
	Establish potato sub-sector platform	Initiated formation of Potato sub-sector platform.	
Improve access to agricultural information and financial services to smallholder potato farmers	Organize sharing events on access to finance	Conducted two sharing events on access to finance, insurance and e-commerce	

4) Key stakeholders

Kachwekano Zonal Agricultural Research and Development Institute (KaZARDI), International Institute for Tropical Agriculture (IITA)-PASIC project, Food and Agriculture Organisation of the United Nations (FAO)-Roots and Tubers Project, International Fertiliser Development Centre (IFDC), Integrated Seed Sector Development (ISSD), Uganda Agribusiness Alliance (UAA), Uganda National Seed Potato Producers Association (UNSPPA), AGT laboratories, AgroMax.

3.1.4.12 Fruits and Vegetables

3.1.4.12.1 Performance Overview for FY 2016/17

Fruits and vegetables are among the 12 priority commodities identified and selected for focused investment in the medium term in the ASSP (2015/16-2019/20). Fruits and Vegetables also provide an opportunity for generating foreign exchange for the country as they have a great export potential. Uganda has suitable agro-ecological environment for production of diverse fruits and vegetables with relatively low costs.

1) Key issues being addressed

The major issues being addressed include increasing production and Marketable volumes of fruits and Vegetables produce and products, Strengthening Sanitary and Phyto-sanitary Standards (SPSS), improving Utilization of fruits and Vegetables and supporting value addition in fruits and vegetables.

Northern Uganda Livelihood Improvement Project (NUFLIP) is supporting vegetable production, marketing and consumption in Acholi sub-region. The planned actions and outputs are as highlighted in the table below.

2) Planned Actions versus outputs

Table 17: Interventions, Planned Actions and Outputs

Intervention	Planned Action/Targets	Performance outputs	Remarks
Production and Productivity of selected crops especially vegetables in Gulu, Kitgum and Pader districts increased	Skills and knowledge of 30 staff of Gulu, Kitgum and Pader on market oriented agriculture built	Training of 30 district and sub-county technical staff on skills and knowledge of market oriented agriculture	Achieved as planned
	Trainings 20 farmer groups in vegetable production techniques in Gulu, Kitgum and Pader districts	Field Based training on agricultural techniques for tomatoes, carrots, cabbage, egg plants, onions and water melon	Vegetable production and productivity increased (statistical data being compiled)

Intervention	Planned Action/Targets	Performance outputs	Remarks
	Input supply i.e. Fertiliser, Pesticides, Vegetable Seeds among 20 farmer groups in Gulu, Kitgum and Pader districts	Twenty farmer groups supplied with seeds (Cabbage, Tomato, Eggplant, Green Pepper, Carrot, water melon) Twenty farmer groups supplied with Fertiliser and Pesticides	Vegetable production and productivity increased (statistical data being compiled)
Access of produce to market in Gulu, Kitgum and Pader increased through smallholder horticulture Empowerment and promotion (SHEP) approach	Conduct at least three (03) market surveys in project districts and the region	Market surveys for vegetables in Gulu, Kitgum and Pader districts. Regional markets surveys on South Sudan Border, central and west Nile	Markets visited in Gulu, Kitgum, Pader and South Sudan. Visits to Vegetable farmers in Tororo and Nakaseke Districts, Namulonge Horticultural association
	Organise Business Forum involving agro-input dealers, vegetable producers, buyers, retailers and whole sellers	A business forum was held in Gulu district for linkage of vegetable producers and other vegetable stakeholders	Vegetable farmers shared contacts with other market stakeholders
	Conduct training of 20 farmer groups on marketing of vegetables using SHEP approach in Gulu, Kitgum and Pader districts	Twenty farmer groups trained on vegetable marketing in Gulu, Kitgum and Pader districts	Field training by JICA Team and NUFLIP extension agents

Source: MAAIF 2017

3.1.4.13 Crop Pests and Diseases Control

3.1.4.13.1 Performance Overview

Crop Pests and diseases may cause yield losses up to 100% especially in horticultural crops and negatively affect crop production and productivity. The Department of Crop Protection, whose objective is to support sustainable crop pests and diseases control for improved crop production and productivity supports control of pests and diseases in the country.

In a bid to increase disease and pest control capacity in the country, the Department trained 233 MAAIF staff and Agricultural Extension workers in crop pest and disease diagnostics, management and control using environmentally sustainable measures.

1) Key achievements for FY 2016/17 in Crop Pests and Disease control

Table 18: Pest/Diseases recorded and Control Measures Undertaken in 2016/2017

Disease/Pest	Commodity and area(s) affected	Control measures undertaken	Results achieved
1. Fall army worm (FAW)	Maize, Sorghum, Sugarcane, Bananas and Pasture Grasses	<ul style="list-style-type: none"> Sensitized farming communities on management of the pest through various media channels. 	Despite the initial high prevalence levels of FAW infestation in season A 2017, its damage was contained at

Disease/Pest		Commodity and area(s) affected	Control measures undertaken	Results achieved
		throughout the country	<ul style="list-style-type: none"> Conducted field efficacy trials and bioassays and came out with effective pesticides for FAW control. Procured and distributed 22500 litres of pesticides, 100 motorized pumps and 500 knapsack spray pumps to the affected districts to demonstrate to farmers on the control of the pest. Information materials such as brochures and posters were printed and disseminated. Plant health rallies were conducted in Districts of Kibale, Mubende, Masindi, Hoima, Kiryandongo, Iganga, Bugiri, Tororo, Bulambuli and Kapchorwa; 3,200 farmers were reached to. 	16.5% except for Karamoja where the damage was >50% due to limited presence of pesticide stockists.
2.	Banana Bacterial Wilt (BBW)	Bananas throughout the country	Monitoring and surveillance conducted in 43 districts to assess the periodic status of BBW disease and BBW control bye-laws enforcement.	There is reduction in BBW prevalence from 7.8% in 2016 to 6.3 % in 2017.
3.	Maize Lethal Necrosis (MLN)	Maize in Eastern Uganda	Conducted surveillance and monitoring of MLN in affected/ threatened districts of Bulambuli, Mbale, Tororo Busia, Iganga, Sironko, Manafwa, Kween, Bududa Bukwo, Kapchorwa, Pallisa) to establish the disease status and control measures employed. Procured 5,000 litres of pesticides (Cypermethrin) to demonstrate on control of vectors. The MLN control strategy in place and being implemented has contained MLN in districts bordering Kenya especially Kween.	MLN prevalence is currently at 2.5% down from 3.4% in 2015/16 FY. Incidences detected only in Kween and Bulambuli, the rest of the country was free of the disease. MLN had no significant effect on maize yields.
4.	Black Coffee Twig Borer (BCTB)	Robusta Coffee	Trained 192 extension officers and lead farmers from Districts of Luwero, Mukono, Rubirizi, Sheema and Buhweju on management of Coffee pests and diseases i.e. BCTB.	There was a reduction in Twig Borer prevalence from 38.9% in 2015/16 to 22.7% in 2016/17 FY. This was attributed to increased capacity in knowledge on management of the pest amongst farmers and recruitment of extension officers at sub-county level who ably advise farmers on control options.
5.	Tomato Leaf miner (<i>Tuta absoluta</i>)	Tomato; in south-west and Central Uganda	Conducted a training of 32 Extension staff and lead farmers from Districts of Rubirizi (hot spot district) on effective control and management measures of the pest.	Capacity was built to ensure proper management measures are disseminated to farming communities.

Disease/Pest		Commodity and area(s) affected	Control measures undertaken	Results achieved
6.	Bronze bug ("Eucalyptus Lice)	Eucalyptus tree in South-Western, Central and Eastern Uganda.	The pest was confirmed by MAAIF in the country 2 years ago. Research (NaFORRI) is ongoing towards multiplication and mass release of a biological control agent for the control of the Bronze Bug.	All districts in South-Western, Central and eastern Uganda are all affected. The pest prevalence amongst Eucalyptus plantations is at >70%.

Source: MAAIF 2017

3.1.4.14 Crop Inspection and Certification Services

Table 19: Interventions Planned Actions and Outputs

Interventions	Planned Actions/targets	Performance Outputs/Intermediate Outcomes	Remarks
Quality Assurance systems along the value chain	Comprehensive supporting regulatory guidelines for enforcement and implementation of the Agricultural Chemicals and (Control) Act 2006 and regulations there under drafted.	Guidelines on requirement for registration of agricultural chemicals, dealers, premises registration, inspection guideline and National Pesticide Residue Control and Monitoring Plan	Guidelines developed and await approval by TPM
	Comprehensive supporting regulatory guidelines for enforcement and implementation of the Seed and Plant Act 2006 and regulations there under drafted.	Inspection and Certification manual reviewed at Departmental level and ready for use.	Guidelines developed and await approval by TPM
	Draft Comprehensive supporting guidelines for enforcement and implementation of the Plant Protection and Health Act 2016 and regulations.	Development of Standard Operation Procedure for Phytosanitary inspection, control and certification completed	Inspection and Certification Manual ready for TPM approval
		Development of the Plant Protection and Health Regulations at technical consultation completed.	Regulations ready for TPM approval to next stage.
		Development of Standard Operating Procedure for inspection of False Codling Moth (<i>Thaumatotibia leucotreta</i>) completed.	SOP ready for TPM approval

Interventions	Planned Actions/targets	Performance Outputs/Intermediate Outcomes	Remarks
		Development of Fruits and Vegetables Export Standards in collaboration with MTIC (UNBS) and other stakeholders completed.	Regulations ready for TPM approval for Stakeholders consultations SOP ready for TPM approval Used to audit plant health for fruits and vegetables to assess conformity with standards.
Crop pest and disease control measures	Delivery of inspection compliance and enforcement service to all agricultural chemical products dealers Countrywide improved and maintained.	<p>Inspection programme covered all the premises within Kampala Central Business District and Districts with high agricultural potential were given preference as these are areas with frequent malpractices relating to pesticides.</p> <p>Repacked products constituted 3% of the total quantity impounded. The biggest quantity of the impounded products was unregistered, comprising 30.2% of the total products impounded.</p> <p>There were amounts of Counterfeit/fake products in the market constituted 15.8% of the total quantity impounded. There were very small amounts of expired products in the market.</p>	<p>The counterfeit products are emerging in the market and difficult to detect. This is because the approved labels are scanned and reproduced making them very similar to the approved labels.</p> <p>There was reduction as compared to last FY 2015/16 as result of improved enforcements and inspections coupled with court prosecutions.</p>
	Agricultural chemicals with proven safety, economic value, quality and efficacy availed for registration.	Inspected 25 farms involved in flower growing and export activities within the districts of Wakiso, Mukono, Mpigi and Ntungamo as regards handling and disposing of agricultural chemicals and wastes, and the potential threats the industry may be causing to the environment and to people's livelihoods. Provision of appropriate personal protective equipment done to worker's ignorance and negligence of workers towards using PPE noted. Most have appropriate chemical waste management system. Strict rules and procedures followed while handling chemicals for spraying.	There was improved compliance by the flower farms towards conformity to EU required standards as result of sensitization, regular inspections and audits by Inspectors.
	Enforce mandatory registration of retail premises and dealers	Assessed suitability of premises against the legal requirements with a view to licensing them for specific functions applied for. A total of 126 premises were visited	Inspection report was made and issuance of a license recommended to 77 premises that qualified for licensing while 49 premises not recommended

Interventions	Planned Actions/targets	Performance Outputs/Intermediate Outcomes	Remarks
		outside in 62 districts Kampala and environs.	failed to meet minimum requirements for issuance of a license.
	Foundation and certified seed crop fields inspected and certified	Total hectares of seed crops applied for field inspection was 25,348 ha with 25,265 hectares being approved, 83 ha rejected.	The acreage under crops increased by 20.6% compared to FY2015/16 This increase was largely due to more land allocated to seed crop production. Seed farmers improved their management which led to a decrease in rejection. Rejection was due to off types, drought, harvesting seed crops before final approval, inadequate isolation distances, and lack of trueness to type.
	Routine/seasonal inspection of seed processing factories to verify maintenance of strict integrity of certified seed lots is not jeopardized during processing undertaken.	Seed inspected during processing and sampled for laboratory quality analysis. Maize accounted for 57.5% of the processed weight as compared to 77.2% of FY 2015/16.	The %age decrease of processed maize was due to fall army worm (<i>Spodoptera frugiperda</i>) coupled with drought in some zones.
	Delivery of inspection compliance and enforcement service to all Seed stockists and retailers and nursery operators countrywide improved and maintained	257 seed stockists were inspected for compliance.	There was improved compliance to seed regulations as result of regular inspections and enforcements.
	Variety testing through Distinctness, Uniformity, and Stability (DUS) for candidate varieties from NARO and National Performance Trials (NPT) jointly with plant breeders in 7 different agro-ecological zones conducted.	DUS testing sites were distributed in the 6 relevant agro-ecological zones. 39 candidate crop varieties were evaluated, 28 were submitted and presented to the Variety Release Committee (VRC) and released. 5 nutrient fortified bean varieties, 10 high yielding drought tolerant maize varieties, 8 Irish potato varieties with superior processing qualities, 5 sunflower hybrids; high yielding; resistant to alternaria; and high oleic acid content.	23 crop varieties were approved by Variety Release Committee and released for commercialisation.
	Inspection and issuance of Phytosanitary certificate for consignments to facilitate export.	78,540 phytosanitary certificates were issued compared to 55,368 issued in 2015/16 FY to authorized exports consignments including fresh produce (flowers,	There an increase of 29.5% phytosanitary certificates issued. Horticultural exports were about

Interventions	Planned Actions/targets	Performance Outputs/Intermediate Outcomes	Remarks
		fruits, vegetables), coffee, tea, tobacco, cotton, cocoa, maize, bean etc. The major exported plants and plant products were coffee, flowers, fresh fruits and vegetables, tobacco, tea maize, bean, simsim, sorghum, millet, Shea butter in order of decreasing volume.	6,193,451 kg equivalent to USD 15,483,627.50 Some exported plant products occasionally failed to meet the requirements of importing countries, resulting in interception at market destination.
	Review applications for permits for field testing of genetically engineered crops (GMOs) and provide regulatory oversight.	Surveillance and inspection of GMOs confined field trials (12 in total) for cassava (4), maize (2), Soybean (1), Irish potato (1), rice (1) and banana (3) was undertaken.	A total of 12 inspections were conducted.
	Strengthen the laboratory infrastructure for the enforcement of legislation	Renovation of 1 post entry quarantine screen house at Namalere completed. Assorted laboratory equipment was received under the East Africa Agricultural Productivity Project (EAAPP) for seed and diagnostic laboratory at Kawanda and Namalere	
	Ensure seed being offered for sale meets quality standards and truth-in-labeling requirements	302 samples as compared to 245 samples of FY 2015/16 were collected from different marketplace locations and tested for germination and purity. Out of this 84.8% passed while the rest failed. In addition, all imported seeds lots were inspected at port of entry and sampled for quality analysis.	More samples were collected and analysed compared to FY 2015/16. This was as result of recruitment of two Seed Analysts.
	Enhance compliance to the provision of the agricultural chemicals, seeds and phytosanitary Act and the Regulations made thereunder.	Investigated and prosecuted persons contravening the Agricultural Chemicals (Control) Act as regards illegal imports, counterfeiting (product/labels), and sales of unregistered pest control products.	There was improved enforcement by working with Agriculture Police.
	Logistical support to the department to facilitate and strengthen compliance enforcement program.	The Department provided support to the technical staff in their various activities for efficient service delivery to the regulated industry and the public in general and ensures that finance, transport, human and other resources are utilized efficiently.	1 screen house was not renovated due to limited availability of funds.

Interventions	Planned Actions/targets	Performance Outputs/Intermediate Outcomes	Remarks
	Private sector investment in agro-inputs promoted by enhancing compliance to the provisions of the Acts and the Regulations made there under.	A multi-stakeholder Agro-input platform is being established involving public and private sector actors.	Needed adequate funding to collect samples countrywide of all major seeds before planting season
	To develop and retain human resource capacity to meet the challenges of the Department	A number of in-service trainings were conducted. Some members of staff underwent training on self-sponsorship at postgraduate level.	Enforcements need more funding and transport to increase coverage in terms of districts
	Farmers educated about the benefit of high quality agro-inputs and trained in their proper use and good agricultural practices.	40 farmers (individuals and companies) from Central Uganda involved in export of fruits and vegetables were trained on good agricultural practice in conformity to export standards to EU.	Improved compliance by exporter of fruits and vegetables to the conformity of EU regulations and standards
	Strengthen district extension staff capacity to inspect and enforce regulatory framework at district level	30 district production staff were trained on inspection and enforcement of regulatory functions.	There is need for logistical support to enable Inspectors traverse all the districts.
	Improve regulatory information flow and dissemination to stakeholders.	Electronic Certification System is being piloted. Not undertaken to facilitate disseminating information on regulatory framework to all users and other interested parties.	There is need for logistical support to enable inspectors traverse all the districts.
	Work with agro-inputs suppliers, agro-dealers and farmers based organization to increase the availability of quality agro-inputs and to demonstrate their proper use at the farm level by setting up at least 10 Demo sites, per Zone, per year	Reviewed developed standard training curriculum for farmers, agro-dealers, spray service providers, fumigators and submitted to ACTC and ACB for approval.	There is overwhelming demand for the service by private sector to regulate the industry. This requires improved provision of funds to the department.

Source: MAAIF 2017

1) Challenges

Fake and counterfeit; seed and agro-chemicals, inadequate funding to enable the department carry out enforcements and inspections (for example department has no single functional field vehicle), interceptions for export crop products mainly horticultural due to harmful micro-organisms. Filling gaps of vacant positions to boost the required human man power to render the

department more effective and efficient. Lack of staff transport (30 seater minibus) to Namalere department working station.

2) Key Stakeholders in the Industry

The department of Crop Inspection and Certification works closely with; NAADs/OWC, NARO, MLG (DLG's), MoH, MTIC (UNBS), UCDA, CDO, URA, Ministry of Internal Affairs, Ministry of Justice, Private sector (horticultural producers and exporters, seed companies, grain producers and exporters, Agro-dealers and stockists, coffee and cocoa exporters, vegetative planting materials nursery operators) Development Partners and other stakeholders.

3.1.4.15 Food and Nutrition Security

The national food security analysis report of January 2017 indicated that the number of food secure households reduced from 83% to 69% of the national population. This was classified as being minimally food insecure (**Phase one**), this population has access to a stable food security and access to a variety of adequate food both from household stocks and markets. However, 26% of national population was facing stressed food insecurity (**Phase two**), accessing minimum adequate food consumption and employing insurance strategies; and 5% of the population was found to be in crisis (**Phase three**), this population had widening food consumption gaps with deteriorating dietary diversity and high malnutrition rates.

The Uganda Demographic and Health Survey (UDHS, 2016) indicated that 29% of children below five (5) years are stunted (short-for-age). Stunting ranges from a high rate of 41% in Toro region to a low rate of 14% in Teso region. The report also indicated that stunting is higher in children from rural areas (30%) as compared to children in urban areas (24%).

1) Key issues addressed in FY 2016/17

Development of a comprehensive Food Security Action plan to address the food insecurity, conducting food and nutrition surveillance in the country, promoting household production and consumption of micro-nutrient rich crops at household level.

Through the Uganda Multi-sectoral and Nutrition project, primary schools have been the entry points for demonstrating production of micro-nutrient rich crops that include fruits, vegetables and bio-fortified crops and a total of 1500 Primary schools in 15 Districts were selected to host the project; namely: Nebbi, Maracha, Yumbe, Arua, Namutumba, Bugiri, Iganga, Bushenyi, Isingiro, Ntungamo, Kabale, Kasese, Kyenjojo, Kabarole and Kiryadongo.

Furthermore, the Ministry working closely with Partnership for Aflatoxin Control in Africa (PACA) has put in place a Multi-sectoral Aflatoxin Mitigation Action Plan and Mycotoxin Steering Committee (MMSC) chaired by MAAIF. Other key stakeholders of the MMSC include MoH, MTIC and other stakeholders to mitigate the impacts of Mycotoxins on animal and human health including.

2) Planned actions Versus achieved outputs

Table 20: Interventions, Planned Actions and Outputs

Interventions	Planned actions/ targets	Performance outputs/ intermediate outcomes	Remarks
Food and Nutrition surveillance	Assess at least 30 districts for Food and Nutrition security	79 districts were assessed for Food and Nutrition security	Countrywide food insecurity experienced called for a countrywide food security assessment and awareness campaign
Capacity building of district extension staff on food and nutrition security	Train at least 120 District Local Government (DLG) staff on household food and nutrition security	Trained 510 District Local Government (DLG) staff on household food and nutrition security. 375 district officials in have been trained in the production of micro-nutrient rich foods.	Support from the Uganda Multi-sectoral Food Security and Nutrition Project (UMFSNP) and Development Partners especially USAID/FANTA project.
Promote production and consumption of micro nutrient-rich crops	Establish demonstration gardens on fruits, vegetables and bio-fortified crops (Orange Fleshed Potato and High Iron Beans) in primary schools.	3,000 Demonstration gardens on Micro-nutrient rich foods (1,000 Demos in Primary schools and 2,000 Demos for Lead Farmers in communities)	Support from Uganda Multi-sectoral Food Security and Nutrition Project (UMFSNP)
Finalizing the Development of Guidelines for integrating Nutrition into Agriculture Enterprise Mixes	Guidelines for Integrating Nutrition into Agriculture Enterprise Mixes developed and Printed	1000 Copies of guidelines on integrating Nutrition in Agriculture Enterprise Mixes produced	Support from USAID/FANTA project. Guidelines were disseminated in distributed in 34 districts and 120 production department officers oriented on them
Development of a Comprehensive food and Nutrition Security Action Plan	Comprehensive food and Nutrition Security Action Plan developed	1 Comprehensive food Security Action Plan Developed	Being integrated into the zero hunger strategy

Source: MAAIF 2017

3) Key stakeholders

Fhi360 (USAID/FANTA Project); IFPRI (Harvest plus program), Local Governments and OPM among others

3.2 Fisheries Sub Sector Performance

3.2.1 Introduction

Fisheries management and development in Uganda is guided by the National Fisheries Policy (2004), whose sub sector Vision is “an ensured sustainable exploitation of the fishery resources at the highest possible levels, thereby maintaining fish availability for both present and future generations without degrading the environment. Fish is one of the priority commodities in the agricultural sector strategic plan (ASSP 2016-2020).

It is projected that capture fisheries production would increase by 530,000 MT by 2020 while aquaculture production is projected at 300,000 metric tonnes. Underpinned in the ASSP is the need to enhance production and productivity. This is needed to upscale efforts to reverse the dwindling fish catches by strengthening regulation and controls, building capacity of institutions with strong collaborative and networking mechanism and promote aquaculture to commercial levels. The Directorate continued to invest in these interventions in the F/Y 2016/17.

3.2.2 Overview of Sub Sector Performance

- | | |
|----------------------|-----------------------------|
| 1) Funding received | 5) Regional fry centers |
| 2) Policy guidance | 6) Cost of fish |
| 3) Declining catches | 7) Enforcement |
| 4) BMU's | 8) Outlook for next 3 years |

3.2.3 Capture Fisheries

3.2.3.1 Key Issues Addressed by Interventions

To sustain the benefits from fisheries, the Directorate of Fisheries Resources (DiFR) has to update strategies and plans to address key issues affecting fisheries. In 2016/17 the following key issues were addressed: -

- 1) Reviewing the National Fisheries Policy and critical regulations;
- 2) declining fish stocks of major commercial fish species;
- 3) Post-harvest losses resulting from inadequate fish handling facilities, poor handling practices, limited use of ice and poor hygiene;
- 4) Increased use of illegal fishing gears and methods;
- 5) Increased capture and trade in immature fish;
- 6) Over capacity leading to increased fishing pressure;
- 7) Inadequate funding and understaffing;
- 8) Co-management institutions and the recently established fisheries protection force tasked with fisheries enforcement have inadequate capacity.

Consequently, a number of targets were set, activities conducted and outputs registered for the year 2016/2017. These are summarized in the table 22, below;

Table 21: Planned Targets Versus Achievements 2016/2017

Key Intervention Areas	Planned Outputs	Achievements	Remarks
Enabling Environment	Review 1 National Fisheries Policy NFP	1 National Fisheries and Aquaculture Policy approved by MAAIF TPM and submitted to MFPED to obtain certificate of financial implication	Project implementation plan and Regulation Impact Assessment(RIA) prepared

Key Intervention Areas	Planned Outputs	Achievements	Remarks
	Implement 1 lake specific management plans	Implemented the Lake Victoria fisheries Management Plan III through activities of Mukene, Nile Perch and Nile Tilapia management	
	Develop 1 statutory instrument on fish breeding areas	Fish Breeding Areas Statutory Instrument was drafted.	Solicitor General advised that regulatory instruments should be submitted after the Fish Bill has been passed
	Review of 1 co-management guideline	Finalized 1 Beach Management Unit BMU guidelines	Implementation of the guidelines was affected by the presidential directive on BMUs
	The Fish (Fishery and Aquaculture products) Quality Assurance Rules 2008 Reviewed. (One)	<ul style="list-style-type: none"> The Fish (Fishery and Aquaculture products) Quality Assurance Rules 2008 Reviewed. 	Finalized review of the Fish quality assurance rules 2008 and are awaiting publication in the gazette.
	One Standard Operating Procedure for fish inspection and quality assurance Reviewed.	<ul style="list-style-type: none"> One SOP on Fish inspection and quality assurance draft to be finalized 	SOP on Fish inspection and quality assurance draft to be finalized in September 2017.
Promoting recovery of depleted stocks of the large commercial fishes	Conduct 1 awareness seminar among fishing communities in Mpigi on HIV/AIDS and how it affects their welfare/ livelihoods	Conducted 3 seminars and meetings at Kiyindi, Kimi and Namirembe fishing communities and informed them of the available HIV/AIDS care services Disseminated HIV infection prevention messages	Support from LVEMP increased performance
	Conduct 30 technical backstopping visits to Local Governments and fishing communities	Conducted 23 technical backstopping visits in various aspects of fisheries management: licensing; aquatic weed control; protection of fish breeding areas and fisheries data collection to enhance fish productivity and production	Inadequate funding
	Collect, compile, analyze and disseminate 4 fisheries data sets on production and marketing	4 data sets collected, compiled from border posts, markets and selected landing sites and disseminated to stakeholders	
	Support the formation of 10 Fisheries cooperatives on the major lakes	Supported the formation of 4 SACCOs in Mpigi district at Senyondo and Ggolo landing sites	Inadequate funds
	Carry out 4 monitoring and surveillance trips to evaluate infestation and resurgence of aquatic weeds in lake Victoria and Kyoga.	Carried out 1 monitoring and surveillance of infestation and resurgence of aquatic weeds in Lake Victoria and Kyoga.	Resource constraints
	Sensitize 15 fishing communities/LGs on management of FBAs on Lake Victoria	10 fishing communities/ districts were sensitized on management and protection of Fish Breeding Areas	Budgetary constraints limited total coverage.

Key Intervention Areas	Planned Outputs	Achievements	Remarks
	Support communities to implement biological and manual aquatic weed control on 3 water bodies	Distributed 20 wheel barrows, 34 forked hoes, 12 forked spades, 30 pairs of gum boots, 30 pairs of gloves, 12 life jackets, 30 pangas in 3 landing sites in Kalungu on Lake Victoria	On one water body covered; Delays in procurement of equipment affected coverage of all the 3 water bodies
	Conduct 4 monitoring visits in the Albertine graben districts to assess impact of oil and gas activities on fisheries	1 visit conducted in the districts of Hoima, Ntoroko and Buliisa districts	Budgetary cuts affected 100% achievement
	Promote alternative livelihoods in fishing communities on 3 fishing communities on 3 water bodies	Conducted 3 sensitization training on alternatives in 3 districts of Mpigi, Kasese and Rubirizi	Only 1 water body covered
	Attended 4 information Disseminate platforms on appropriate fishery technologies for uptake by the local fishing communities	2 dissemination platforms attended and disseminated published information on the new technology for post-harvest handling at Kiyindi landing sites and at National Agricultural show in Jinja and World Food Day at Ngetta	Inadequate funding
	Collaboration on fisheries regulation and standards nationally strengthened; target 4 collaboration platforms attended.	2 platforms on EAC and border inspectors attended. Initiated and streamlined the importation and exports of fisheries products, generated data base for all importers and exporters.	Established boarder inspectors to monitor exports and imports.
	Fishing capacity on major water bodies controlled target; register 40,000 fishers	15,000 registered so far Registration of fishers on all water bodies is ongoing, captured data of all fishers.	Process on-going
Improved market access for fisheries and fish products	Capacity for fisheries regulation enhanced; target, 4 staff trainings to benefit 80 staff both center and local governments	1 training conducted 30 staff benefited	Inadequate funding
	Capacity for licensing enforcement and quality assurance of public and private institutions along the fish value chain strengthened. Target -20 sensitizations meetings -1 guideline reviewed	10 sensitization meeting conducted. 1 Licensing guidelines developed including a requirement to meet quality standards before licensing and harmonized at EAC level and introduced e-licensing, on-site licensing;	Inadequate funding
	Capacity of technical staff to effectively carry out quality assurance for fish products strengthened; target 4 trainings	1 training conducted; Capacity of technical staff to effectively carry out quality assurance for fish products strengthened	Inadequate funding
	Compliance to laws, regulations and standards enhanced. Target; 60 compliance inspections	40 compliance inspections conducted; Intensified compliance inspection at landing sites, border posts and fish factories;	Inadequate funding

Key Intervention Areas	Planned Outputs	Achievements	Remarks
	Fish and Fisheries products traded nationally, regionally and internationally certified; Target; 150 compliance inspections	90 inspections conducted; Intensified compliance inspection at landing sites, border posts and fish factories;	Inadequate funding
	Fish Quality standards regulated and enforced Fishing activities on all major water bodies in the country regulated and controlled. Target 120 inspections	86 inspections conducted; Intensified compliance inspection at landing sites, border posts and fish factories;	Inadequate funding
	Operations of fisheries enforcement agencies for regulation purposes supported; Target 200 operations	197 operations supported both technically and financially; HE under article 99 of the Constitution of the republic of Uganda Established a fisheries protection force with the purpose for eliminating illegalities. To promote sustainable fisheries;	FPF is being supported by the Directorate to achieve intended objective

Source; DiFR Performance reports 2016/17

3.2.3.2 Strategies for Regulation and Enforcement

- 1) Reviewed enforcement guidelines to guide implementation at District, Regional and National Level;
- 2) Instituted mobile licensing teams to reach out to landing sites where the fishers are;
- 3) Built capacity of the border inspectors and increased compliances checks at the border posts;
- 4) Instituted registration procedures for all persons actively involved in fishing or related activities to help categorize the players and facilitate the planning process to support them;
- 5) Reviewed and updated the Fish (Fishery and Aquaculture products) Quality Assurance Rules 2008 to improve quality and safety measure to trade fish both locally, regionally and internationally.

3.2.3.3 Contribution of Different Stakeholders to Performance

- 1) The Egyptian Aquatic Weed control project (UEAWCP) funded by The Egyptian government working with government of Uganda have continued to fund efforts to enable the removal of aquatic weeds especially water hyacinth mainly on from Lake Victoria. And completed construction of a modern fish market and landing sited at Masese. This market was jointly commissioned on 28th March 2017 and handed over to Jinja Municipal Council;
- 2) SMARTFISH project under the enforcement unit, the Food and Agricultural Organisation in conjunction with the Indian Ocean Commission, supported monitoring, control and surveillance through training of border inspectors to strengthen compliance measures at the border posts;
- 3) The Fisheries Protection Force has contributed to increased enforcement;
- 4) UFPEA participated in the quality assurance streamlining process;

- 5) District local government have participated in the registration exercise of fishers;
- 6) LVFO; Developed a Fisheries Management Plan III, for Lake Victoria, developed regional guidelines for cage fish farming, regional guidelines for licensing;
- 7) LEAF II; Initiated harmonization of fisheries polices for Lake Albert and Edward George (Transboundary shared water bodies);
- 8) Uganda Women Fish Network has contributed to value addition along the value chain of fisheries and aquaculture products.

3.2.3.4 Outcomes and Impact

3.2.3.4.1 Production from Natural Water Bodies (Capture)

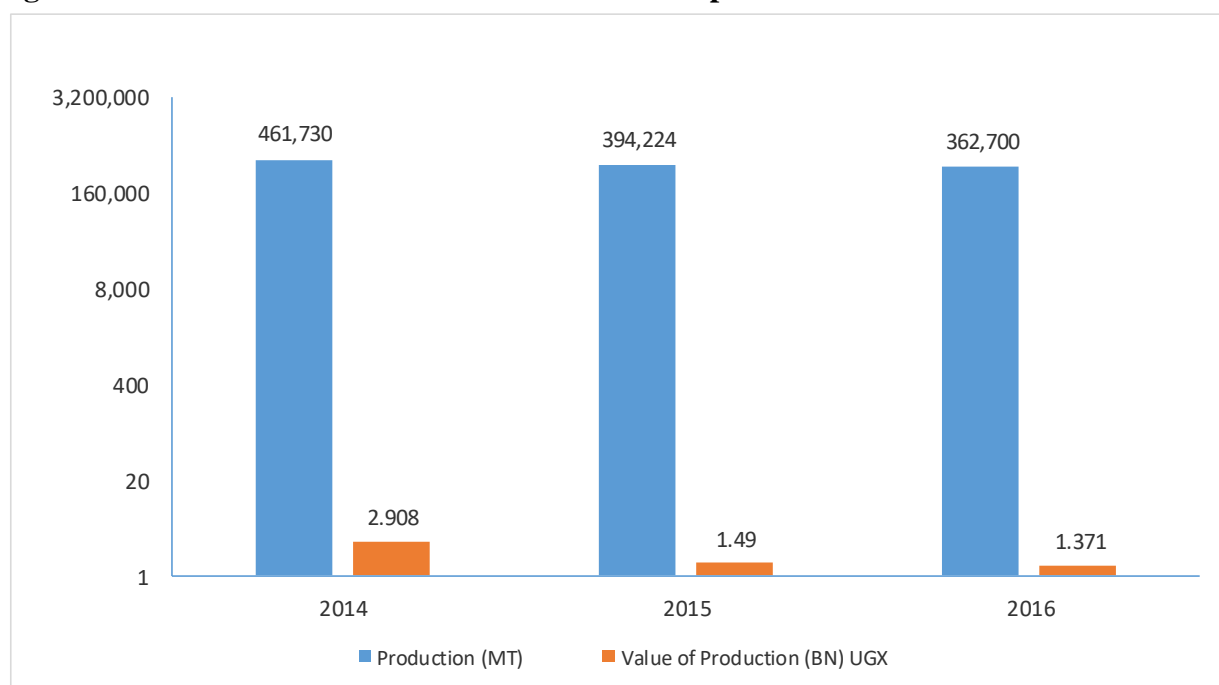
Continued decline in fish production was observed, from 396,205 MT in 2015 to 389,244 MT in 2016 as shown in Table 2. Decrease in total fish production was caused by increased enforcement by the Fisheries Protection Force. Small pelagic fishes have continued to emerge as predominate catch. The main commercial species caught included Nile perch, Tilapia and Mukene on all major water bodies.

Table 22: Trends in Production And Value from Capture Fisheries

YEAR	2014	2015	2016
Production (MT)	461,730	396,205	389,244
Value of Production (BN) UGX	2.908	1.113	1.108

Source; DiFR Performance reports 2016/17

Figure 12: Trends in Production and Value from Capture fisheries



3.2.3.4.2 Performance of Fish Exports and Value (Contribution to Export Earnings)

In the year 2016 exports of various fish products to international markets decreased from 18,785 MT in 2015 to 16,168 MT in 2016. This resulted in change in value from 123.117 million USD in 2015 to 88,970 million USD in 2016 as seen in table 3 below.

Table 23: Performance of Fish Exports and Value

YEAR	2015	2016
Total Exports (MT)	18,785	16,158
Value Total Exports millions (USD)	123,177	88,970

Source; DiFR Performance reports 2016/17

3.2.3.4.3 Contribution to Job Creation

Fisheries activities along the value chain contribute 3% to national GDP and 12% to agricultural GDP of Uganda. Fisheries sub sector employs up to 1.7 million people directly and over 3.5 million people indirectly and fish accounts for over 50% of animal protein food with a *per capita* consumption of 10 kg for Uganda (FAO 2016).

3.2.3.4.4 Contribution to Non-Tax Revenue Collections

Since the introduction of licensing measure under the DIFR the directorate has been collecting non tax revenues from issuance of licenses and permits as a regulatory measure to regulate the sub sector. As a result of interventions above, the revenue collection has been increasing from 579.65 million last F/Y to current year report of

Table 24: Performance of Non-Tax Revenue (Regulatory Collections)

YEAR	2015	2016	2017 (Half year)
Number of fishing vessels licensed	2,508	5,120	2,671
Total Collections, millions (UGX) (Including other fees and permits)	433.65	579.65	220.54

Source; DiFR Performance reports 2016/17

3.2.3.4.5 Protection of Fish Breeding Areas Enhanced

Over 50 potential fish breeding areas identified and demarcated in collaboration with NaFIRRI. Guidelines developed and Gazette process on going. Plans underway to train the communities in implementation of the guidelines. This will increase fish recruitment in the natural stocks.

3.2.3.4.6 Reduction of Illegal Gears and Methods

2015/16 was the F/Y year when the president issued a directive stopping all kinds of enforcement activities by the directorate. During that year there was minimal enforcement at all levels. This resulted in poor performance especially in the 2015/16 as opposed to 2016/17 when the fisheries protection force has started conducting enforcement. Where more than 100% increase in all indicators is observed in 2016/17.

Table 25: Trends in Enforcement

YEAR	2014/15	2015/16	2016/17
Number of enforcement operations conducted	67	42	178
Number of illegal gears impounded	567000	350,000	1,500,000
Number of prosecutions conducted	82	60	230
Total tonnage of immature fish impounded and disposed of (kgs)	240,000	100,000	800,000
Number of illegal fishing boats destroyed	340	220	1250

Source: DiFR Performance Report 2016/17

3.2.4 Aquaculture

3.2.4.1 Key Interventions for Aquaculture during 2016/17

- 1) Finalize development of comprehensive National Aquaculture Policy;
- 2) Review and update existing guidelines and develop new ones;
- 3) Under take critical input supply to commercial fish farmers as a stimulus package to up-scale production and productivity;
- 4) Strengthening certification inspection and standards along the Aquaculture value chain;
- 5) Capacity building/skills development in Aquaculture;
- 6) Promote new and existing Aquaculture cooperatives/Associations in; production, processing, trade and marketing;
- 7) Establish a functional Aquaculture data management system;
- 8) Surveillance of aquaculture diseases in the country;
- 9) Certification of Aquaculture inputs, services and goods; and
- 10) Establishments of an Aquaculture market information management system.

Consequently, a number of targets were set, activities conducted and outputs registered for the year 2016/2017. These are summarized in the table 27 below;

Table 26: Planned Targets Versus Achievements in Aquaculture 2016/2017

Key Intervention Areas	Planned Outputs	Achievements	Remarks
Enabling Environment	Finalize development of comprehensive one National Aquaculture Policy;	1 National Fisheries and Aquaculture Policy approved by MAAIF TPM and submitted to MoFPED to obtain certificate of financial implication	Awaiting cabinet approval
	Review and update one existing guidelines and develop new ones;	Reviewed the fish feed guidelines and awaits further scrutiny by the stakeholders after mending some clauses	Process incomplete stakeholder consultations on going
Promotion of sustainable fisheries	Under take critical input supply to commercial fish farmers as a stimulus package to upscale production and productivity; Target	Supported over 850 fish farmers with critical fish inputs of fish feed and seed from both OWC/NAADS and GOU support totaling to 6,171,818 fingerlings (of tilapia, Catfish and Mirror carp) and Fish feed of 242,765 kgs in all the regions of Uganda	Good performance resulted from support from OWC

Key Intervention Areas	Planned Outputs	Achievements	Remarks
	1000 farmers 6,000,000 fingerlings 200,000 kgs of feed		
	Strengthening certification inspection and standards along the Aquaculture value chain; 10 compliance inspections	6 Aquaculture compliance inspections conducted, along the production chain and marketing chain conducted to ensure standards are adhered to and environment protected	Inadequate funding
	Capacity building/skills development in aquaculture enhanced; Target 8 trainings	Carried out 4 trainings of local government staff and selected farmers in aquaculture Best Management Practices and distributed aquaculture training manuals to local government staff and commercial farmers	Coverage still low, more training required inadequate funding
	Promote new and existing aquaculture cooperatives/Associations in; production, processing, trade and marketing; capacity building training Target 4	1 training conducted for Masese Fish Farmers Association, 50 farmers benefited. the focus was sector to organized along the production value chain to ease access to support from government	Inadequate funding
	Establish 1 functional aquaculture data management system; target 4 trainings	4 Capacity building training conducted benefiting 60 local government staff. Main focus strengthening data collection tools in Aquaculture. Trainings covered 4 regions of Uganda	
	Surveillance of aquaculture diseases in the country; Target 4 surveillance exercises	2 exercises were conducted. Increased surveillance along the value chain, farmers trained to put in place mitigation safety measure for containment.	Inadequate funding
Improved market access for fisheries and fish products	Certification of aquaculture inputs, services and goods; Target 4 trainings	4 training conducted. This facilitated private sector to increase adherence to Best Management Practices (BAP)	
	Establishments of an aquaculture market information management system; Target 4 trainings	4 trainings conducted, to facilitate the formation of, market information system through training of data collectors to increase accuracy and usability of the collected data by fish farmers in collaboration with Agromarketday	An online data system established more resources required to complete the process.

Source: DAM&D Performance Report 2016/17

3.2.4.2 Fish Production from Ponds and Fish Cages

A comparison of production figures for 2014 and 2015, shows that there is clear indication that Aquaculture production grew by 8.4%, although this fell short of the set target of 15% per annum. The increase resulted in a total increase in yield for both fish ponds and fish cages to an estimated 120,360 MT as indicated in Table 6 below. The steady increase has been as a result of establishment of various infrastructure by the private sector especially hatcheries and feed mills.

This has enabled increased production of fish seed and feed to support the production chain of fish farmers.

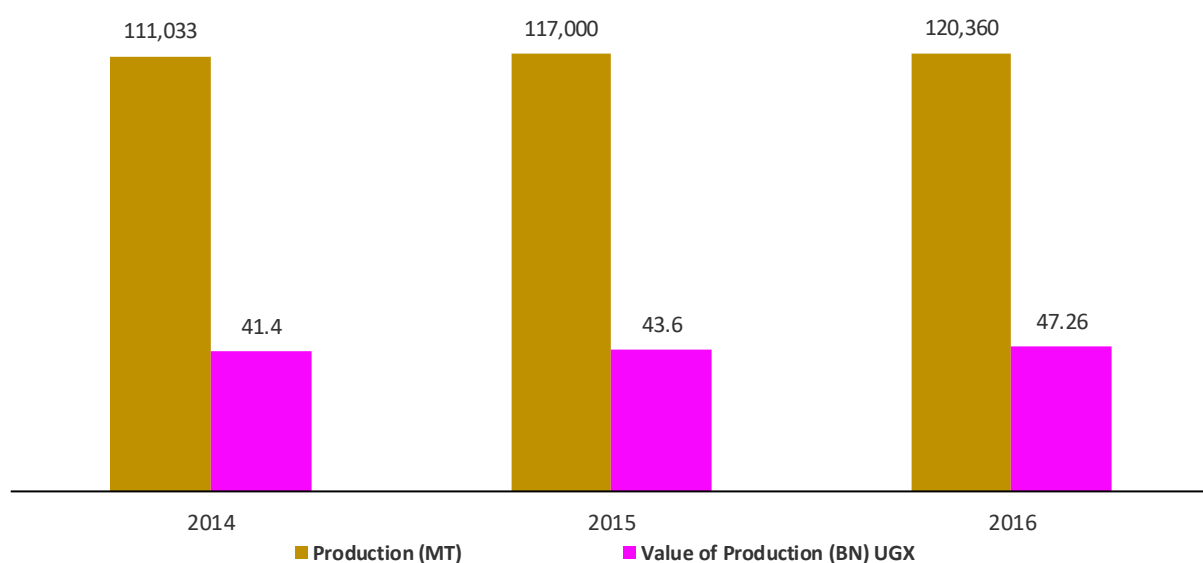
The Department of Aquaculture has facilitated the increase in private sector investment through certification processes for fish cage production systems mainly on Lake Victoria, hence up-scaling production. Tilapia is the predominantly farmed species but catfish and Mirror carp are also being farmed.

Table 27: Trends in Aquaculture Production and Value

YEAR	2014	2015	2016
Production (MT)	111,033	117,000	120,360
Value of Production (BN) UGX	41.4	43.6	47.26

Source: DAM&D Performance Report 2016/17

Figure 13: Trends in Aquaculture Production and Value



Source: DiFR 2017

3.2.4.3 Households Participation in Fish Farming

Aquaculture is steadily registering a transition from small earthen ponds to Low volume high density (LVHD) fish cages. The estimated number of farmers involved in Aquaculture has increased from 15,000 in 2015/16, to 16,200 farmers in 2016/2017, it's important to note that these number are evenly distributed through the country. Currently these farmers own 27,000 ponds and 3,500 fish cages which produced about 120,360 MT in 2016.

3.2.4.4 Commercial Value of Farmed Fish

There was continued increase in Aquaculture production, this earned fish farmers UGX 47.26 Bn in 2016 as compared to UGX 43.6 Bn. in 2015. Given the current level of investment by both the

Public and Private sector in Aquaculture, production from Aquaculture is expected to rise in 2017 by 15% from the current 8.4% seen in 2016. This increase has contributed to jobs and wealth creation through employment of youth and young graduates on fish farms and sale of fish by entrepreneurs. Moreover, increased fish production could improve nutrition, food security and household incomes thus meeting part of the sustainable development goals.

3.2.4.5 Contribution of Private Sector in Promoting Aquaculture

- 1) The sub-sector has continued to receive support in form of input of fish seed and fish feed from Operation Wealth Creation under the National Agricultural Advisory Services (OWC-NAADS).
- 2) The FAO/TCP has continued to support farmers and technical staff in the Northern and Eastern regions of Uganda with trainings to farmers and capacity building to technical staff in Districts;
- 3) South to South cooperation project funded by FAO implemented by the China Africa Cooperation has established; rice/fish production system demos in Butaleja, Amuria and Budaka Districts. They have trained farmers in rice/fish production systems; established on farm fish feed production machines for demonstration to fish farmers in the Luwero zone (Kapeeka) and training farmers to produce on farm feeds;
- 4) Establishment of Fish feed mills of Ugachick; IG invest, Aquafarm Ltd, Sabre & Sons; and Jodar Services has increased farmers access to improved fish feed which has helped to increase fish production;
- 5) Establishment of fish hatcheries by the private sector mainly; Aquafarm Ltd, Cougar Ltd; Rivers Edge fish farm, SoN fish in Jinja, many others totaling to 36 operational hatcheries that are privately owned. This investment by the private sector has increased access to fish seed by farmer's hence up-scaling production from Aquaculture.

3.2.4.6 Outcomes and Impact

- 1) Increased forex earning as shown in earlier table 28, over 90% of farmed fish is exported to; Kenya, Rwanda, DRC and Southern Sudan;
- 2) Increased job creation from increased investment by the private sector in setting up Aquaculture Establishments put a fig.;
- 3) Increase in number of actors along the value chain notably, those supporting value addition through increased processing. For example; farmed tilapia being processed into powdered ready meal by KATI FARM fish processors;
- 4) Enabling environment established by the DiFR has led to increase investment in Aquaculture enterprises establishment and development;
- 5) No reported incidence of fish disease outbreak so far as a result of increased disease surveillance efforts by both the Public and Private sector; and
- 6) Well established online Aquaculture data collection tool operationalised and being hosted by the MAAIF web site and can be accessed at aquaculture.agriculture.go.ug.

3.2.5 Challenges in the Fisheries Sub Sector

Table 28: Challenges in the Fisheries Sub Sector

Challenge	Proposed Mitigation strategies
a) Continued decline in the stocks of large commercial fish species especially Nile perch resulting from un-sustained enforcement activities.	<ul style="list-style-type: none"> Fisheries enforcement task force which was constituted be operationalised and supported from all stakeholders; Continued promotion of aquaculture as an alternative to relieve pressure on capture fisheries through aquaculture parks and public private partnerships.
b) Limited funding to the subsector	<ul style="list-style-type: none"> Funding be increased especially for enforcement. The operationalization of the fisheries fund as provided for under the Fish (Amendment) Act 2011 needs to be fast-tracked. The contribution of fisheries to GDP needs to be considered along the value chain
c) Continuous under funding of quality assurance contributed to increased post-harvest losses, increased over-capacity, lack of enforcement to ensure compliance to fisheries laws and regulations.	<ul style="list-style-type: none"> There is need for increased funding of quality assurance activities to reduce post-harvest losses, licensing to reduce over-capacity, enforcement to ensure compliance to fisheries laws and regulations and fish stocks management. As a stepping stone, MoFPED should expedite the creation of a fisheries fund to allow for plough-back of an estimated 3 billion generated from fisheries activities into management as provided for under the Fish (Amendment) Act 2011.
d) Continued proliferation of the Kariba weed on lake Albert and Kyoga	<ul style="list-style-type: none"> Instituting manual, mechanical and biological control technologies; Funding to those technologies required.
e) Continued importation of Twins despite the export ban on importation of illegal gears creates a challenge to enforcement because 90% of the illegal gears are locally hand made by gear making specialist at landing sites	<ul style="list-style-type: none"> There is need to specify which twins to import and which ones not to import.

Source: MAAIF 2017

3.2.6 Conclusions

The undertaking of the various strategic interventions mentioned earlier has led to overall increase in Aquaculture production. Under capture fisheries, increase in production was noted in the small pelagic fish species and tilapia. Increases in stocks of Nile perch are yet to be realized and this continues to hamper the fish processing industry. It is thus necessary to maintain and direct effort towards interventions to increase stocks of Nile perch and Tilapia.

3.2.7 Recommendations

- 1) In a bid to improve fish production levels, promotion of investment in stock recovery programs for Nile perch and Tilapia under capture fisheries is suggested. This will require mitigating various challenges to fish production. Most especially, there is need to support strategic interventions to boost enforcement.
- 2) Additionally, there is need to support investment in aquaculture production & productivity to ease pressure on capture fisheries. The promotion of interventions towards fish value

addition and market access will be necessary to increase profitability. In implementing the above recommendations, institutional and policy frameworks should be strengthened to create an enabling environment.

- 3) Government, donor agencies and all stakeholders (private sector) are therefore called upon to provide the necessary budgetary and direct investment in upscaling aquaculture production to continue with transformation from subsistence to commercial aquaculture.

3.3 Livestock Sub Sector Performance

3.3.1 Department of Animal Health

3.3.1.1 Division: Diagnostic, Epidemiology and Disease Control Section

3.3.1.1.1 Key Issues Addressed During FY 2016/17

- a) Animal Disease outbreaks (Foot and Mouth Disease, CBPP, PPR, ASF, LSD, Anthrax, Rabies, Avian Influenza);
- b) Tick infestation, tick resistance to Acaricides and tick borne diseases such as East coast fever;
- c) Tsetse fly infestation and Nagana (Trypanosomiasis); and
- d) Vaccination against priority animal diseases.

The interventions to address those issues were: -

- a) Investigation of animal diseases;
- b) Surveillance of animal diseases;
- c) Procurement of vaccines to vaccinate against priority diseases;
- d) Control of tick infestation and TBDs;
- e) Monitoring of tick resistance to acaricide;
- f) Tsetse eradication and Trypanosomiasis eradication;
- g) Collaborations with other institutions (COVAB Makerere University, NARO) to fight against animal diseases;
- h) Intensification of laboratory activities at diagnostic and Epidemiology laboratory of MAAIF (NADDEC), regional and district labs in analyzing and confirmation of animal diseases;
- i) Sensitization of livestock stakeholders (farmers, vets, traders and politicians) to create public awareness on the trade sensitive diseases; access to regional and international markets; control measures; biosecurity; food security and public health; and
- j) Research and development for FMD and tick vaccines.

3.3.1.1.2 Target Versus Achieved

During FY 2016/2017, the Department planned to: -

- a) investigate all disease outbreaks in animals;
- b) Inspect all Animal products at entry points and stock routes for control of animal movement at Entebbe International Airport and at boarder districts in 12 districts (Isingiro, Kabale, Rakai, Ntungamo, Busia, Tororo, Manafwa, Bududa, Arua, Koboko, Zombo and Ntoroko);

- c) Inspect and certify animals and animal products at ports of entry / exit to ensure importation and exportation of quality products;
- d) Support the National Referral Laboratory at Entebbe (NADDEC) to improve capacity for animal disease diagnosis and certification of animal products for Export; and
- e) Undertake epidemic animal disease surveillance countrywide (especially in high risk districts)

The following achievements were realized:

- a) FMD outbreaks investigated in 42 districts of Isingiro, Mbarara, Rakai, Lyantonde, Bushenyi, Lwengo, Sembabule, Kiruhura, Nakasongola, Gomba, Mityana, Buliisa, Kween, Moyo, Wakiso, Amudat, Moroto, Kiryandongo, Butaleja, Namutumba, Nakaseke, Tororo, Pallisa, Budaka, Bugiri, Bukomansimbi, Soroti, Katakwi, Bukedea, Mbale, Kumi, Ntungamo, Sheema, Ibanda, Hoima, Kyotera, Rukungiri, Lamwo, Masaka, Lira, Nebbi and Gulu.
- b) Rabies outbreaks were investigated in the districts of Mityana, Gomba, Arua, Wakiso, Masaka, Busia, Butambala and Tororo. The Department of Animal Health intervened as follows:
 - i. Provision of Rabies Vaccines to affected districts
 - ii. Pet vaccinations done
 - iii. Communities especially children were sensitized on rabies
- c) Contagious Bovine Pleuropneumonia (CBPP) was investigated in Rakai, Nebbi, Kapchorwa, Moroto, Nakapiripirit, Napak, Amudat and Abim. Control measures taken were;
 - i. Provision of CBPP vaccines to affected districts
 - ii. Sensitization of livestock stakeholders on CBPP outbreaks and control measures
- d) *Peste des Pestiis Ruminantes* (PPR) a disease of goats and sheep was investigated in Lyantonde, Kisoro, Bushenyi, Kabale, Kasese, Rubanda, Rukungiri, Ntungamo, Bundibugyo, Kyegegwa and Kyenjojo.
 - i. Sensitization of goat and sheep farmers on the danger of PPR on food security and economic implications was done.
- e) African Swine Fever (ASF), a disease of pigs, was investigated in the districts of Rakai, Masaka, Lwengo, Kamuli, Tororo, Busia and Bukedea.
- f) Brucellosis in cattle and goats was investigated in Kiruhura, Mbarara, Bushenyi, Sembabule, Ntungamo, Mityana, Gomba, Nakaseke, Luwero, Nakasongola and Masindi.
- g) Lump Skin Disease (LSD) in cattle was investigated in Masaka, Gomba, Lwengo, Rakai, Luwero districts.
- h) Anthrax outbreaks in Gomba, Mbarara
- i) Black Quarter outbreaks were investigated in Pader, Agago and Gomba districts.

3.3.1.1.3 Major Pests/Disease Outbreaks Reported and Location

The table below summarizes the outbreaks: -

Table 29: Disease Outbreaks

Reported disease outbreak	Districts where the outbreak occurred
Foot and Mouth Disease	Isingiro, Mbarara, Rakai, Lyantonde, Bushenyi, Lwengo, Sembabule, Kiruhura, Nakasongola, Gomba, Mityana, Buliisa, Kween, Moyo, Wakiso, Amudat, Moroto, Kiryandongo, Butaleja, Namutumba,

	Nakaseke, Tororo, Pallisa, Budaka, Bugiri, Bukomansimbi, Soroti, Katakwi, Bukedea, Mbale, Kumi, Ntungamo, Sheema, Ibanda, Hoima, Kyotera, Rukungiri, Lamwo, Masaka, Lira, Nebbi and Gulu.
Rabies	Mityana, Gomba, Arua, Wakiso, Masaka, Busia, Butambala and Tororo.
CBPP	Rakai, Nebbi, Kapchorwa, Moroto, Nakapiripirit, Napak, Amudat and Abim
PPR	Lyantonde, Kisoro, Bushenyi, Kabale, Kasese, Rubanda, Rukungiri, Ntungamo, Bundibugyo, Kyegegwa and Kyenjojo
ASF	Rakai, Masaka, Lwengo, Kamuli, Tororo, Busia and Bukedea
LSD	Masaka, Gomba, Lwengo, Rakai, Luwero
Anthrax	Gomba, Mbarara
Black Quarter	Pader, Agago and Gomba

Source: MAAIF 2017

3.3.1.1.4 Isolated Cases Reported and Location

Isolated cases of Avian Influenza (H5N8) were investigated in the affected districts of Masaka, Wakiso and Kalangala; Other at risk districts of Mukono, Kampala, Budaka, Buliisa, Kayunga, Kisoro, Rakai, Sembabule, Jinja, Luwero, Nakasongola, Masindi and Hoima. The following were the interventions to control Avian Influenza: -

- a) Quarantine/animal checkpoints;
- b) Sensitization;
- c) Biosecurity;
- d) Risk assessment;
- e) Sustained surveillance in affected and at risk areas;
- f) Capacity building of district veterinary staff and laboratory staff; and
- g) Ongoing surveillance in district along the river and lakes shores.

3.3.1.1.5 Incidence, Prevalence of Disease, Vector and Pest Attack (Number of Districts and Which Ones)

There are rampant disease out breaks in most districts of the country especially for FMD in 42 districts, PPR in 11 districts, CBPP in 8 districts and tick borne diseases.

3.3.1.1.6 Control Measures Applied

These are the measures that were applied: -

- a) Laboratory confirmation at the diagnostic and epidemiology laboratory (NADDEC) of MAAIF;
- b) Institution of Quarantine in the areas with FMD, ASF, CBPP and Avian Influenza outbreak;
- c) Ring vaccinations against FMD and CBPP around the areas outbreak and at risk neighboring districts; and
- d) Sensitisation and awareness creation regarding farm biosecurity, public health, animal management, animal movement and permits for movement of animal and animal products.

3.3.1.1.7 Stakeholders Contribution to Reported Performance

- a) Farmers and vets have vigilantly reported the diseases to the district veterinary officers to the Commissioner Animal Health (CAH).
- b) The vet staff at both district and ministry level have managed to control the diseases.

- c) Traders have complied to control measures instituted to combat the diseases.
- d) Business people procure and deliver vaccines.

3.3.1.1.8 Extent Planned Interventions Have Addressed Key Issues and Identified Gaps

The following vaccine doses were planned for procurement: -

- a) 1,000,000 doses of FMD;
- b) 1,000,000 doses of CBPP;
- c) 500,000 doses of Rabies;
- d) 1,000,000 doses of Brucellosis;
- e) 1,000,000 doses of ECF;
- f) 1,000,000 doses of PPR;
- g) 1,000,000 doses of Sheep and Goat pox;
- h) 1,000,000 doses of Black quarter; and
- i) 1,000,000 doses of Anthrax Vaccines.

The amounts of doses procured were far less the planned and for some diseases, no vaccines were procured and so a need for allocation of enough resources to control animal diseases.

3.3.1.2 Division: Animal Veterinary Regulation and Enforcement

3.3.1.2.1 Formulation and /or Review of Veterinary Legislations

The following legislations have been formulated or reviewed and the drafts will soon be presented for stakeholder consultations in this coming financial year.

- 1) Draft Veterinary Practitioners Bill
- 2) Draft Standard Methods, guidelines and procedures for Quarantine of animals and Regulation of Animal products
- 3) Draft policy on Regulation of Veterinary Medicines, Biologicals, chemicals and devices

3.3.1.2.2 Registration and Approval of Animal and Animal Product Handling and Processing Establishments

The Division has inspected, approved and registered the following animal and animal handling and processing establishments which are producing for local and export markets.

Table 30: Exporters, Exports and Markets

Establishment	Export Product	Export market
Ugachick Poultry Breeders Ltd. (Hatchery)	Day-old broiler and layer chicks	Kenya, Rwanda, Burundi and Tanzania
Ugachick Poultry Breeders Ltd. (Poultry Abattoir)	Dressed chicken	Kenya, Rwanda, Burundi and Tanzania
Biyinzika Poultry International (Hatchery) Ltd.	Day-old broiler and layer chicks	Kenya, Tanzania
SR Afrochick Poultry (Farm)	Table eggs	Kenya, S. Sudan
HMH Rainbow Poultry (poultry Abattoir)	Dressed chicken	Kenya
HMH Rainbow Poultry Broiler (Farm)	Broilers for HMH abattoir	Kenya, S. Sudan
Kukuchic Poultry Breeders Ltd. (Hatchery)	Day-old broiler and layer chicks	Kenya. S. Sudan
Egypt Uganda Food Security Ltd. (Small and Large Animal Abattoir)	Beef	Egypt
Royal Farms Ltd. (Poultry Abattoir)	Dressed chicken	Kenya

Establishment	Export Product	Export market
Sanga Meat Company Ltd. (Small and large Animal Abattoir)	Beef	Local market

Source: MAAIF 2017

3.3.1.2.3 Exports of Animals and Animal Products Since 2011 to Date

Uganda is currently exporting exceptional animal products such as *milk casein* to the hard-to-penetrate market like USA, and *dried cattle penises* to Vietnam. In collaboration with private sector players, the division has supported implementation of sanitary measures in animal and animal product handling establishments thus contributing to enhanced competitiveness in regional and international markets. Consequently, the Division of Veterinary Regulation and Enforcement has, in a ten-year period, inspected and certified a wide range of animal products to the lucrative markets as indicated in the table below and the export trend is increasing year by year.

Table 31: Exports, Volume, Destination and Exporters

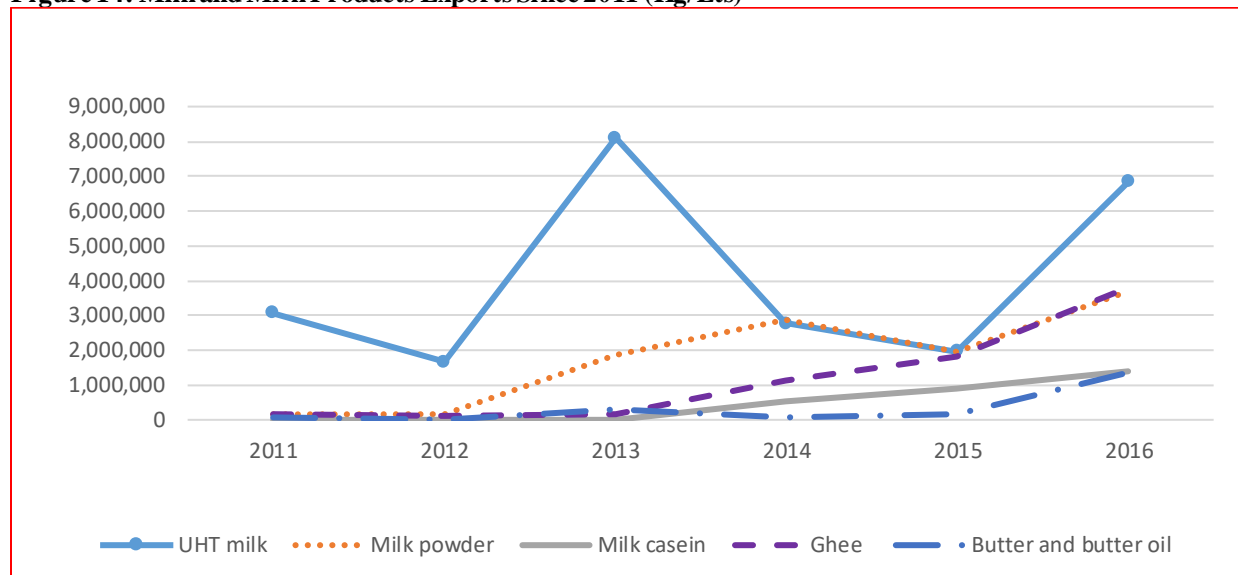
Animal Product	Total Annual Exports (Kgs/Lts)						Importing Countries	Major Exporters
	2011	2012	2013	2014	2015	2016		
Wet blue hides	3,358,688	3,394,712	11,959,180	12,216,100	8,532,086	12,788,974	Switzerland, Sri Lanka, Kenya, India, Hong Kong, Italy, Turkey, China, Pakistan, Indonesia	Hoopoe Trading Company Ltd, Skyfat Tannery, Tannery Waste Management, Novelty, S.W.T. Leather Industries, Leather Industries of Uganda, Jambo Tannery
Wet blue skins	552,869	1,475,545	3,248,400	2,989,012	1,527,181	2,875,841	Switzerland, China, Ethiopia, Italy, Turkey, Pakistan, Kenya and India	SWT Leather Industries Ltd, Skyfat Tannery Co., Novelty Tannery Investments and Novelty Tannery
Chrome tanned Leather	0	0	421,743	1,020,918	1,169,833	1,048,538	Kenya, Italy, China, Canada	Leather Industries of Uganda, MSA Investors, Elgon Leather Company
UHT milk	3,067,052	1,671,208	8,102,984	2,771,361	1,963,252	6,841,546	D. R. Congo (UN Mission), Tanzania, S. Sudan, DRC, Somalia and Kenya	Sameer Agriculture and Livestock
Milk powder	156,456	179,300	1,885,641	2,868,767	1,932,810	3,689,273	Kenya, Tanzania, Sudan, S. Sudan, Yemen,	Sameer Agriculture and Livestock Ltd, and Pearl Dairy Farms

Animal Product	Total Annual Exports (Kgs/Lts)						Importing Countries	Major Exporters
	2011	2012	2013	2014	2015	2016		
							Oman, Qatar, Nepal Saudi Arabia, Turkey and Japan	
Milk casein	0	0	0	544,000	883,675	1,394,000	USA	Amos Dairies
Ghee	175,889	112,540	173,331	1,133,936	1,826,269	3,799,371	India, Egypt, S. Sudan, Syria, Eritrea, Saudi Arabia, and Turkey	Amos Dairies, Pearl Dairy Farms
Butter and butter oil	49,443	4,950	321,893	71,135	166,550	1,355,185	India, S. Sudan, Syria, Eritrea, Saudi Arabia, Turkey, Egypt, Oman, Japan	Pearl Dairy Farms
Cheese	481	1,235	26	2,811	-	0	D. R. Congo	Sameer Agriculture and Livestock
Beef	203,491	84,616	79,348	183,812	54,906	18,314	D. R. Congo, S. Sudan, Rwanda and Somalia	Fresh Cuts Ltd., Nyama Trading Co., Uganda Meat Industries, Fanuel General Trading, Katebe Farm, YH Barka Gen. Trading
Cattle dried penis and salted offals	-	-	-	-	-	164,602	Vietnam	Truong Giang Mong Ca1 Co. Ltd., Tri Duc Trade and Services Joint Stock Company
Pork	4,363	6,124	10,991	31,577	7,086	2,067	D. R. Congo and Southern Sudan	Fresh Cuts Ltd
Dressed chicken	18559	4,992	2,988	71,409	21,765	32,538	D. R. Congo, Rwanda and S. Sudan	Fresh Cuts
Pig stomachs	-	-	-	-	-	6,000	Vietnam	Lixiang Company Ltd.
Eggs	1,186,500	339,900	737,945	2,037,250	833,907	2,994,160	D. R. Congo and S. Sudan, Burundi	Yash Investments, LM Engineering, Mr. Bangawihi
Horn products	79,232	7,681	-	79,232	167,726	272,421	Vietnam, China, USA, UK, Taiwan, Kenya, Norway, Germany, China, Vietnam, Italy, Spain, Austria	Horn Products Ltd., Hornbiz Investments, Kasabrint, OSI, Skyfat, Mukiibi Joshua, Olivia Knox

Animal Product	Total Annual Exports (Kgs/Lts)						Importing Countries	Major Exporters
	2011	2012	2013	2014	2015	2016		
Pangolin scales	-	-	-	-	-	50,000	China	Smico Skin Crafts Industries Ltd.

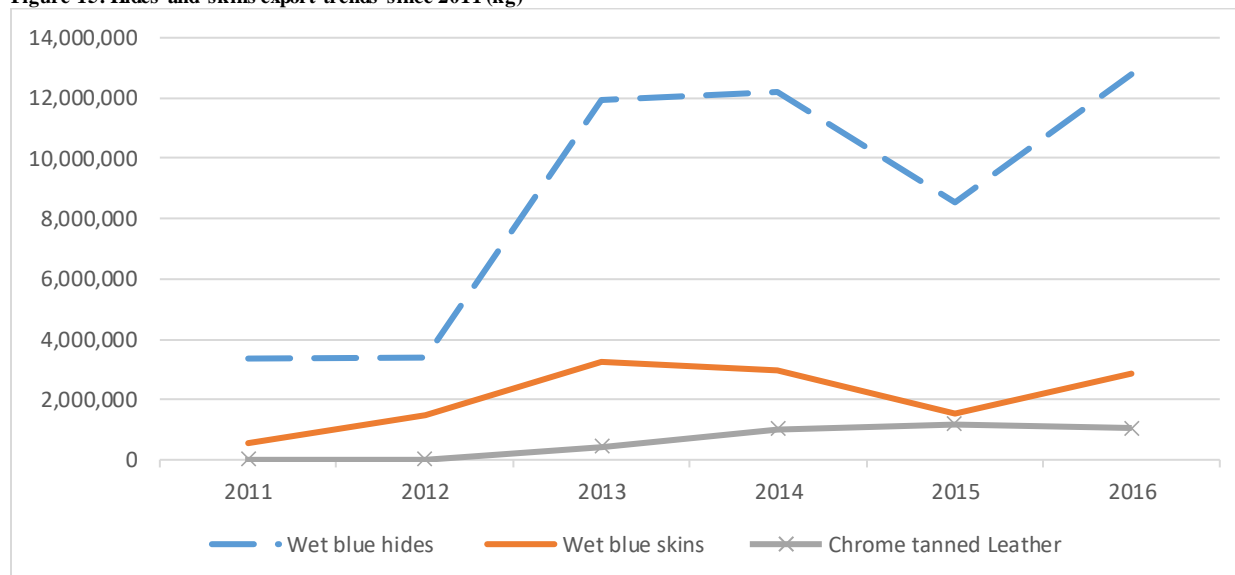
Source: DAR 2017

Figure 14: Milk and Milk Products Exports Since 2011 (Kg/Lts)



Source: DAR 2017

Figure 15: Hides and skins export trends since 2011 (kg)



Source: DAR 2017

The Division has also provided guidance to Ms. Okozewoki Uganda Ltd on the requirements for export of beef and other animal products to Canada and other markets in USA, Europe, Middle East and Asia.

3.3.2 Department of Animal Production

Table 32: Level of Achievements for the Planned Outputs for the FY 2016/17

PLANNED OUTPUT	Actual performance 2016/17	Performance 2016/17	%age	Reason for variation
Animal feeds bill presented to cabinet for enactment. Approval	Finalized national stakeholder consultations on the draft Animal Feeds Bill.	Conducted regional stakeholder's consultations on the draft Animal Feeds Bill	70%	Funds for the national stakeholder's consultations were accessed during Q 4 2016/17
Animal feeds standards enforced on pilot basis in 50% of the sampled farmers from Kampala and Wakiso districts.	Standards not enforced.	Standards not enforced	20%	There was need to review the Animal Feed standards in collaboration with UNBS and other stakeholders in order to harmonize with the East Africa regional standards. Lack of funds to enforce standards.
Pastoralism & Rangelands Management policy (PRMP) finalized.	PRMP finalized awaiting presentation to TPM	Conducted regional stakeholder's consultations on the draft PRMP	90%	Received funding for the national stakeholder's consultations from Sustainable Land Management during Q4, 2016/17
First Draft of The National Dairy Policy developed	Dairy policy not drafted	Conducted Regional consultations to identify issues to be addressed in the dairy policy.	10%	Lack of funds for the technical committee to compile the zero draft.
Complete revision of the draft Meat Development Bill at departmental level	Draft Bill not revised	Regional consultations carried out to identify issues to be revised in the bill	25%	Lack of funds for the technical committee to produce the zero draft.
First draft of the Hides and Skins Development Policy formulated.	First draft was formulated and presented to DAP for comments	N/A	65%	
First draft of the National Breeding rules and regulations presented to TPM	First draft of the rules and regulations was presented to the DAP meeting for staff input.	N/A	65%	Received funding to draft regulations at departmental level. No funds availed to conduct stakeholder's consultations.
Legal Instrument for electronic Identification and traceability developed and tabled to TPM.	National LITS Forum established. Draft legal instrument for LITS presented to DAP for input.		65%	There was a need to harmonise LITS with similar instruments in the rest of IGAD Countries

PLANNED OUTPUT	Actual performance 2016/17	Performance 2016/17	%age	Reason for variation
Capacity to manage rangelands and natural feed resources enhanced in 38 cattle corridor districts through training of 120 district staff	District staff not trained. However, FAO funded training of 230 farmers in Kole and Apac districts in pasture establishment and management		10%	Available funds in the DAP could not support training of district staff
Capacity building for promotion of Small Animal enterprises carried out in at least six districts	Staff in in Namayingo and Kalangala Districts trained		33%	Funds provided were sufficient to support training in only two districts
Meat and dairy sub-sector activities supported to ensure implementation of the commodity approach in the country (mobilisation of at least 100 farmers per district to produce animals for slaughter)	400 farmers mobilised from 12 districts i.e. Kyankwanzi, Kiboga, Mubende, Gomba, Kiruhura, Lyantonde, Mbarara, Bukomansimbi, Masaka, Masindi, Nakasongola, Luwero, Nakaseke		30%	Funds provided were sufficient to support mobilisation of farmers to produce animals for slaughter in only twelve districts
At least 100 stakeholders in 10 districts of the cattle corridor are sensitized/technically supported on meat quality and safety standards (Meat, meat products and co-products quality improved and value addition promoted along the meat value chain)	102 people from 17 districts were technically supported and copy of meat standards distributed to 17 DVOs		100%	Budgeted to cover a small area and funding was provided under DAP budgetline
Inspect & technically support meat establishments to ensure compliance with established standards (Quality Assurance)	Two (2) establishments (Ugachick Poultry Breeders Ltd and Your Choice (U) Ltd) inspected & technically supported		100%	Funds provided under DAP budgetline
Dairy processing facilities in Central and Western Uganda are supervised/monitored to enhance compliance to dairy processing standards (Dairy products quality and hygiene improved and value addition promoted along the dairy value chain)	Supervised and monitored processing facilities/ plants in Mukono, Buikwe, Lwengo, Lyantonde, Kabarole, Ntoroko, Mbarara, Isingiro, Ntungamo, Kiruhura, Bushenyi and Kamwenge Districts		70%	Funds availed under DAP budget line and activity targeted functional processing facilities
Forming one beef value chain innovation platform	Beef value Chain platform not formed		0%	Funds not availed.
Forming one poultry value chain innovation platform	Piggery platform was formed instead		100%	Funds availed under DAP budgetline
50 meat/animal product samples submitted to the laboratory for analysis and quantification of hazards (chemical, microorganisms, toxins, veterinary drug residues and pesticides)	123 samples (beef, kidneys, liver, chicken, eggs) submitted to two laboratories –NADDEC & UNBS laboratory Laboratory		90%	Awaiting analytical report on identified hazards in meat samples submitted.

PLANNED OUTPUT	Actual performance 2016/17	Performance 2016/17	%age	Reason for variation
100 stakeholders sensitized on enforcement of Livestock transportation, slaughter and marketing standards and regulations.	102 stakeholders sensitized in 17 districts.		100%	Staff used the opportunity to sensitize stakeholders alongside other activities carried out in the districts.

3.3.3 Department of Entomology

3.3.3.1 Introduction:

The main Objective of this department is to Support National vector control, and Productive Entomology for improved food security and household income.

3.3.3.1.1 Tsetse Control Planned Annual Outputs 2016/2017

- 1) A National GIS Tsetse and Trypanosomiasis Data Base established and maintained for decision support In Planning T and T Interventions;
- 2) Departmental geo-information Unit strengthened;
- 3) Tsetse suppression undertaken Karamoja region using community based control technologies;
- 4) Tsetse suppression undertaken in high tsetse and trypanosomiasis districts using community based control technologies;
- 5) Entomology infrastructure(land) verified, surveyed and, secured;
- 6) Feasibility of SIT as part of Area Wide Pest Management Against *Glossina fuscipes fuscipes* Demonstrated in Kalangala Islands by GOU in collaboration with IAEA;
- 7) Accessibility to Tsetse and Trypanosomiasis information among stakeholders increased;
- 8) Technical backup and support supervision for T and T undertaken by the department;
- 9) Formulation of Project for tsetse eradication and trypanosomiasis elimination for West Nile and Northern Uganda regions completed; and
- 10) Formulation of Project for tsetse eradication and trypanosomiasis elimination in Northern Uganda (Amuru, Gulu, Oyam, Apac, Lira, Dokolo, Amolatar, Otuke, Kole, Pader, Agago, Kitgum, Lamwo, Alebtong) completed.

Table 33: Annual Performance Report for the Department of Entomology (Vector Control) FY 2016/17

Annual: Planned Output targets	Outputs achieved	Remarks
A National GIS Tsetse and Trypanosomiasis Data Base Established And maintained for decision support In Planning T and T Interventions	GIS based Entomological data was collected, analysed and mapped for the districts of Moroto, Kotido, Kabong, Abim, Nakapiripirit, and selected sub counties of Kalangala, Maracha, Arua, Moyo, Yumbe, Luwero, Nakasongola, Tororo, Busia, Bugiri, Iganga, Kamuli, Buyende, Oyam, Masaka 35 newly recruited district Entomologists were trained in basic GIS data collection and analysis techniques; and Area-wide	Entomological data has been obtained from only 15% of the entire country. The data was collected within the limited budgetary allocation. There is need to support the surveys with increase in budgetary allocation this is the key to decision making in planning control operations. (On average a district would require UGX 30 million)

Annual: targets	Planned Output	Outputs achieved	Remarks
		Integrated Pest management, AW-IPM. The training was undertaken with support from FAO project "Improving food security in Sub Saharan Africa by Supporting the progressive reduction of tsetse transmitted trypanosomiasis in the frame work of NEPAD" (GTFS/RAF/474/ITA)	With the low recruitment rate for Entomology staff at district level coupled with very low levels of funding for Entomology activities both at the center and local governments, the planning and implementation of tsetse suppression operations is likely to be affected
Departmental geo-information Unit strengthened		Digital topographic maps scale 1:50,000 for Kotido and Kabong districts were acquired by the GIS Unit, 19 GPS sets were received by the department with the support of FAO	
Tsetse suppression undertaken Karamoja region using community based control technologies		The department procured 6400lts of Deltamethrin pour-on insecticide for emergence tsetse control interventions in High tsetse infested areas of Kabong and Kotido. These are being undertaken in 6 sub counties of Karenga, Lobalangit, Loleria, kawalakol, Loyoro, Sidok in Kabong district and 3 sub counties of Kacheri, Kotido and Rengen in Kotido district. To date 232,189 cattle have been treated with Deltamethrin pour-on (1%), in the 2 high risk districts of the Karamoja region (87,035 head of cattle in Kabong and 145,154 head of cattle in Kotido). Preliminary results have indicated significant tsetse population reductions	The department planned to procure 10,000lts of pour-on insecticide for emergency tsetse suppression activities in the high risk sub counties of Kotido and Kabong of the Karamoja region. 6400lts of Deltamethrin pour-on insecticide (6000lts with support from RPLRP and 400lts GOU) was procured This phase is expected to cover a total of 320,000 animals in Kabong and Kotido districts (1 litre of insecticide can cover 50 cows). These operations constitute emergency interventions. The project "Improving Food Security and Livelihood Through the Progressive Reduction of tsetse and trypanosomiasis in the Karamoja region" 2016 -2019 has been formulated to provide a long term solution. The project will be implemented in 7 districts at a cost of USD.11,718,600
		The available budget could only allow for the procurement of 2200 tsetse screens the procurement process of which is ongoing. Localised Tsetse suppression activities supported by the Bill and Melinda Gates foundation are being undertaken in the 5 districts of Arua, Moyo, Maracha, Koboko and Yumbe by the Liverpool School of Tropical medicine LSTM.	The department planned to procure 30,000 pyramidal tsetse traps and 500 Lts of insecticide (Deltamethrin 20%) procured for treatment of traps, to support tsetse suppression in high tsetse risk districts This support was inadequate due to limited funds. There is a very high risk of the tsetse fly population build up with the resultant increase in the cases of sleeping sickness in the region. The department formulated and submitted The Uganda Tsetse and Trypanosomiasis Eradication Project (UTTEP) covering an Area of 30,000 Km ² in South Eastern Uganda at a cost of USD 13,000,000. This would be the ultimate solution to sustainably creating a tsetse free zone of the SE region. This project was approved by Ministry of Finance Planning and Economic Development –MoFPED and is in the pipeline awaiting provision of funding

Annual: Planned Output targets	Outputs achieved	Remarks
Entomology infrastructure(land) verified surveyed and, secured	Departmental infrastructure (land)in Kasenene, Hoima district was verified for future survey. The process for opening boundaries for the land in Nalukolongo was initiated with Ministry of Lands	A provision will be made to have these pieces of land surveyed and titled during FY 2017/18
Feasibility of SIT as part of Area Wide Pest Management Against <i>Glossina fuscipes fuscipes</i> Demonstrated in Kalangala Islands by GOU in collaboration with IAEA	Preliminary entomological and parasitological data were collected from the islands of Sserinya, Lulamba, Buvvu, and Kibibi of Kalangala district for decision support in project implementation. Tsetse suppression using equipment (Foggers, pyramidal tsetse traps, screens), procured with the support of IAEA, is ongoing in Sserinya island. 5 fogging machines and 900 insecticide treated pyramidal traps have been deployed and geo-referenced for suppression Plans to release Sterile Males tsetse flies for Eradication using drones are in advanced stages following clearance from the Chief Defence Forces as advised by the Civil Aviation authority A temporary tsetse mass rearing facility was set up at Kalangala to support the Planned SIT activities in the project area Stake holder sensitization Campaigns on SIT related activities were undertaken 1 Harmonisation meeting was undertaken in Tororo for SIT based activities 5 technical staff were recruited to support nuclear related activities in tsetse eradication. 3 staff attended were supported by the IAEA to undertake SIT related training in Senegal	Effective demonstration of the Feasibility of Sterile Insect Technique, SIT, as part of Area Wide Pest Management Against <i>Glossina fuscipes fuscipes</i> , requires consistent flow of sufficient resources. These activities require a project approach The proposed relocation of NALIRRI where the department's tsetse mass rearing facility is located is a big challenge to the planned tsetse eradication activities
Accessibility to Tsetse and Trypanosomiasis information among stakeholders increased	The department of entomology developed and designed sensitization materials and approaches for use during Tsetse and Tick control activities Using these materials, stakeholder awareness meetings were conducted for local government leaders, local communities district leaders and technical staff in 13 districts of Kabong Abim, Napak, Kotido Moroto, Nakapiripirit, Amudat, Kween, Bukedea, Kumi, Katakwi, Amuria and Kalangala.	The activity was done in order to ensure integration of tsetse and trypanosomiasis control activities into the district planning processes; their harmonized participation in control activities and sustainability of achievements
Technical backup and support supervision for T and T undertaken by the department	Technical back up was undertaken in Bugiri, Busia, Tororo, Napak, Moroto and Nakapiripirit	
Formulation of Project for tsetse eradication and trypanosomiasis elimination	The project "Livelihood Improvement Through Tsetse Control in NW Uganda (LITCNWU)", was formulated to cover the	Preliminary information on River systems of West Nile were collected in terms of total length for all minor and major rivers in Kms Arua- 1,610 km; Maracha- 804 km; Moyo-

Annual: Planned Output targets	Outputs achieved	Remarks
for West Nile and Northern Uganda regions completed	tsetse infested river length of 16256 km. The project is expected to cost USD 4,921,800	742 km; Koboko-487 km; Yumbe-915 km and Nebbi/ Zombo-1,639 km
Formulation of Project for tsetse eradication and trypanosomiasis elimination in Northern Uganda (Amuru, Gulu, Oyam, Apac, Lira, Dokolo, Amolatar, Otuke, Kole, Pader, Agago, Kitgum, Lamwo, Alebtong) completed	<p>The project “Support the Tourism Industry, through progressive reduction of Tsetse infestation in the National parks”</p> <p>The 1st phase of the project will be implemented in the Murchison falls National park covering an area of 8100 sq. km in the districts of Oyam, Nwoya, Kiryandongo, Masindi, Bulisa, Nebbi, and Apac. The project duration is estimated to be 2 years of operation.</p> <p>Preliminary activities were initiated for formulation of the tsetse eradication and trypanosomiasis elimination project in Northern Uganda (Amuru, Gulu, Lira, Dokolo, Amolatar, Otuke, Kole, Pader, Agago, Kitgum, Lamwo, Alebtong)</p>	<p>Tsetse infestation in the touristic areas (National parks) is likely to affect the tourism industry. Cases of sleeping sickness in these areas have been reported. The use of aerial application of insecticide to control tsetse flies in these areas will be emphasized</p> <p>A draft project document has been produced for review by stakeholders</p>

Source: MAAIF 2017

Figure 16: Training of Technical staff and Community Animal Health Workers in Moroto DLG



Figure 17: Community Sensitization Meetings Being Conducted in Kotido by the Department Team



Source DAR 2017

Table 34: Spraying and Treatment Summary

S/N	Sub-county of implementation	Pour-on	Trypanosomidium
1	Kakamar	5,067	5,067
2	Kalapata	11,218	2,765
3	Kapedo	3,687	0
4	Karenga	1,543	891

5	Kawalakol	6,234	1,643
6	Lobalangit	1,560	1,497
7	Lokori	499	206
8	Lolelia	14,642	14,619
9	Loyoro	5,462	3,585
10	Sangar	2,775	2,064
11	Sidok	34,348	35,086
	TOTAL	87,035	67,423

Source: MAAIF 2017

Figure 18: Insecticide being loaded for delivery to the Karamoja region and Commissioner Entomology Demonstrating the application of pour-on insecticides on livestock in Kacheri sub-county in Kotido district



Source: DAR 2017

Preliminary results from entomological monitoring have indicated significant tsetse population reductions as indicated in the table below.

Table 35: Tsetse Population Reductions

Parish	FMS villages	Longitude (x coordinate)	Latitude (coordinate)	Date of baseline	Baseline FTD Nov-16	FTD s	FTD s June 2017
LOLELIA	Kapetha	0600844	03663144		3.33	0.00	0.66
	Moruaiakoto	0601074	0362262		27	8.0	0.66
	Lokwathinyon	0594177	0364489		3.7	30.0	0.66
	Lokwaithiyon	0596111	0364868		3.7	4.33	
KACHERI	Kateriteri	0601043	0360792		10.33	1.67	0.33
	Tilang	0602146	0355348		2.33	0.00	0
LUSAKUCHA	Lutangat	0591552	035422		1.00.	0.00	-
	Lobanya	0588689	0349110		0.33.	0.00	0
	Losakucha	0598330	0346414		1.33.	0.00	0.33
	Lomalera	0592300	0356823		-	0.00	-
LOKADLI	Moruitit (kapaan)	0625231	0366389		38.33	39.00	0.66
	Kalokwam	0627738	0366791		22.00.	12.67	1.33
	Morunyang	0625143	0363669		68.67	58.33	0.33
	Lokiloro	062568	0363109		84.00.	7.33	0.66
	Losak	0624495	03361183		47.67	51.67	0

Parish	FMS villages	Longitude (x coordinate)	Latitude (coordinate)	Date of baseline	Baseline FTD Nov-16	FTD s	FTD s June 2017
	Walwal (dam)	0625868	0351520		5.70.	5.67	0
	Lobeel	0624916	0354660		3.00.	1.00	0
	Kokoit	0625390	0351741		1.33	1.33	0

Source: MAAIF 2017

Figure 19: Insecticide for Hot Fogging Being Loaded for Use in Tsetse Suppression On Kalangala Islands and Field Teams Preparing to Go for Tsetse Suppression Using Hot Fogging in Kalangala



Source DAR 2017

3.3.3.1.2 Apiculture Sub-Sector Report for FY 2016-2017

The Apiculture Sub-sector in Uganda is spearheaded by the Apiculture Sub-division in the Department of Entomology; Ministry of Agriculture, Animal Industry and Fisheries (MAAIF). The Apiculture Sub-division works through the Directorate of Animal Resources (DAR), Directorate of Crop Resources (DCR) and Directorate of Agricultural Extension Services (DAES), Livestock Disease Control Project (LDC) and Farm-Based Bee Reserve Establishment Project (FBBEP) of MAAIF and district local governments (DLGs) to promote apiculture in the country. The Apiculture Sub-division also works with the National Agriculture Research Organization (NARO), Makerere University and other research institutions on apiculture-related research.

Under the Public Private Partnership (PPP) arrangement, the Apiculture Sub-division works in collaboration with The Uganda National Apiculture Development Organization (TUNADO). TUNADO is the apex membership-based organization (MBO) recognized by government to coordinate private stakeholders in apiculture. The Sub-division also collaborates and works with international bodies like African Union Interafrican Bureau for Animal Resources (AU-IBAR), ApiTrade Africa.

1) Partnerships, Projects and Activities Implemented in FY 2016/2017:

a) The Farm-Based Bee Reserve Establishment Project (FBBEP)

The Apiculture Sub-division is implementing a 5-year Farm-Based Bee Reserve Establishment Project (FBBEP). The FBBEP worth UGX 7bn became effective in the FY 2014/2015. FBBEP is being implemented in the districts of Wakiso, Mukono, Mpigi, Luwero, Nakasongola, Nakaseke, Masaka, Mityana, Mubende, Kiboga, Sembabule, Gomba, Kayunga, Buikwe, Kamuli, Buyende, Kaliro, Iganga, Lyantonde, Bukomansimbi, Lwengo, Kalungu, Luuka and Mayuge. In FY 2016/2017, a total of 132 beehives, 10 overalls, 10 pairs of gloves, 10 pairs of gumboots, 3 sets of hive tools and smokers were procured and distributed to the districts of Masaka, Lwengo and Kalungu. 24 Entomologists/project focal persons were trained in farm-based bee reserves management. A total of 440 beneficiary beekeepers were trained, of which 30% were women and youth. Technical follow-up supervision and backstopping by MAAIF was carried out in the districts of Mpigi, Luwero, Nakasongola, Wakiso, Nakaseke, Kiboga, Gomba and Mubende. Over 300 leaflets of bee farming information were passed to show-goers at the 2016 World Food Day event at Ngetta Zonal Agricultural Research and Development Institute in Lira on 16th October 2016.

b) Livestock Disease Control Project (LDC):

A total of 18 honey samples were collected, analysed for pesticide residues. The honey analysis results were submitted together with National Residue Monitoring Plan (NMRP) for Uganda to EU as a requirement to maintain Uganda on list third countries allowed to export honey into the EU market.

c) The Uganda National Apiculture Development Organization (TUNADO):

TUNADO reached out and trained 1,321 member beekeepers on apiary site selection, apiary establishment and management, pest control, beehive product diversification and value addition (beeswax, honey, propolis, bee venom) and marketing in the regions of Mid-West, West Nile and Central. Beekeeper to beekeeper extension model was promoted; benefiting 2,950 beekeepers from the districts of Masindi, Buliisa, Hoima, Bushenyi, Kamwenge, Arua, Nebbi, Luwero and Nakaseke; resulting in the establishment of 210 apiaries and 15 honey hubs, bulking 22.5MT of honey. 32 TUNADO members participated in apiculture promotion events, including the 2016 National Agriculture Show in Jinja.

TUNADO disseminated apiculture-related promotional and market information in at least 4 editions of the Api-News Magazine. A business wing for TUNADO was established, named and registered as “The World of Bees Ltd.” TUNADO organized a National Honey Week in August 2016. Apiculture business forum was organized in Kampala in November 2016, which attracted 100 participants.

TUNADO also organized farmer exchange visits to Kamwenge District, benefiting 16 honey hub coordinators and learning centre managers from the districts of Luwero and Nakaseke. 3 Multi-Stakeholder Platforms (MSPs) were organized, each drawing at least 65 participants, including beekeeper representatives from the different regions of Uganda, officials from MAAIF and other institutions.

2) Apiculture Research

A team of staff drawn from MAAIF, NARO and Makerere University with support from NARO Competitive Grant Scheme (CGS) implemented a project “Developing innovative tools and technologies for increased beekeeping production in Uganda”, running 2014/2015-2016/2017. In this project the different beehive types commonly used in Uganda were evaluated for their productivity efficiency in order to appropriately guide farmers in their choice of beehives and associated technologies. 190 honey samples were collected across the 10 agro-ecological zones of Uganda, and analysed and characterized for their physicochemical properties. Methods were formulated for honey traceability and quality assurance, and for honey value addition.

Following the success story of implementing the project “Developing innovative tools and technologies for increased beekeeping production in Uganda”, the same team secured another project “The Development and Commercialization of Bee Products in Uganda”, running January –December 2017. In this project a total of 500 beneficiary beekeepers are being supported to add value and sell liquid honey, creamed honey, comb honey, bee venom, beeswax and propolis tincture.

d) *African Union Interafrican Bureau for Animal Resources (AU-IBAR):*

Through Apiculture Sub-division of MAAIF, AU-IBAR supported the training of 80 district entomologist on the use of the National Beekeeping Training and Extension Manual; bee venom extraction; and apiculture data collection. AU-IBAR also supported procurement of 1 CAB hive beekeeper starter kit comprising 10 CAB hives and accessories. The hives will be used to establish a national demonstration apiary at the National Farmers’ Leadership Centre (NFLC).

3) Challenges Faced During Implementation

- a) Misguided use of pesticides, killing bees and other pollinators
- b) Climate change
- c) The role of bees as pollinators and indispensable agricultural input for enhancing coffee and other crops production not well understood by crop farmers, livestock farmers, and policy and decision makers.
- d) Inadequate funding to apiculture sub-sector

4) Suggested way forward:

- a) Initiatives to protect bees and promote beekeeping should be supported by policy and decision makers, livestock farmers and crop farmers.
- b) Increase funding to the apiculture sub-sector

3.3.3.1.3 *Promotion of Silkworm Farming (Sericulture)*

Sericulture is an emerging agro- enterprise that is being promoted by the Government through the Ministry of Agriculture Animal Industry and Fisheries. It has the potential to generate house

hold incomes, create employment and contribute to the country's foreign exchange earnings. MAAIF has established the National Sericulture Centre (NSC) at Kawanda in Wakiso District. The NSC provides an institutional framework and central services required for the development of the sericulture sector. These services include central laboratories, silkworm breed maintenance, silkworm egg production, post-harvest cocoon processing facilities, a mulberry mother garden / germplasm maintenance, multiplication and distribution of mulberry cuttings to silk farmers. In addition, activities supported by the government include; capacity building and advisory services, technical backstopping, supervision, monitoring and evaluation of farmers activities.

There are about 2,300 farmers with mulberry gardens and about 210 farmers actively rearing silkworms and producing cocoons in 12 districts in western, central and eastern Uganda namely Bushenyi, Kiruhura, Sheema, Mitooma, Kanungu, Kabarole, Mpigi, Mubende, Wakiso, Luwero, Iganga and Kamuli. Farmers in these districts have formed associations and belong to one national umbrella organization the Uganda Silk Producers Association (USPA). The current cocoon production level is about 13 tons per year. Most of it is processed and sold as silk yarn to Ethiopia, Egypt and Hongkong through Bushenyi Silk Farmers Association. Finished silk products such as scarves, Robes (Kanzu) and accessories are sold to local markets.

1) Achievements FY 2016/2017

- a) Silkworm breeds and mulberry stocks maintained at the National Sericulture Centre in Kawanda
- b) 168 boxes of silkworm eggs (each box contains 20,000 eggs) were distributed to farmers in Kamuli, Luwero, Wakiso and Bushenyi districts.
- c) 3.6 tons of mulberry planting materials were produced at the National Sericulture Centre and distributed to 6 farmer groups in Luwero and Mubende districts. On average 18 acres of mulberry were planted in the 2 districts.
- d) 72 farmers were trained in Silkworm farming technologies at the National Sericulture Centre in Kawanda.
- e) Technical backstopping in mulberry cultivation and management was conducted for 12 farmer groups in central and eastern Uganda.
- f) Mobilization and Sensitization on silkworm farming enterprise conducted in 6 districts in Central and Eastern Uganda (Luwero, Nakaseke, Mubende, Kamuli, Buyende and Luuka).

2) Challenges

- a) Most farmers lack silkworm rearing houses and rearing equipment such as spinning frames, spray pumps etc.
- b) Incidences of silkworm and mulberry pests and diseases.
- c) Inadequate extension service delivery.

3) Recommendations

- a) Strengthen the sector by mobilizing more farmers to plant mulberry, rear silkworms and produce cocoons.
- b) Farmers should be encouraged to construct low cost rearing houses using locally available materials.
- c) Support local government and private sector to build capacity for efficient extension service delivery and supervision.
- d) Train farmers and other stakeholders in sericulture technologies,
- e) Promote small and medium scale silk processing enterprises
- f) Establish both local and international market outlets for silk products.

3.4 Agricultural Extension Services

3.4.1 Introduction

Agricultural extension is essential for communicating useful information, imparting skills and promoting technologies to the rural population and ensuring their application for increased productivity and enhanced quality of rural life. One of the main problem of agricultural extension service delivery is the suboptimal structures in the sector legitimated during the adoption of the neo liberal reforms in the 1990s. These reforms downsized MAAIF's technical manpower at grassroots and increased the ratio of extension staff to households to 1:5000 as of 2014. This ratio is ten times higher compared to the recommended ratio of 1:500. Since FY 2015/2016, following the adoption of the Single Spine Extension System, MAAIF embarked on the recruitment drive of Public Agricultural Extension Staff in Local Governments. The ratio has since been reduced by more than half to about 1:2000 by end by March 2017.

The suboptimal structures significantly reduced the capacity of MAAIF and Local Governments to effectively coordinate service delivery. The service for a long time has been fragmented and uncoordinated. The diverse players involved in agricultural extension delivery have for a long time operated largely independently of each other, without harmonized standards and ethics, their messages are not frequently updated and or sufficiently regulated and in most cases their operations are unknown and unrecognized. Addressing these concerns is necessary for transformation of smallholder subsistence farmers into the desired commercial farmers and this partly formed the basis for adoption of the National Agricultural Extension Policy 2016.

Government therefore, in October 2016 adopted the National Agricultural Extension Policy that effectively transferred the function of agricultural extension from the National Agricultural Advisory Services (NAADS) to the MAAIF. Under this policy, the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) through the Directorate of Agricultural Extension Services is mandated to reorganize the agricultural extension service into a harmonized, well-coordinated and integrated delivery system.

3.4.2 Mandate and Functions of the Directorate of Agricultural Extension Services

The mandate of the Directorate of Agricultural Extension Services (DAES) is to: *“promote adoption of appropriate information, knowledge, and technological innovations for commercialization of agriculture.”*

3.4.2.1 Directorate functions

- 1) Policy formulation and reviews on matters related to agricultural extension
- 2) Strengthen coordination of local government production departments, NGOs and private sector in provision of agricultural extension services
- 3) Provide technical advice on agricultural extension and advisory services
- 4) Setting standards for service delivery in local governments and private sector
- 5) Quality assurance of agricultural extension services
- 6) Support agricultural enterprise development nationally
- 7) Provide information and communication services to MAAIF and local governments
- 8) Strengthen inter-institutional linkages between research, educational and farmer institutions
- 9) Promote agribusiness services and agricultural value chain development in close collaboration with the private sector
- 10) Support farmer institutional development through capacity building programs
- 11) Support skilling and manpower development in the agricultural sector
- 12) Identify investment opportunities in the agricultural sector

3.4.2.2 Structure of the Directorate

- 1) Department of Extension and Skills Management
 - a) Division of Information Communication
 - b) Division of Skills Management
 - c) Division of Agricultural Extension Coordination
- 2) Department of Agricultural Investment and Enterprise Development
 - a) Division of Agribusiness Services
 - b) Division of Primary Processing and Value Addition

3.4.3 Performance for FY 2016/2017

During the FY 2016/2017, the institutional processes to mainstream the agricultural extension services into the Ministry's and Local Governments' administrative, planning and budgeting frameworks were undertaken. The Vote Function of DAES became operational and the departmental program codes were also created. Two more Technical officers were posted to the Directorate on assignment of duties to operationalize the Division of Skills Management. This increased the technical manpower to 18 out of the required 34 approved in the structure. Effective 2016/2017 the DAES started receiving budget allocation. The major activities undertaken by the Directorate during the FY 2016/2017 were funded from Agricultural Technology, Agribusiness Advisory Services Project (ATAAS) and off budget support from development partners. The key interventions undertaken are outlined in the Table below.

3.4.4 Key Issues that Agricultural Extension Interventions Addressed

- a) Policies, strategies, plans and guidelines
- b) Administration, Human Resource Development and Accounting
- c) Coordination of Agricultural Extension Services
- d) Experimentation and Evaluation of Agricultural Extension delivery models
- e) Support to Farmer Institutional Development
- f) Policy, Advocacy and Publicity
- g) Value Addition and Agro-Enterprise Development
- h) Youth involvement in Agriculture
- i) Integration of climate change and environmental issues

Table 36: Performance Versus Targets

Key Interventions Areas	Planned Actions/ Targets	Performance Outputs and Intermediate Outcomes	Remarks
Policies, strategies, plans and guidelines	Finalize, print Launch, and disseminate the National Agricultural Extension Policy (NAEP)	National Agricultural Extension Policy (NAEP) 2016 approved by Cabinet and launched in December, 2016 NAEP can now be accessed by the Public on the MAAIF Website 695 people participated in the dissemination workshops for the regional dissemination workshops in February and March, 2017. All the 116 districts were represented and each took home 60 copies of the policy and 60 copies of the strategy	The policy process was highly consultative and inclusive involving more than 3000 people.
	Finalize, print Launch, and disseminate the National Agricultural Extension Strategy (NAES)	National Agricultural Extension Strategy (NAES) 2015/16-2020/21 approved by Cabinet and launched in December, 2016	The NAES has been printed and disseminated in all regions to over 1500 stakeholders
	Developed principles of the National Agricultural Extension Bill 2017	Principles for the National Agricultural Extension Bill 2017 approved by TPM in June 2017	Draft Cabinet Paper prepared due for submission to Cabinet
	Develop the National Agricultural Knowledge Management and Communication Strategy	National Agricultural Knowledge Management and Communication Strategy approved by TPM in June 2017	Plans are underway to print and disseminate
	Develop the Agro Processing and Marketing Strategy	Agro Processing and Marketing Strategy for Rice and Maize approved by TPM in June 2017	The strategy will help processors to reduce on the post-harvest losses
	Develop guidelines and standards of the for regulation and quality assurance of the agricultural extension services	DAES guidelines and standards for the regulation and quality assurance of the Agricultural extension services developed and approved by TPM	These are just awaiting printing and dissemination

Key Interventions Areas	Planned Actions/ Targets	Performance Outputs and Intermediate Outcomes	Remarks
	Develop the strategy for involvement of the youth in Agriculture	Strategy for youth involvement in Agriculture developed and approved by TPM in June 2017	Strategy now awaiting printing dissemination and implementation, also mapping out youth to promote champions under the theme, "Youth inspiring youth agriculture initiative."
	Develop Guidelines for Accreditation of Private Service Providers	The Accreditation Guidelines developed and approved by MAAIF TPM	Final editing and printing of guidelines ongoing
Administration, Human Resource Development and Accounting	Supervise and Coordinate the recruitment of agricultural extension staff in all the 116 District Local Governments	Supervisory and coordination activities in all the 116 districts were conducted to guide recruitment of extension staff. The number of staff in production departments countrywide increased from 2,503 as of June 2015 to 3,062 as of March 2017.	The recruitment process is still ongoing.
	Regularize all staff in the DAES with Ministry of Public Service.	In consultation with the Human Resource Department, submissions for confirmation of staff in the DAES were made to Ministry of Public Service	Public Service Commission interviews ongoing
	Train and upgrade technical staff	One DAES staff was admitted for PhD in Agriculture Extension at University of Hohenheim, Germany as part of collaborative arrangements and has completed coursework	The officer is back to Uganda to start the research part of the PhD program.
		DAES in Collaboration with Makerere University' College of Veterinary Medicine, Animal Health and Biosafety (CoVAB) conducted the following courses DLG Agricultural Extension staff. 1. Control of ticks and tick borne diseases. The main objectives of this course were; <ul style="list-style-type: none"> To control ticks by integrated means Identify reasons for tick resistance against common acaricides To lay strategies and new formulations for effective control of ticks and tick borne diseases 	<p>The attendance was 100%. 50 districts were represented and the total number of participants was 100</p> <p>70 participants from 34 districts attended. The attendance was 100%</p> <p>30 participants from 30 districts attended. The attendance was 100%</p>
		2. Dry season feeding in ruminants <ul style="list-style-type: none"> Participants equipped with fodder conservation (Hay and silage) skills Taught to select correct feed combinations and formulae while incorporating hay and silage in the ruminant diets and the attendant benefits 3. Training on infectious/zoonotic diseases + avian influenza <ul style="list-style-type: none"> Participants taught the epidemiology common infectious and zoonotic diseases Equipped with early warning and other skills of preventing spread of zoonotic and infectious diseases including avian influenza. 	

Key Interventions Areas	Planned Actions/ Targets	Performance Outputs and Intermediate Outcomes	Remarks
		<p>DAES in collaboration with Makerere University's College of Agriculture and Environmental Sciences (CAES) conducted the following courses DLG Agricultural Extension staff.</p> <ol style="list-style-type: none"> 1. Agribusiness Development <ul style="list-style-type: none"> • Staff were equipped with agribusiness development techniques • Staff were equipped with data management and record keeping skills 2. Training participants on agro-chemical handling and fertilizer optimization. DLG Extension staff were equipped with <ul style="list-style-type: none"> • Knowledge and skills on safe and effective use of agro-chemicals for both livestock and crops • Impact of agro-chemicals on the environment 3. DLG staff were equipped appropriate knowledge and skills on post-harvest handling techniques so that it could be reduced from the current over 30% <p>DAES in Collaboration with Makerere University's School of Statistics trained DLG staff on Agricultural Statistics</p> <ul style="list-style-type: none"> • Staff were exposed to tools for data collection and management • Given skills on utilising agricultural data in planning and development. <p>DAES in Collaboration with KLIMO TRUST conducted trainings on value chain development.</p> <ul style="list-style-type: none"> • DLG staff were equipped with knowledge on value chain development from production to marketing • The learners were equipped with knowledge on the various linkages between the different nodes on the commodity value chains. <p>DAES collaborated with the National Farmers' Leadership Centre (NFLC)</p> <ul style="list-style-type: none"> • to conduct trainings for mindset change. The target group was District Production Officers, DLG leaders, OWC, Farmer leaders • Participants were re-oriented in their perceptions about agriculture so that they would go back and mobilize the masses on agricultural transformation and also taking farming as a business <p>DAES in collaboration with World bank and MAK</p>	<p>113 out of the expected 116 Districts participated, likewise the participants were 113 out of the expected 116. Therefore, the attendance was 97%</p> <p>48 out of the expected 50 districts participated. Therefore, attendance was 96%</p> <p>70 out of the expected 70 districts attended. The attendance was 100%</p> <p>115 out of the expected 116 districts participated. The attendance was 99%</p> <p>380 Out of the expected 392 participants attended. This was 97% attendance.</p> <p>All the 116 districts participated and the attendance was 995 participants. (the</p>

Key Interventions Areas	Planned Actions/ Targets	Performance Outputs and Intermediate Outcomes	Remarks
		<ul style="list-style-type: none"> built the capacity of 16 staff from MAAF and 20 Journalist students from MAK in Agricultural knowledge management and communication. <p>DAES in collaboration with NARO trained DLG Extension staff in fruit value chain and production techniques</p> <p>Participants with equipped with:</p> <ul style="list-style-type: none"> Practical citrus and mango nursery management techniques. Updated extension staff with knowledge on tea nursery agronomy. Knowledge on citrus and mango field establishment and management; and also, knowledge on their pests and diseases <p>In addition, four staff from all the 116 DLGs underwent a TOT in Demand articulation and priority setting skills. Then were to subsequently equip sub-county staff and farmers with these skills</p>	<p>composition was RDCs, Chairpersons LCV, CAOs, OWC, DPMOs and farmer leaders</p> <p>380 participants from 41 districts out of the planned 42 participated</p> <p>464 staff from all the 116 DLGs attended</p>
		<p>3. DLG staff were equipped appropriate knowledge and skills on post-harvest handling techniques so that it could be reduced from the current over 30%</p> <p>DAES in Collaboration with Makerere University's School of Statistics trained DLG staff on Agricultural Statistics</p> <ul style="list-style-type: none"> Staff were exposed to tools for data collection and management Given skills on utilising agricultural data in planning and development. <p>DAES in Collaboration with USAID Feed the future EEA contracted KLIMO TRUST to conduct trainings on value chain development.</p> <ul style="list-style-type: none"> DLG staff were equipped with knowledge on value chain development from production to marketing The learners were equipped with knowledge on the various linkages between the different nodes on the commodity value chains. <p>DAES collaborated with the National Farmers' Leadership Centre (NFLC)</p> <ul style="list-style-type: none"> to conduct trainings for mindset change. The target group was District Production Officers, DLG leaders, OWC, Farmer leaders Participants were re-oriented in their perceptions about agriculture so that they would go back and mobilize the 	<p>70 out of the 70 districts attended. The attendance was 100%</p> <p>115 out of the expected 116 Districts attended. The attendance was 100%</p> <p>380 out of the expected 392 participants attended. This was 97% attendance</p>

Key Interventions Areas	Planned Actions/ Targets	Performance Outputs and Intermediate Outcomes	Remarks
		<p>masses on agricultural transformation and also taking farming as a business</p> <p>DAES in collaboration with World bank and MAK</p> <ul style="list-style-type: none"> built the capacity of 16 staff from MAAIF and 20 Journalist students from MAK in Agricultural knowledge management and communication. <p>DAES in collaboration with NARO trained DLG Extension staff in fruit value chain and production techniques</p> <p>Participants equipped with:</p> <ul style="list-style-type: none"> Practical citrus and mango nursery management techniques. Updated extension staff with knowledge on tea nursery agronomy. Knowledge on citrus and mango field establishment and management; and also, knowledge on their pests and diseases 	<p>All the 116 districts participated and the attendance was 995 participants. (The composition was RDCs, Chairpersons L.C.V, CAOs, OWC, DPMOs and farmer leaders</p> <p>380 participants from 41 out of the 42 planned participated</p>
Coordination of Agricultural Extension Services	Update the Human Resource Database for all agricultural extension staff in Local Governments	<p>Updated the data on all existing public agricultural extension staff in District Local Governments in the created data base</p> <p>Collaborated with the World Bank and developed a Solutions Finder Database that is used to share knowledge captured</p>	<p>Update of database ongoing</p> <p>Plans are underway to get the database online for staff to share knowledge in real time.</p>
	Collaborate with at least 4 organisations to support the Directorate in coordinating and strengthening agricultural extension services	<p>Trained 380 Agricultural extension staff in seedling nursery management and seedling handling, plantation management and production of tea, mangoes, citrus and coffee in support to OWC programme under NAADS and UCA</p> <p>USAID Feed the Future EEA – Provided support during the development of: principles, guidelines, standards and ethical code of conduct of agricultural extension service providers.</p> <p>USAID Feed the Future CPM popularized the Village Agent mode of extension service delivery to link farmers to traders and input dealers.</p> <p>UCA conducted needs assessment for capacity building for Farmers Institutional Development (FID)</p> <p>FAO supported development of the strategy to involve youth and for them to actively participate in agricultural activities.</p> <p>KOICA supported the development of the agro processing and marketing strategy for maize and rice.</p>	<p>Exceeded the target.</p> <p>More 12 organisations came on board because of mobilization by the Directorate to bring more actors so as to implement the Pluralistic agricultural extension service approach</p> <p>Covered 38 DLGs and promoted post-harvest handling technologies in maize, beans and coffee.</p> <p>There are many farmer groups but most of them are not doing agriculture as a business, therefore there is need to build their capacity so that they can do commercial agriculture and get out of poverty.</p>

Key Interventions Areas	Planned Actions/ Targets	Performance Outputs and Intermediate Outcomes	Remarks
		NGOs/CSOs (CARITAS, PELUM, FRA, SG 2000, USAID, UFAAS/AFAAS participated in development of guidelines, standards and ethics	The CSOs have picked interest in implementing the extension strategies. They therefore need to be coordinated, harmonized and regulated
	Strengthen Research-Extension-Farmer linkages in 9 ZARDIs and 116 Districts to upscale new improved technologies through demonstration and technology upscaling Technologies were to be demonstrated at sub-county level in 1364 sub-counties.	4236 Demonstrations established in February to June, 2017 in all the 116 districts and 1396 sub-counties. Below is the break down as per commodity promoted Commodity Number Cassava 1,310 Maize 784 Beans 913 Rice 275 Dairy (AI) 145 Forage 693 Fish 19 Nutritional Mineral Blocks 39 Poultry 29 Apiary 11 Goats 9 Ground nuts 9	The approach was to handle technological interventions along the whole value chain so the Post-harvest handling and storage technologies for the commodities are to be handled in the subsequent season.
	Support the ACDP commodities namely Cassava, maize, beans, rice and coffee in the 12 clusters to become viable commercial enterprises	DAES participated in the initial ACDP activities of sensitization, in the 12 clusters Stakeholder engagement in the 5 pilot districts of: Nebbi, Amuru, Iganga, Ntungamo and Masaka. Also, Cluster Committee Establishment and District Coordination Committee establishment in the above-mentioned districts	Committees in place and other activities to follow soon.
	Conduct advanced stakeholder engagement and communications trainings for all senior staff of MAAIF	Three three-day advanced stakeholder engagement and communications trainings involving more than 175 senior staff of MAAIF were conducted.	The trainings were meant to help the MAAIF staff to understand and improve communication with stakeholders.
	Establish collaboration and coordination mechanisms with key institutions relevant to the agricultural extension system	At least 11 Memoranda of Understanding (MOU) have been entered and or in process of approval into with different institutions including: Colleges of Agriculture and Environmental Sciences and that of Veterinary Medicine, Animal Resources and Biosecurity; School of Statistics and Planning, School of Journalism and Mass Communication, School of Biological Sciences, Kilimo Trust, Café Africa, Farm Radio International, National Agricultural Research Organization and National Agricultural Advisory Services. Supported planning and coordination of agricultural extension and research for technology upscaling in all the 116 districts through joint planning at the 9 Zonal Agricultural Research and Development Institutes (ZARDIs).	The MOUs have been signed and approved and activities are on-going Joint planning by District Production Officers and Zonal Research officers has been institutionalized.

Key Interventions Areas	Planned Actions/ Targets	Performance Outputs and Intermediate Outcomes	Remarks
Experimentation and Evaluation of Agricultural Extension delivery models	Collaborate with Development Partners to evaluate extension models/approaches of increasing efficiency extension service delivery along the value chain	In partnership with USAID continued conducted field evaluation exercises to assess the village agent model as one of the approaches in promoting agricultural value chains in Mubende, Masindi and Iganga districts. The objective was to assess the applicability of the model and how it can be institutionalized in the extension system. The good lessons from the evaluation of the model are currently under study.	Negotiations with USAID to get a Resident Consultant in DAES to scale up the model in extension service ongoing.
Support to Farmer Institutional Development	Undertake farmer needs assessment, develop an inventory of all farmer groups and training materials	Uganda Cooperative Alliance contracted to develop and inventory of all farmers organisations, find out their training needs and develop a programme for building their capacity to become viable commercial entities following the zoning strategy.	The contract is ongoing and expected to be completed in September 2017.
Policy, Advocacy and Publicity	Engage key stakeholders to advocate for policy and increased budget allocation to agricultural extension.	Engaged the World Bank and Mainstreamed the ATAAS project activities to support the extension reform.	ATAAS extension related activities budgeted to the tune of USD 15 Million
		Negotiated with IFAD to restore funding for ATAAS that was withdrawn following the reform of agricultural extension to support mobility and capacity building of recruited extension staff in local governments. The funding was restored to the tune of USD 8.1 million	All requirements for disbursement have been met
		Engaged Non State Actors, Parliament and stakeholders; and commissioned short term consultancy on agricultural extension budget performance. The findings were used to advocate for resource allocation to extension.	The advocacy partly led to budget allocation for agricultural extension non wage component to the tune of UGX 39.6bn
		In collaboration with Makerere University and University of Sussex, UK, DAES staff participated in publication of a book titled "Agronomy in Development: The politics of Knowledge in Agricultural Research". The Book is available on www.amazon.com .	The book is a collection of research articles globally on the influence of politics in agricultural development.
		Engaged more than 20 FM Radios and 5 Television Stations (UBC, STAR, WBS, NBS and DELTA) and publicized agricultural programs MAAIF is implementing.	MAAIF Political and Technical leadership participated in televised and broadcasted programs.
		Published a number of articles and supplements in the print media in collaboration with other MAAIF Departments and Agencies. Some of the publications include World Food Day celebrations 16 th October 2016, National Agricultural Show July 2016, National Veterinary Day and World Rabies Day.	
Value Addition and Agro-Enterprise Development	Collaborate with stakeholders for agricultural markets and other infrastructure development	The Ministry constructed storage facilities for Farmers Groups as pilot demonstration centers in Masindi and Jinja	
	Reduce post harvest losses in Maize and Rice	Value addition and processing pilot demonstration centers have been established in Masindi and	

Key Interventions Areas	Planned Actions/ Targets	Performance Outputs and Intermediate Outcomes	Remarks
	in Masindi and Jinja respectively	Jinja for both maize and rice respectively, with capacity of processing 2MT of grains per hour.	
	Increase value addition along the all value chains	Promoted value addition on sunflower, Groundnuts and simsim in Eastern and Western Uganda districts together with palm oil in Kalangala and neighboring areas in collaboration with VODP Project.	
		Promoted value addition on rice through training processors of rice in different regions on color sorting, grading and destining in collaboration with JICA.	
		Promoted high quality cassava chips and cassava flour in Eastern region under ATAAS project	
Youth involvement in Agriculture	Develop a strategy for youth involvement in agricultural value chains.	In collaboration with FAO,	The strategy approved by TPM and implementation has started
	Profile, map, characterize and benchmark successful farmers producing priority commodities as centres of excellence and learning	DAES in collaboration with FAO have organized a programme to map out youth best farmers under the theme “Youth inspiring youth in Agriculture Initiative”	This is on-going
Integration of climate change and environmental issues	Develop and implement climate change adaptation measures and address environmental concerns to enhance resilience and ensure productive and sustainable cropping, fisheries and animal systems	In collaboration with IITA, DAES is putting in place the E- weather information system and have signed an MoU with UNMA to put weather stations in six pilot districts	Authority to import weather equipment was sought from UNMA

Source DAES 2017

3.4.5 How Different Stakeholders Contributed to Reported Performance

The Directorate performance as reflected above was achieved with contributions from different stakeholders. The contributions were in form of financial, technical assistance and training. Development Partners that supported these efforts included: -

- 1) World Bank through the ATAAS Project;
- 2) USAID Feed the Future program and International Institute of tropical Agriculture (IITA) through Policy Action for Sustainable Intensification of Cropping systems (PASIC) project;
- 3) The Non State Actors (NSA) with coordination by Food Rights Alliance supported the policy processes through stakeholder mobilization, advocacy and financing of stakeholder workshops and talk shows on radios and television; and
- 4) The Civil Society Budget Advocacy Group supported budget negotiations with Parliamentary committees on Agriculture and National Economy.

3.4.6 Extent Planned Interventions Addressed Key Issues and Gaps

The National Agricultural Extension Policy processes were concluded and approved by Cabinet. What remains to be done is putting in place legislation for implementation. The Ministry has finalized the development of the Principles for the National Agricultural Extension Bill. The strategy however, was approved by MAAIF Top Management and is now in implementation phase. However, some of the strategies to be implemented requires enforcement by the law and cannot be implemented until the said Bill is passed by Parliament.

The main institutional issues that require attention are getting the required manpower to implement the new extension policy both at national and local government levels. As of March 2017, the recruitment was at about 68% in local governments and at national level it is less than 50%. The approved policy recommends, some modifications on the structures both at district and national levels.

3.4.7 Gaps/ Challenges

- 1) Inadequate Extension services
 - a) Low numbers of agricultural Extension staff. Extension: Farmer ratio is currently at 1:1800 whereas the recommended is 1: 500.
 - b) Inadequate logistical support to Extension staff in form of transport and allowance.
 - c) The newly recruited Extension staff lack the required knowledge, skills and approaches necessary for effective extension service delivery.
- 2) Weak farmers Institutions
 - a) Engaged only in primary production and weak in value addition and bulk marketing.
 - b) Weak in resource mobilisation, financial management and business management

3.4.8 Recommendations/Action Areas

- 1) Fast track the approval of the National Agricultural extension Bill;
- 2) Confirm the Officers in acting positions at the DAES and recruit and fill the gaps;
- 3) Govt. should provide additional funding to fill vacancies at District and Sub-county levels in the DLGs.;
- 4) ULGA and Local Govt. Finance Commission to sanction DLGs which failed to recruit in 2015/16 and 2016/2017;
- 5) Production Departments in the DLGs should work closely with the Community Development Department to build capacity of Farmer Organizations using the training manuals developed by UCA, so that they can be strong institutions and be able to circulate and demand for services;
- 6) Leverage on CBF and private sector to reduce E:F ratio in provision of agricultural extension services;
- 7) Engage the NSA through MoUs and PPP arrangements;
- 8) MAAIF has MoUs with Kilimo Trust, One –Acre Fund, PPP with BIDCO;

- 9) Provide extension services along the value chain by extension officers' facilitating and brokering businesses and meetings between farmers, and farmer organizations, Local traders, Exporters and agro processors, so that agribusinesses can take place;
- 10) Strengthen linkages between farmer organizations, researchers and other sources of innovations and services by convening multi stakeholder innovation platform (MSIPs);
- 11) Continuous capacity building in terms of training and skilling extension staff as well as private service providers; tooling extension staff so that they can provide updated information knowledge technology and skills in time;
- 12) Strong monitoring and evaluation of agricultural extension services to track the progress and impact of extension services in terms of: -
 - a) Uptake and adoption of technologies and skills;
 - b) Value chains developed;
 - c) Households engaging in commercial agricultural activities along the value chains;
 - d) Engaging with the DLG, private sector service providers along the value chain; and
 - e) Gov't providing resources to support the single spine extension system.
- 13) There is a lot to be done which requires strong coordination and collaboration: -
 - a) Support from NSA and Govt; and
 - b) Continuous engagement and reviews of progress.

3.5 Other MAAIF Departments

3.5.1 Agricultural Infrastructure and Water for Agricultural Production

3.5.1.1 Introduction

The department reports to Permanent Secretary and comprises of four divisions namely: Water for Agricultural Production (Irrigation and Drainage and Aquaculture and animals), Soil and Water Conservation (Sustainable Land Management and Soil and water Conservation, Agricultural Engineering and mechanisation (Mechanisation and Farm Structures and Energy) and Farm Planning (Farmland Planning and Farming Systems).

The mandate of the department is to support, promote and guide the adoption of appropriate technologies in the development and utilization of Water for Agricultural Production, Farm Machinery and agricultural equipment, Soils, Sustainable Land Management and Farm Land Planning in Uganda.

3.5.1.2 Key Functions of the Department

- 1) Formulate, review, and implement policies, legislation, regulations, standards, designs, plans and strategies, for agricultural infrastructure and water for agricultural production and mechanization;
- 2) Provide water for animals, crops and fisheries production and development;

- 3) Compile, analyze, maintain and disseminate data on soils, water, wetlands, semi-arid areas and rangelands for sustainable animal, crop and fish production;
- 4) Enforce legislation, regulations and standards of soil fertility management, irrigation, aquaculture, soil and water conservation, agricultural engineering, mechanization and farming systems for the development of agriculture;
- 5) Provide equipment and technical guidance for physical farm planning, topographical, vegetation and soil surveys, classification and mapping;
- 6) Provide technical support and guidance to MDAs, District local governments, NGOs and other stakeholders in management of infrastructure, water for agricultural production and mechanization;
- 7) Establish and operationalize collaborative mechanisms with research and extension services institutions for the development, uptake and application of appropriate technologies; and
- 8) Build capacity of MAAIF, Local Governments and other stakeholders in management of systems and infrastructure, water for agricultural production and mechanization.

3.5.1.3 Planned Actions Versus Achieved Outputs

Table 37: Interventions, Planned Actions and Outputs

Key Intervention Areas	Planned Outputs	Performance: Achieved Against Planned	Explanation of Performance
Promotion of small scale Irrigation and water harvesting technologies promoted selected districts	Small scale Irrigation demonstrations technically supported and promoted under the SLM component of the ATAAS project targeting 200 ha	Surveys done, Bills of Quantities developed and designs completed. Procurement for materials to be undertaken soon.	Delays in funds release
Irrigation for selected research crops at ZARDIs developed	Solar powered irrigation targeting 5ha in all the 9 ZARDIs for selected research crops developed	Boreholes sited, Preliminary designs developed, and procurement of drilling contractor underway	Delays in approvals from the bank.
Sustainable land management, Best farming practices and Technologies in Farmland planning and Conservation Smart Agriculture (CSA) technologies promoted and supervised in selected districts	Sustainable land management and conservation smart agriculture (CSA) programmes and projects promoted and supervised in 9 ZARDIs	Farmer Communities have been sensitised on sustainable land management and farmers have shown willingness to use and adopt the new technologies due to their proven benefits	Funds have been provided under the ATAAS program
Guidelines to mainstream climate change in the agricultural sector developed by Climate Change Task Force HQ and disseminated in agro ecological zones	Final draft for the guidelines for mainstreaming climate into policies, programmes and activities was validated.	Guidelines ready for submission	Support was provided by FAO
Support to labour saving technologies to improve access to and use of productive assets.	<ul style="list-style-type: none"> ➤ Construction of Valley tanks ➤ Opening up Agricultural Land 	<ul style="list-style-type: none"> ➤ 35 Valley tanks of 174,750 cubic meters of water constructed 	

Key Intervention Areas	Planned Outputs	Performance: Achieved Against Planned	Explanation of Performance
	<ul style="list-style-type: none"> ➤ Procurement of low bed carrier pickup double cabin ➤ Training of Water Users Associations (WUAs) in Doho, Mubuku irrigation schemes 	<ul style="list-style-type: none"> ➤ 945 acres of bush clearing/opened for agriculture. ➤ 38 farm roads of 136Km opened by ministry equipment ➤ Low bed carrier and pick up double cabin procured ➤ Water User Associations (WUAs) trained in Doho and Mubuku irrigation Schemes. 	
Support to Irrigation scheme development	<ul style="list-style-type: none"> ➤ Rehabilitation of medium irrigation schemes under FIEFOC. ➤ Irrigations schemes developed 	<ul style="list-style-type: none"> ➤ 3 Medium Scale Irrigation Schemes rehabilitated under FIEFOC; Agoro irrigation schemes in Lamwo, Doho in Butaleja, Mubuku in Kasese completed and Olweny Irrigation scheme in Dokolo/Lira which is still under construction. ➤ Feasibility studies for two schemes; Atari Irrigation scheme in Bulambuli and Kween Districts; and Sironko/Acomai Irrigation schemes in Bulambuli and Bukedea conducted ➤ Preparatory Survey and Stakeholders engagement in Progress in Atari irrigation. 	<p>ADB/GoU executed by MWE</p> <p>GoU GrantAid.</p>
Enhanced water harvesting capacity for agriculture	<ul style="list-style-type: none"> ➤ Carry out an assessment of the status, performance and scope for improving water harvesting for agriculture ➤ Develop and implement a training program on water harvesting to build the capacity of farmers, agricultural water extension agents and technical experts 	<ul style="list-style-type: none"> ➤ Assessment conducted and report generated. ➤ 26 technical staff from MAAIF, MWE, NARO, Makerere University, Busitema University and selected local Governments trained on Skills and materials for planning future water harvesting systems 	Support provided by FAO

Source: AIMWfAP 2017

3.5.1.4 Major Challenges Experienced in the Department.

- 1) Inadequate staffing levels, some positions not filled at MAAIF and most Districts Local Governments have not recruited Engineers as provided for in their structures.
- 2) Inadequate transport, few old vehicles expensive to run and maintain.
- 3) High demand for irrigation systems with inadequate budget for implementation of irrigation activities.

3.5.1.5 Policies, Strategies, Laws, Guidelines and Regulations

- 1) Draft irrigation policy was reviewed and re submitted to Cabinet Secretariat for approval.
- 2) Desk reviews and stakeholder consultations on National Agricultural Mechanization Policy concluded.
- 3) Desk reviews on Farmland Planning strategy and guidelines conducted.
- 4) Tractor hire guidelines draft Zero in Place.

3.5.2 Human Resource Management

3.5.2.1 Introduction

As part of the implementation of the ASSP, the Human Resource Management (HRM) department in the FY 2016/17 identified and implemented a number of interventions which focused on ensuring that sector institutional structures and systems were in place and optimally configured to achieve impact.

3.5.2.2 Key Institutional Issues to be Addressed

The key institutional issues that MAAIF sought to address included: -

1) Finalization of Review of the MAAIF Structure

In 2016/2017, MAAIF planned to implement the following interventions: -

- a) In liaison with the Ministry of Public Service, to finalize the restructuring of the Ministry for effective coordination; and
- b) Recruit and fill vacant positions under the approved establishment to strengthen the Ministry capacity to provide quality services to its clients.

2) Linkages and Coordination Between MAAIF HQs and LGs

During the FY 2016/17, the Ministry planned to: -

- a) Implement the District Local Government Production Department structures both at District headquarters and Sub County level which are critical to the new agricultural extension system.

3) Linkages and Coordination Between MAAIF HQs and Agencies

During FY 2016/17, the Ministry planned for the following interventions: -

- a) To restructure the Agricultural Training Institutions, with the objective of merging the three institutions of Bukalasa Agricultural College, Fisheries Training Institute-Entebbe and Uganda Veterinary Training College;
- b) To improve linkages with its agencies to enable MAAIF improve service delivery in the Sector; and
- c) To mainstream the National Farmers' Leadership Centre and obtain approval of its structure and staff establishment.

4) Relocation of MAAIF HQs and Agency Offices to Kampala

In FY 2016/17, MAAIF planned to secure funding of USD 25m to commence construction of MAAIF headquarters in Kampala.

5) Capacity Gaps in the Agricultural Sector Staff

To address the issue of capacity building, MAAIF identified and planned for 3 outputs namely: -

- a) Enhancing capacity and competences of sector personnel;
- b) Retooling and equipping personnel of MAAIF and agencies; and
- c) Retooling and equipping district offices.

3.5.2.3 Progress Registered

1) Restructuring of MAAIF

MAAIF has achieved the following under the restructuring: -

- a) The restructuring exercise was concluded and the new Ministry structure was approved.
- b) Out of the 340 vacant positions reported in FY 2015/2016, 50 were filled in FY 2016/2017 within the available resource.
- c) 18 technical staff and 12 support staff are currently assigned to discharge the functions of the Directorate of Agricultural Extension Services; and
- d) Submissions were made to the Public Service Commission (PSC) to assess the suitability of staff temporarily deployed under the Directorate for substantive appointment to the respective positions.

2) Improved linkages and Collaboration with Local Governments

With regard to improving linkages and collaboration with LGs, the following have been achieved:

-

- a) Guidelines for implementation of the reviewed agricultural extension system were disseminated through consultation and discussion of the various stakeholders for effective and efficient implementation; and

- b) Support Supervision and Monitoring visits have been conducted in Districts of Mpigi, Gomba, Butambala, Sembabule, Buikwe, Kayunga, Buvuma, Mukono, Jinja, Iganga, Mayuge, Namayingo, Namutumba, Bugiri, Busia, Tororo, Budaka, Pallisa, Mbale, Butaleja, Sironko, Manafwa, Budaka, Bulambuli, Bundibugyo, Kasese, Ntoroko, Rubirizi, Mitooma, Mityana, Mubende, Kyenjojo, Kyegegwa, Kabarole, Arua, Nebbi, Koboko, Zombo, Moyo, Adjumani, Yumbe, Gulu, Lira, Pader Amolatar, Kitgum, Oyam, Dokolo, Nyonya, Masindi, Nakasongola, Kiryandongo, Luwero, Maracha, Kalungu, Bukomansimbi, Rakai, Masaka, Lwengo, Lyantonde, Kiruhura, Mbarara, Kalangala, Bushenyi and Sheema.

3) Improved Linkages and Collaboration with Stakeholders

To improve linkages and collaboration with stakeholders, the following interventions were undertaken: -

- a) The Ministry held regular meetings of the Top Policy Management Team that includes all its Agencies and Development Partners, for information sharing and consideration of policy documents. In addition, 2 retreats for the Top Management Team were held. These provided an opportunity for management to review performance and trends as well as discuss and agree on action plan to improve performance. It also created an opportunity for team building among senior staff so as to promote cohesion and minimize conflicts and silo-planning and implementation;
- b) Review meetings have been held at regional level for DPO's, CAO's and District Chairpersons; and
- c) Zonal meetings have also been organized for planning for funds sent to the Zonal Agricultural Research Institutes.

4) Mainstreaming Agricultural Training Institutions (ATI) into MAAIF

MAAIF undertook the following interventions in order to improve the ATIs performance: -

- a) Arrangements to establish a National Agricultural College are in advanced stages. Under the College, the Director of the College will be part of the Top Management Policy Team;
- b) The Ministry is represented at senior level on all the Institute Governing Councils;
- c) MAAIF has supported Fisheries Training Institute and Bukalasa Agricultural College to review their curricula in line with the NDP II, Agricultural Sector Strategic Plan and Skilling Uganda initiative. The draft curricula have been submitted to Top Policy Management for approval;
- d) The World Bank and GoU, under Skills Development Project, are supporting Bukalasa Agricultural College to become a National Centre of Excellence in Agricultural training.

5) Relocation of MAAIF to Kampala

This intervention has not been achieved due to the Government policy shift on construction of Government offices. Arrangements are being made to construct all Government Offices in one village for efficiency and ease of communication.

6) Enhancing Competencies of Senior Personnel

The Ministry has registered the following achievements: -

- a) A 3 year Capacity Building Plan (CBP) for the agricultural sector, well aligned with the ASSP objectives, was developed.
- b) MAAIF training plan covering priority arrears for FY 2017/18 was developed; and
- c) Training in priority areas and professional training opportunities have been extended to MAAIF staff through GoU funding and bilateral arrangements as detailed below: -
 - i. 40 Heads of Department at MAAIF, Agencies, MAAIF Institutions and Districts were trained in Leadership and Change Management for three (3) days at Civil Service College Uganda;
 - ii. 40 Middle Level Managers, Heads of Agricultural Institutes, District Production Officers and District Agriculture Officers were trained in Negotiation and Lobbying skills for three (3) days at Civil Service College Uganda;
 - iii. 30 Heads of Department, Mid-level Managers (Principals, Seniors and Officers) were trained in Team work/Team building for three (3) days at Civil Service College Uganda;
 - iv. Seven (7) HR Staff were trained in HR Analytics (HR metrics, Audit and TNA including ROI) for five (5) days at PROACT International; Kampala;
 - v. 25 Mid-level Managers (Principals Officers and Senior Officers) and 40 Project staff, Mid-level managers and M&E staff in Agriculture sector were trained in Evidence-Based Monitoring and Impact Evaluation for five (5) days at Civil Service College Uganda;
 - vi. 40 Staff /Project Implementers of Agricultural Training & Research Institutions and Extension staff were trained in Project operation areas in Research, Diagnosis, Control and Management of weeds, pests & disease and IPM practices for 5 days at Makerere University Kampala;
 - vii. 40 Staff from Crop Inspection and Certification Department were trained in Certification Enforcement and Investigation techniques for crop Inspection for 3 days in Kampala;
 - viii. 40 Staff in the department of Crop Protection were trained in Bio safety of pests and diseases/ vectors for three (3) days in Kampala;
 - ix. 40 Staff in MAAIF and DLGs were trained in Seed production technology and Inspection, Plant variety testing for three days;
 - x. 40 Senior and Middle level managers at MAAIF headquarters and Extension staff were trained in Project operation areas in Agrochemicals (Fertilizer, Herbicides, Pesticides, Fungicides) handling techniques for three days; and
 - xi. 40 Heads of Department, Middle Level Managers, CAOs, District Chairpersons and Extension staff were trained in By-Laws/Ordinance Formulation & Enforcement technologies in Crop protection for three days.
 - xii. The following long-term training programs are ongoing: -
 - a) Training of two (2) Mid-level Managers in Results-Based Monitoring and Impact Evaluation for one (1) year Masters' Course at Uganda Management Institute;
 - b) Two years' Master's Degree course in M&E for 3 officers at Uganda Management Institute.
 - c) Two years' Master's Degree Course in Seed science and Technology for one Senior Inspector at Makerere University;

- d) Two years' Master's Degree in Agriculture (Agronomy) for one Senior Officer at Makerere University.

7) Filling Vacant Posts in the Approved MAAIF Structure

The following interventions were undertaken to address the vacant positions in the current structure so as to strengthen the Ministry capacity to deliver services to its clients: -

- a) Out of **886** approved establishment, **572** positions have been filled, representing **64.56%**;
- b) MAAIF received an additional wage provision of **UGX. 1,191,000,000/=** to cater for wage shortfalls experienced in FY 2016/2017 and enable filling of critical positions under different Directorates; and
- c) Out of the **314** vacant positions **60** positions are already with Public Service Commission for filing.

8) Operationalization of Approved Production and Marketing Structures in District Local Governments

Following the approval of the Local Government Production and Marketing structures, MAAIF has undertaken the following activities: -

- a) Analysed and costed all vacant posts against available wage at DLGs and Sub county levels to guide recruitment; and
- b) MAAIF has provided technical guidance and overall monitoring of the recruitment of 3,062 District Local Government extension staff out of 5,000 approved positions.

3.6 MAAIF Agencies

3.6.1 National Agriculture Research Organisation (NARO)

3.6.1.1 Introduction

The National Agricultural Research Organisation (NARO) is an agency under the Ministry of Agriculture Animal Industries and Fisheries (MAAIF) mandated to undertake research in all aspects of crops, Livestock, fisheries and forestry. NARO is the apex body for guidance and coordination of all agricultural research activities in the National Agricultural Research System (NARS) in Uganda. NARO is a public institution established by an Act of parliament enacted on 21st November 2005. The primary role of NARO in agriculture is to improve livelihood of more than 68% of the resource poor subsistence farmers operating in very militating environments. NARO implements a research agenda with the aim of solving food and nutrition insecurity; unlocking employment opportunities and wealth creation; increasing production and productivity; value addition, market access and institutional capacity development. To do this, NARO implements a core business of generating and promoting Technologies Innovations and Management Practices (TIMPS) in crops, livestock, fisheries and integration of Indigenous

Knowledge (IK) with modern scientific methods in some of our research agenda e.g. biodiversity conservation, characterisation, bio-prospecting.

NARO receives budgetary support from the Government of Uganda and other development partners according to comprehensive annual work plans guided by the NARO budget policy and procedures that are aligned to the Public Finance and Accountability Act (2015) of Uganda as well as the NARO Financial Management Manual. The work plans are consolidated through the annual review and planning processes that involve the different PARIs and stakeholders.

3.6.1.2 Key Issues Addressed by Interventions in FY 2016/17

During the FY 2016/17, progress was made in plant variety and animal breeding genetic improvement; developing improved animal and crop management practices; plant and animal health management; product development and diversification along the value chain; fisheries; forestry; climate smart agriculture; agro-machinery and cross-cutting research areas. A total of 162 technological innovations were generated. Some of these technological innovations are ready for commercialization and dissemination, and twelve (12) products are ready for patenting. NARO has delivered on all targets set against the key performance indicators for the FY 2016/17.

3.6.1.3 Key Performance Indicators (KPI)

In the financial year 2016/17, NARO delivered on all the set targets against KPI (table 39).

Table 38: Performance Benchmarks for FY 2016/17

Table 58: Performance Benchmarks for FY 2016/17					
	KEY PERFORMANCE INDICATORS	Annual targets	Achieved	Annual targets	Remarks
		2016/2017	2016/2017	2017/2018	
VF Output: Generation of agricultural technologies					
1	No. of new varieties/ prototypes submitted to Variety Release Committee	20	35	70	Emphasis was on finalising the interim outputs
2	No. of production technologies generated	60	64	199	Emphasis was on finalising the interim outputs
3	No. of research studies under competitive grants scheme	45	46	47	
VF Output: Research extension interface promoted and strengthened					
4	No. of technological innovation platforms established/supported	7	8	43	Over-performance was due to improved extension-research linkages through District Local Government Technology up-scaling demonstrations
5	No. of technological innovations delivered to uptake pathways	5	15	138	

Source: NARO Data 2016

Table 39: Budget Performance FY 2016/17

		Approved Budget (UGX in Billions)	Released by June (UGX in Billions)	Spent by June (UGX in Billions)	% Budget Released	% Budget Spent	% Releases Spent
Recurrent	Wage	22.472	22.472	22.472	100.00%	100.00%	100.00%
	Non-Wage	8.523	6.922	6.922	81.20%	81.20%	100.00%
Dev.	GoU	9.13	5.983	5.983	65.50%	65.50%	100.00%

		Approved Budget (UGX in Billions)	Released by June (UGX in Billions)	Spent by June (UGX in Billions)	% Budget Released	% Budget Spent	% Releases Spent
	Ext. Fin.	67.739	57.181	50.588	84.40%	74.70%	88.50%
	GoU Total	40.126	35.376	35.376	88.20%	88.20%	100.00%
	Total GoU + Ext Fin (MTEF)	107.865	92.558	85.964	85.80%	79.70%	92.90%
	Arrears	0	0	0	0.00%	0.00%	0.00%
	Total Budget	107.865	92.558	85.964	85.80%	79.70%	92.90%
	A.I.A Total	6.272	2.995	2.995	47.80%	47.80%	100.00%
	Grand Total	114.137	95.553	88.959	83.70%	77.90%	93.10%
	Total Vote Budget Excluding Arrears	114.137	95.553	88.959	83.70%	77.90%	93.10%

Source: NARO Data, 2016

3.6.1.4 Generation of Agricultural Technologies

1) Crops

a) Varietal Development

NARO has submitted 35 varieties to the variety release committee during the reporting period. By the end of 2016/2017 varieties of coffee, maize, Rice, Sorghum, Finger millet, Sweet potato, cow pea, groundnuts and mangoes were generated as in table: 3 bellow.

Table 40: Crop Submitted to the Variety Release Committee

Crop varieties submitted to the variety release committee	Number	Key attribute
Coffee	3	<ul style="list-style-type: none"> Coffee wilts disease resistant candidate varieties. Candidates 2/22/2, 245/25/1 and 3/15/1, yielding 3.1, 3.9 and 4.8tns/ha/yr. respectively, submitted for release
Maize	5	<ul style="list-style-type: none"> 2 Maize <i>striga</i> resistant, 2 MNL tolerant and 1 highland maize variety
Rice	2	<ul style="list-style-type: none"> cold-tolerant rice varieties suitable for high altitude areas
Sorghum	4	<ul style="list-style-type: none"> Stable drought tolerant and I resistant
Finger millet	6	Blast resistant and drought tolerant
Sweet potato	5	High yielding and <i>mealiness</i>
Cow pea	5	<ul style="list-style-type: none"> Drought tolerant Resistant to diseases (virus, scab, yellow blister and bacterial blight)
Groundnuts	2	<ul style="list-style-type: none"> Early maturing 75-80 days Extreme Drought resistant Both in red and tan colors
Mangoes	2	Early maturing
	34	

Source: NARO Data, 2017

Figure 20: Plate 1: Groundnut Varieties



DOK1R



DOK1T

Figure 21: Plate 2: Maize Varieties with Resistance to *Striga*



Source: NARO 2017

Figure 22: Plate 3: Coffee Candidate Variety: 245/25/1 Yielding 3.9 Tons/Ha/Yr.








Host Farmers comments
Mr. Mabingo's comments
about the variety:

- a) Have short nodes
- b) Have big berries
- c) High yielding
- d) Survives drought

A farmer, Mr. Mabingo of Mityana showing off one of the candidate varieties. He says he gets up to about 4t/ha/annum equivalent to Shs 24 million (cf 0.6t/ha which gives shs 3.6million). He has his own mother garden for these new

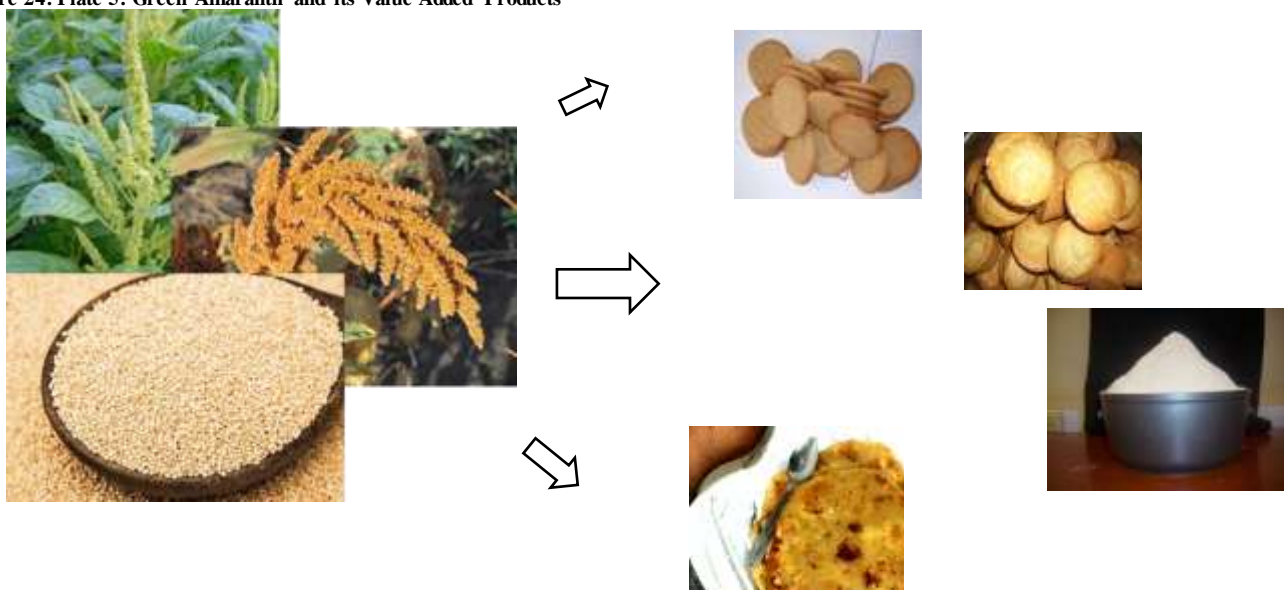
Source: NARO 2017

Figure 23: Plate 4: Bio-Fortified Bean Varieties with Enhanced Levels of Iron and Zinc

Name	NAROBEAN 1	NAROBEAN2	NARO BEAN 3	NAROBEAN4C	NAROBEBEAN 5C
					
Days to maturity	60-68	58-68	58-68	82-88	88-96
Yield Kg/ha	1500-2000	1600-2200	1500-2000	2500-3700	2500-3300
Zn mgKg ⁻¹	31.4-34.2	32.5-36.2	35-38	32.1	34.7-38
Fe mgKg ⁻¹	65.8-72	66.1-72	65.4-69	77.4-83	72.2-80
Ca mgKg ⁻¹	1504	1422	763	1603	1379
P mgKg ⁻¹	4636	4500	5083	4473	4420

Source: NARO 2017

Figure 24: Plate 5: Green Amaranth and its Value Added Products



Source: NARO 2017

Figure 25: Plate 6: Used Vegetable Oil and Its Application in Engines



Figure 26: Plate 7: Professor. Joseph Obua (left), Chairperson NARO Council together with Dr. Ambrose Agona (right) Varietal Release



Source: NARO 2017

NARO is mandate with development of improved technologies including new crop varieties. However, it remains the mandate of the Ministry of Agriculture, Animal Industry and Fisheries to officially release the varieties. 19 Varieties have been released and commercialized.

Table 41: Crop Varieties Released

Crop varieties released	Number	Key attribute
Maize – WE1101, WE3103, WE3106 and WE3109	4	1. Water efficient /drought tolerant varieties released.
Cassava - NARO-CASS 1 and NAROCASS 2	2	2. cassava varieties tolerant to both CMD and CBSD. NAROCASS1 and NAROCASS2 that are highly tolerant
Potato	8	3. Eight potato varieties released (Connect, Sarpo Mira, Arizona, El Mundo, Voyager, Markies, Sagitta & NAROPOT 4)
Beans	5	4. Five bio-fortified bean varieties with enhanced levels of Iron (Fe) and Zinc (Zn) 4. NAROBAN1 (Fe = 65.8 – 72.0ppm; Zn = 31.4 – 34.2ppm), 5. NAROBAN2 (Fe = 66.1 – 72.0ppm; Zn = 32.5 – 36.2ppm),

Crop varieties released	Number	Key attribute
		6. NAROBAN3 (Fe = 65.4 – 69.0ppm; Zn = 35.0 – 38.0ppm), 7. NAROBAN4C (Fe = 77.4 – 83.0ppm; Zn = 32.1ppm) and 8. NAROBAN5C (Fe = 72.2 – 80.0ppm; Zn = 34.7ppm).
Sweet potato	2	High yielding and mealiness

Source: NARO 2017

Progress in Horticultural Research and Development

In NARO, research in horticulture has been part and parcel of the research agenda. Research thrusts have been in the following impact areas: -

1. IPM packages for improved Plant health;
2. Improved plant environment for enhanced production & Productivity;
3. Enhanced Socio-economic and Agribusiness development;
4. Generation and dissemination of Bio-analytical recommendations;
5. Development of post harvest management packages; and
6. Strengthen research-extension/public linkages (interphases).

The priority horticultural crops have been: -

1. **Fruit:** Mango, Citrus, Pineapple, Passion fruits and apples.
2. **Vegetables: Tomatoes**, African Indigenous Vegetables (amaranths & pumpkin).
3. **Essential oil plants:** Oil Palm and pepper.
4. **Flowers & ornamentals:** Flowers & landscaping.

NARO is conducting research in production of off-season mango for increased income & nutrition using KNO₃ to produce 48kg/ tree. Flower induced mango have been profiled and declared safe for consumption. The variety Tommy Atkins responded to KNO₃ application in Namulonge, Masindi & Soroti. The technology of off-season mango production has been disseminated to 200 farmers (87 women, 113 men) 10 (4 women, 6 men) LG extension staff in 3 districts.

Research interventions have been conducted to address leaf and fruit spot diseases affecting citrus and mango production in Uganda. An effective management package for control of leaf & fruit spot disease in citrus has been developed. Information materials for guiding management of fruit and leaf spot disease in citrus have been developed and distributed. Several species of fruit flies among fruits- citrus, Water melon, Guava (except mango) and vegetables – Pumpkins, Pawpaw, have been identified. NARO has developed a fruit bait Baits for management of fruit flies in mangos. Work is still on-going.

NARO is expending efforts in strengthening the horticultural breeding programme. In passion fruit breeding, 14 passion fruit accessions collected from 4 districts in eastern Uganda and a PWD virus detection protocol has been optimized. In tomato breeding 5 Korean tomato lines, MT 56 Ugandan tomato line tolerant to bacterial wilt, Serbian tomato lines, and 10 multiple tomato disease tolerant germplasm acquired from AVRDC are being evaluated at Namulonge.

NARO is expending efforts in improving the seed system for vegetable production. NARO

launched vegetable seed facility 50-100 ton of grain seed at Namulonge. The facility will be strengthened further to handle more crops and to include other seed processing technology. NARO is also expending efforts in developing appropriate integrated pest and disease and nutrient management packages for pineapples. This is on-going. However, of interest are mealy bug & mites control package developed, die back & yellow spot disease management, Fertilizer rates & time of application, and spacing in pineapple production.

NARO is expending efforts in developing and disseminating improved oil palm production technologies; oil palm yield and growth performance in different agro-ecologies; Incidence and severity of bacterial leaf spots in Kalangala. 15 trainers of trainers (ToTs) and 78 farmers (28 women, 50 men) trained in oil palm production.

NARO is also expending efforts in developing and disseminating apple production technologies. Six (6) apple varieties (*Fuji*, *Shilomit*, *Mayae*, *Sharpearly*, *Micheal* and James Grieves) show tolerance to Powdery mildew and the intensity of flowering is medium. James Grieves has high fruiting intensity and vigour. In determining appropriate fertilizer types and application rate for increased apple fruit productivity, treatments only facilitated the recovery of trees. However, the difference was significant in terms of shooting and sprouting at 5 % level of response. Results on economic viability of apple enterprise and the associated determinants indicated that gross margin of apple enterprise in Kabale and Kanungu district had a positive ratio of return on investment of 1.5 and 1.7, respectively. Kisoro and Rukungiri districts had a negative ratio of return on investment of (0.9 and 0.3, respectively).

2) Livestock

Great strides have been made in advancing the work on vaccine development. The achievements include: -

- a) Two anti-tick vaccine molecules have been confirmed to effectively control blue ear ticks (*Boophilus decoloratus*) and found to be efficacious.
- b) In complement, three drugs for control of internal (Nematode, Cestode and Trematode worms) and external parasites in ruminants were evaluated with highly promising results.
- c) Two diagnostic kits for detection of Foot and Mouth Disease (FMD) and African Swine Fever (ASF) were developed.
- d) Two bio-acaricide formulations were developed and evaluated to manage the emerging challenge of tick resistance to available acaricides.
- e) A national tick distribution map, to guide tick control programs and initiatives was produced.
- f) NARO has conducted initiatives to increase the availability of forages and feed.
- g) NARO has developed, evaluated and availed to farmers a milk enhancing ration, with the potential to increase milk production from local animals by 30%. One (1) milk-enhancing ration based on sorghum stover and Tithonia.
- h) NARO piloted the rehabilitation and restoration of at least 42 ha of unproductive and degraded grazing land to enhance nutritive and palatable pastures in the central cattle corridor. This has contributed to increased pasture availability from 0 – 4t/ha.
- i) Two (2) management techniques for optimal biomass production and conservation for four

(4) fodder species (*C. calothyrsus*, *M. alba*, *V. amygdalina* and *Brachiaria spp*) were developed.

- j) one (1) productivity enhancing alfasafe broiler feed ration comprising of 1% NARO aflatoxin binder that reduces aflatoxin induced mortality by 445% from 6% to 1.1%, improves mature weight of broiler birds by over 12 %, and boosts bird's immunity through enhancement of Newcastle Disease anti-body concentration in blood from 4.75 to 7.91, was successfully developed.
- k) In livestock, 5.5 tons of milk enhancing dairy pellets produced and availed to farmers. 45 smallholder dairy farmers (18 females and 27 males) engaged in 1day forage exposure visit in Mbale.

3) Forestry

Thirteen (13) improved management and production practices were generated for the improvement of productivity and production of forestry resources. The practices included one (1) tea production practice; one (1) shea grafting method for early fruiting of shea tree that reduces time to fruiting from 15 to 5 years or less; three (3) protocols for propagation of three (3) tree species; and one (1) control method for citrus canker disease using back horning technology.

In addition, 80 kg of Calliandra seed; 501 grafted shea butter tree wildlings, 90, 000 seedlings of assorted tree species (Eucalyptus, Avocado, Albizia, pine, Melia, Terminalia) were produced. A protocol for rearing, evaluation and release of *Selectroides neseri* (a parasitoid for control of Blue gum Chalcid) was developed and optimized; and 500 *S. neseri* were reared and released in Lake Victoria agro ecological zone.

4) Agro-machinery

NARO has solved the problem of physical rice grain loss, drudgery and labor shortage during rice threshing by adapting and disseminating two gender responsive designs of rice threshers: NARO lightweight rice thresher and ASI rice thresher, a design obtained through collaboration with Africarice. The lightweight rice thresher targets women, youth and smallholder farmers while the ASI targets large scale farmers. NARO has put in place sustainable approach of disseminating these threshers country wide through promoting grain hire service scheme businesses who are entrepreneurial farmers among farming communities and training technicians/artisans who operate their businesses close to farmers in fabrication and repair of the threshers.

In the design and development pipeline, NARO completed the modification of the shelling unit of the medium size motorized maize sheller. This modification shows a reduction in breakage level from 11% to 6%. Under development also is a kiln for smoking small pelagic fish species. The first prototype is under evaluation.

The first commercial prototype of Polycyclic aromatic hydrocarbons (PAH) safe fish smoking kiln is ready. Its fabrication is due to be completed. Design and workings drawings of the first 1st

prototype of liquid smoke distillation kiln ready.

5) Food Biosciences and Agribusiness

NARO has developed One fish product (fish powder) formulated from fish wastes (skins and bone) was characterized and culinary profiling successfully completed with an acceptability rate of 6.2. Its commercialization is ongoing. In addition, one (1) bean product; two (2) maize based products and two cassava based products were developed. Cassava waxing proved to keep cassava fresh for a period of one month. For all these products, being developed as commercial products with private entrepreneurs, consumer profiling and market testing has been successfully completed. In product development, NARO has developed two cost effective fish feeds for farmed fish, and four different products developed from fish.

NARO has developed a biodegradable film with antimicrobial properties from cassava. The Protocepts are under testing and the bio-films are ready for commercial testing.

NARO has also been mentoring incubatees in product development for selected companies and entrepreneurs. Two new incubatee companies are on board. These are in addition to 11 admitted previously. Three enterprises have graduated.

6) Sustainable Land Management (SLM)

NARO is conducting work in water, soil, Land management. The following have been achieved:

a) Zonal Profiles and Baseline Information

Comprehensive biophysical and socio-economic data and information has been collated, analyzed and documented in nine zonal profiles and nine baseline manuscripts.

b) Technology Packages

NARO has developed and demonstrated technology packages on Conservation agriculture (CA). The use of Permanent Planting Basins (PPBs) and rip lines in combination with improved seed and crop residues to create a mulch cover that reduces evaporation losses has consistently increased average grain yields by 50–200%, depending on the amount of rainfall, soil type, and fertility. With average yields of about 4 t ha⁻¹ for maize and over 1 t ha⁻¹ for beans these packages are helping farmers to bridge the yield gap between potential output vis-à-vis farmer outputs. The potential maize yield in Uganda is estimated to range from 3.8 to 8.0 t ha⁻¹, while that of beans is 2.0 t ha⁻¹. PPBs are being targeted for households with limited or no access to oxen, while ripping is meant for smallholder farmers with oxen.

NARO has developed and demonstrated technology packages on Integrated Nutrient Management (INM). Calcium-bentonite, a mineral resource mined in Uganda, has been tested on sandy soils in eastern Uganda. It has been established through these trials that Calcium-bentonite

used as a soil amendment on sandy soils in the dry eastern Uganda gives higher cereal and legume yields (indicate %ages).

Conservation Agriculture (CA) technology packages were developed and promoted (on maize and legumes profitability) within the different AEZs specifically targeting the youth, Efforts have progressed in development of hotspot maps for the different AEZs for decision making by the policy makers and other users.

c) The Uganda Soils Map

NARO is undertaking a nation-wide soils survey to update the soils map of the country at a scale of 1:50,000. The original map was drawn at 1:250,000 with limited details. Currently, six soil sheets out of 17 that comprise Uganda have been digitized and updated. These include: Masaka, Mbarara, Kabale, Fort portal, Kampala, and Jinja. The updated soil maps are now finer and more specific, and layers of information added include climate and weather. One package of soil erosion hazard catastrophic maps was generated for West Nile Agro-ecological Zone (WNAEZ). These have been disseminated to the different Local Governments (LGs) and communities in the zone.

d) The SLM Online Tools

NARO has developed and is managing (by NARL) an SLM Website (<http://www.slm.go.ug>). The Website provides information about the NARO SLM activities. Awareness was enhanced among 60 extension staff, agro-input dealers and NAADS service providers in three (3) AEZs on the potential of the Fertilizer Optimizer Tool (FOT) when giving fertilizer recommendations.

e) Rehabilitation of Degraded Rangelands

The productivity, functionality and carrying capacity of selected grazing lands during the dry season were determined in Nakasongola, Nakaseke and Kabong, Nakapiripirit and Amudat districts. This generated information shall aid development of sustainable grazing land management regime to prevent soil and rangeland degradation. A total 42 hectares of degraded grazing lands rehabilitated through bush clearing, anthill removal and palatable and nutritious herbaceous vegetation has been restored.

f) Irrigation Infrastructure

Three irrigation facilities, to determine the most cost effective irrigation method and to assess the yield performance of key commodity crops, have been established in three locations (Nakasongola Prison's Farm, Nakasongola District, Kiteredde, Kalungu District and NARL – Kawanda, Wakiso District).

g) Water for Production

Three valley tanks with total capacity of 40,000 cubic meters were constructed at Nakasongola

Prison Farm, Nakasongola District (12,000 m³) where the community has benefited in terms of water for production; Kiwumulo, Kalungu District (14,000m³) where a group of youth has benefited in vegetable production; and Ijuka Farm, Kinyogoga Parish, Nakaseke District (14,000m³) in terms of water for consumption and production. It is now possible to conduct irrigation and all year production. This work is ongoing. Eight shallow wells were constructed in Soroti District (3); Pallisa District (1); Luwero District (2); Nakaseke District (1); and Mukono District (1)

h) Laboratory infrastructure

The research capacity of the soils laboratory at NARL, Kawanda, which has led to more quality outputs and handling of more samples. The capacity to handle conduct soils and plant tissue sample analysis has been enhanced by the procurement of a soil analysis machine.

7) Managing Invasive Species

NARO has conducted nation-wide work to manage plant and animal invasive species. Uganda has been invaded by animal invasive species largely by **fall army worm**, and plant invasive species mainly ***Salvinia molesta***.

The Fall Army Worm (*Spodoptera frugiperda*), (Fall = Autumn (season in temperate zones) lost fruits because of: -

- a) The feeding habit of the pest;
- b) High reproductive capacity (1000 – 2000 eggs per female);
- c) Wide host range (>80 plant species): -
 - i. Cereals: maize, millet, sorghum, rice, wheat, and sugar cane; and
 - ii. Other crops: cowpea, peanuts, potato, soybean, cotton, banana, beans, elephant grass
- d) High migratory ability (>1000 km per annum);
- e) High propensity to develop resistance to insecticides (carbamates, pyrethroids, organophosphates) and Bt (Cry1F);
- f) Occurrence of sister species in Africa: In Uganda: maize- and rice-strains;
- g) Rice strain further divided into two matriline; and
- h) Total maternal lineages: Three

Following the invasion of the Fall Armyworm (FAW) (*Spodoptera frugiperda*), NISCU chaired and coordinated the National Task Team to assess the present and potential damage due to this rapidly unfolding emergency, and to discuss and devise a holistic national response action plan to control the FAW menace.

A master plan detailing salient action points and recommendations on the major areas identified as essential for effective management of FAW in Uganda, with strong inter-linkages among actors was developed and presented to government for action.

Figure 27: Ragged Feeding, and Moist Sawdust-Like Frass Near the Funnel and Upper Leaves. Deep Feeding in the Leaf Funnel May Destroy Developing Tassels



Source: NARO 2017

Figure 28: Plate 4: The Fall Army Worm Invasion & Damage Caused by FAW on Maize Cobs



Larvae move to the ear as plants begin to tassel and young ears become available. The ear may be partly or totally destroyed. Damage to the ear may be much more important than leaf damage.

a) **Emergency Control of Fall Army Worm**

NARO has developed recommendations for managing the pest

- a) Early planting
- b) Keeping gardens weed-free
- c) Physical removal and destruction of egg masses
- d) Placing sand/soil mixed with ash/lime into the whorl
- e) Destruction of crop residue
- f) Pesticide application -.
- g) Deployment of transgenics

b) Managing Kariba Weed

Following the invasion of the Kariba weed (*Salvinia molesta*), NARO and the Inter-Ministerial working committee on invasive species have developed and submitted to Government a national strategy for the sustainable management of *Salvinia molesta*. NARO has geo-mapped Kariba weed on Lake Kyoga (Lake Kwanja). The weevils for biological control of *Salvinia molesta* are now being reared and multiplied at Namulonge. NARO has established socio economic impacts of the proliferation of Kariba weed. Socioeconomic impacts of Kariba weed quantified are (disruption of fishing/breeding/nursery grounds) 21%, blockage of navigation routes 15%, prevalence of waterborne diseases 15% % & loss of fishing equipment and gears 15%. A draft policy brief for management of the Kariba weed has been developed.

c) Managing Invasive Alien Species

NARO has established the spread and abundance of invasive plant species in 70% of the Ugandan cattle corridor. Parthenium and cymbopogon are the abundant species. Strategies for management of parthenium and cymbopogon have been demonstrated to farmers in the cattle-corridor districts in Mazinga, Bushenyi.

3.6.1.5 Engagement of Agriculture Research Service Providers

NARO has increased the capacity to respond to demands for improved technologies, methods and practices through collaborative and competitive projects with agricultural research providers in the value chains. Ninety (90) research projects on commercialisation have been implemented by scientists from NARS; from universities (27%); private sector (19) and NARO (54%). Transformational outputs are accruing from the CGS activities including, but not limited to: -

- 1) Baits for management of fruit flies in mangos;
- 2) Transformation of traditional ghee processing into an economically viable business;
- 3) Production of feed pellets for improved performance of dairy calves and cows;
- 4) Isolation of compounds in plants with wound healing properties;
- 5) Development and commercialization of soil test kits,
- 6) Development of fish floating feeds a partnership with Makerere university;
- 7) Production of NARO honey bee,
- 8) bio-diesel production from waste vegetable oil; and

- 9) Restoration of citrus production at Kiige citrus scheme. Our focus to strengthen the weak link between the CGS outputs and the technology uptake pathways to make sure that technologies accruing from the CGS find their way into the mainstream NARO-generated technologies.

3.6.1.6 Promotion of Agricultural Technologies

NARO has been strengthening the research-extension interface by providing leadership in seed production and adaptive trials, empowerment of stakeholders, providing clean planting materials and provision of agricultural information. NARO has achieved the following:

1) Breeder and Foundation Seed Multiplication

NARO has spearheaded the development, multiplication and distribution of seed to stakeholders in the farming community. The table 43 below is a summary of the efforts of the organisation to ensure the Uganda as a nation is food secure and food self-sufficient in seed and improved planting materials for the farming community.

It must be recognised that Uganda is also source of seed and improved materials for DR. Congo, South Sudan, Rwanda among the neighbouring countries.

Table 42: Foundation Seed for Multiplication

Commodity (crop or livestock species)	Variety or breed	Seed type (breeder, foundation, certified, DQS)	Target	Achieved	
			(Qty= Kgs, cuttings, bales, etc.)	(Qty= Kgs, cuttings, bales, etc.)	
Coffee			1 Mt	500Kg of coffee seed	Availed to nursery operators
				50 Kg	Availed to Kyagalanyi and EADEN
	KP423 and SL14		1 Mt	311Kgs of Arabica seed	availed to farmers and nursery operators of Sironko, Bulambuli through UCDA and OWC
Maize	Various varieties	Certified	200 Mt	160 Mt	
		Certified	150 Mt		19 ha prepared
		foundation seed	100 Mt	40 Mt	
		Foundation seed	11mt		5.5 ha prepared
		Breeder seed	6 Mt		2.5 ha prepared
Maize and Sorghum	MM3, VPMaX	CERTIFIED	20 TONS OF MAIZE, 20 TONS OF VPMaX	24500	
Rice	Various varieties	CERTIFIED	20 Mt	20 MT	27 ha planted
	NERICA 4	Foundation	1 Mt, 1 Mt	0.4 tons	

Commodity (crop or livestock species)	Variety or breed	Seed type (breeder, foundation, certified, DQS)	Target	Achieved	
			(Qty= Kgs, cuttings, bales, etc.)	(Qty= Kgs, cuttings, bales, etc.)	
Sorghum	seso 1	Certified	2 Mt, 1 Mt	1 Mt	seso 1 ha and seso 3=4.5 ha prepared 20 ha= prepared other Varieties
	seso 3	Certified	2 Mt, 2 Mt	1 Mt	
Beans	NABE 15	Foundation	4,200 kg	≈ 3,000 kg,	<ul style="list-style-type: none"> • 60 ha planted, • 11 Mt foundation seed expected • 6 mt breeder seeder
Beans	NABE 16	Foundation	1,800 kg	≈ 1,500 kg	
Beans	NABE 17	Foundation	2,400 kg	≈ 1,800 kg	
Beans	NABE 19	Foundation	4,800 kg	≈ 3,600 kg	
Beans	NARObear1	Foundation	4,200 kg	≈ 3,600 kg	
Beans	NARObear2	Foundation	4,200 kg	≈ 3600 kg	
Beans	NARObear3	Foundation	1,800 kg	≈ 1500 kg	
Beans	NABE12C	Quality declared	1 tons	600kg (previous harvest)	
CASSAVA	NAROCAS1	Foundation	1,500,000 cuttings generated	89500 cuttings and accessed by 14 farmers in the zone	29 ha prepared
Cassava	NAROCAS 1	Foundation	Maintaining 27 acres of NAROCAS 1	Maintained 27 acres of NAROCAS 1	
Cassava	NASE 19	Foundation	Maintaining 3 acres of NASE 19	Maintained 3 acres of NASE 19	
Cassava	NAROCAS 1	Certified	20 acres	Not yet harvested	
Cassava	NAROCAS 1	Certified	20 acres	Not yet harvested	
Cassava	NASE 14	Certified	5 acres	Not yet harvested	
Cassava	NASE 14	Certified	5 acres	Not yet harvested	
Cassava	NAROCASS 1 (5 ha)	Foundation	1000 bags of stem cuttings	Nil	
Potatoes	Rwangume	foundation	80 tons		Not yet harvested
Potatoes		Pre-basic seed	20 tons	15.3 tons	=5 ha, on farm=0.5 ha, 10 tons in sept
		Basic seed	100 tons.	80 tons.	
Green gram		Basic	200 kg	100 kg	
Pigeon pea		Foundation	500 kg	229 kg	
		Basic	100 kg	62 kg	
Dairy cattle	Chloris gayana,	certified	Production of 4,500 kg of <i>Chloris gayana</i> seed and 300 bales of hay	2.5 MT	Gardens have been established with renewed rains.
	Glycine		100 kgs of Glycine	None	
	<i>Centrosema pubescens</i> (centro or butterfly pea)		Production of 100 kgs of <i>Centrosema pubescens</i>	None	

Commodity (crop or livestock species)	Variety or breed	Seed type (breeder, foundation, certified, DQS)	Target	Achieved	
			(Qty= Kgs, cuttings, bales, etc.)	(Qty= Kgs, cuttings, bales, etc.)	
	<i>Brachiaria brizantha</i>		.	10,000 bags of splits	
	disease tolerant Napier grass			1,000,000 cuttings	
	<i>Medicago sativa</i> (Alfalfa).			2,000,000 seedlings	
Fish			2,000,000	1,387,900 Nile tilapia seed	Produced and distributed
Fish			2,000,000	237,820 African catfish seed	Produced and distributed
Fish			1000,000	78000 Sex reversed Tilapia	distributed to 8 farms

Source: NARO 2017

Other than seed, seven (7) MT of silage were produced and availed to users for dry season feeding of cattle. The silage produced is sufficient to establish-1800 ha of forage which can support 4400 dairy cows annually.

2) Accessing Agricultural Technologies

NARO has been strengthening the research-extension interface by providing access to clean planting materials and agricultural information. NARO has achieved the following:

- Generated an assortment of improved planting materials for stakeholders (coffee=223,020 seedlings, coffee seed=1,250kgs); Banana suckers=2,042, cassava cuttings=1000 bags; 34,551 CWDr seedlings availed to farmers and 2,144 ready for planting; Potato=56,574 plantlets
- NARO has empowered 200 farmers in cost-effective and ecologically sound pasture restoration technologies. A total of 255 farmers of whom 58.8% (n=150) female have adopted and are now using 25 units of NARO lightweight threshers. Similarly, 30 farmers of whom 60% (n=18) female have adopted and are using the three (3) units of ASI threshers. The 285 farmers using the NARO lightweight and ASI rice threshers have reduced their grain physical loss during threshing from 4.8 to 0.1% and save 100 – 141kg/ha of paddy. At an average rice garden of one hectare per farmer, this means that these 285 farmers alone are able to save 28.5 – 40.2 tons of paddy per season. This is good quantity of food for the communities being served by these farmers. NARO has created six (6), grain hire service scheme businesses in northern Uganda, of these 67% (n=4) are owned by women and youth. These entrepreneurs are hiring out six units of the above threshers to others at a fee. Through this arrangement these farmers earn USD 180 – 835 per month as additional income. In a harvest season of three (3) months these farmers in northern hub therefore earn additional USD 540 – 2,505 per year. The hire service scheme therefore contributes to creating rural employment especially for the youth. For example, the youth recruited as thresher operators were earning USD 170 – 200/person and per month as additional income during the three months of rice harvest period in northern Uganda.
- NARO maintains mother gardens to generate clean planting materials. The following mother

gardens are maintained: (Bananas=10ha, Coffee=2ha, Cocoa=5ha, Mangos=10ha, Citrus=10ha, Apples=10ha).

- d) NARO has empowered 4013 stakeholders in 15 different subjects from 28 districts. NARO has produced and distributed an assortment of agricultural information materials to stakeholders.

3) Dissemination Through High End Adaptive Trials and Demonstrations

A combined high-end adaptive trial and demonstrations were set-up at ZARDIs in a not less than five acre plot and used to expose various NARO generated technologies to target end users in the respective agro-ecological zones. The relatively large scale trial and demo plots gave a close to reality picture than the conventional small plots. In addition to exposure, the demo plots were used to train farmers and school children in the best agricultural practices. The technologies adapted included near to release and recently released varieties of the priority food crops and pasture.

The demonstrated technologies ranged from productivity enhancing to value addition and product development technologies. Technologies promoted varied depending on commodity in question however, for most crops and pastures the technologies were improved varieties, especially those addressing issues of drought, adaptability and tolerance to diseases and pests. For livestock, dominated by goats and dairy cows, technologies demonstrated were mainly on breed improvement through artificial insemination and proven bull as well as improved nutrition and fodder conservation. Water conservation, harvesting and use for irrigation were also demonstrated in some ZARDIs. NARO established two (2) ram pump demonstrations at sites in the Kween and Kapchorwa districts to demonstrate the production of all year round vegetables using irrigation.

4) 5.5 Strengthening Technology Uptake Through Innovation Platforms

The multi-stakeholder innovation platforms (MSIPs) in agricultural sector are key in the dissemination of the agricultural research technologies for impact. MSIPs initiated in each of the nine zones are commodities based however the level of functionality of each MSIP has challenges and require capacity building. Seventy three MSIPs were assessed and less than 10% of them were found functional to a good extent. Majority needed revitalisation.

The reasons for failure of MSIPs to continue were also established and will inform the next MSIP establishment process. NARO has developed guidelines to support demand articulation, priority setting that have been used by the innovation platforms in setting the research agenda. The draft was tested through training ZARDI together with extension staff in the various zones on application of the guidelines. The NARI staff will be trained in the new financial year, and a final guideline document will be availed too.

5) Access to Agriculture Research Information

NARO has initiated the development of an information system to support research and seed

traceability. The Uganda Agriculture Research Information and Seed Traceability System (UARISTS) has been presented to NITA Uganda for validation and input for refinement.

6) Providing Support to Operation Wealth Creation efforts

NARO is participating in the Uganda Development Forum (UDF) established by OPM/OWC leadership. Under this arrangement, NARO has shared information on NARO technologies that can be disseminated through the OWC system.

3.6.1.7 Agricultural Research Capacity Strengthened

1) Human Resource Management

The Human Resource Management function in NARO is coordinated by the Directorate of Human Resources. The directorate is responsible for the management the entry of people into the organization (Recruitment), developing the capacities of staff to deliver on their mandate (training and development), managing the utilization of human resource (performance management) and managing the exit of people out of the organization.

The major investment areas in the human resource function in the financial year 2018/16 included:-

- a) Staff recruitment and promotion;
- b) Staff promotion;
- c) Training and development;
- d) Development of a new performance management system; and
- e) Managing the exit of staff out of the organisation.

2) Staff Establishment.

The NATIONAL Agricultural Research organisation has an establishment of 995 staff. As at 30th June 2017, 893 positions were filled while 105 positions were vacant. As summarised in the table below:

Table 6: NARO Establishment.

Staff Category	Required Establishment	Filled positions 30 th June 2017	Gaps
Directors	22	22	0
Scientists	283	276	7
Technicians	256	195	61
Support Staff	434	400	37
Total	998	893	105

Source: NARO 2017

3) Recruitment of Staff

In accordance with the approved recruitment plan for the FY2016/17, a total of 64 staff were

recruited in the categories and numbers summarized in table 7.

Table 43: Staff Recruitment in the FY 2016/17

Category	Male	Female	TOTAL
Scientists	31	07	38
Technicians	13	02	15
Support Staff	07	00	07
Senior Support Staff NAROSEC	02	02	04
TOTAL	53	11	64

Source: NARO 2017

4) Qualification of Recruited Scientists.

NARO as scientific originations aims to recruiting graduate scientist with Masters and PhDs. In the year under reference, thirty eight (38) scientists were recruited with qualifications summarized below.

Table 44: Scientists Recruitment in the 2016/17 by Qualifications,

Qualification of Scientist	Number
PhD	2
MSc	32
BSc	4
TOTAL	38

Source: NARO 2017

5) Promotions

In the financial year 2016/17 a total 132 members of staff in the various categories were promoted based on results of performance evaluation for support staff and technicians. For scientists an additional criterion of publication in peer reviewed journals was considered. Due to budgetary constraints, only staff who had not received any promotion in the last four years were considered. The number of staff promoted by category is summarized in the table below:

Table 45: Summary of staff promotions by category

Category	Number
Scientists	25
Technicians	62
Support Staff	45
Total	132

Source: NARO 2017

6) Training and Staff Development

During the Financial year under review, NARO continued to supported staff on both long term and short term training. Under long term training, NARO supported 31 staff on PhD and eight (8) on Masters. Out of the 31 PhD students, 12 are female and 19 are male, while out of eight (8) Masters Students, two (2) are female and six (6) are male. During the year, the following

achievements were registered under long term training: -

- a) 5 students completed their PhDs;
- b) 4 students defended their theses;
- c) 3 students submitted their theses for examination; and
- d) 5 out of the 8 MSc students completed their training.

Under short term training, the following achievements were registered: -

- a) 37 scientists trained in data analysis and reporting;
- b) 46 staff trained in Monitoring & Evaluation at UMI;
- c) 20 Directors and Senior Staff trained in Leadership and Change Management at CSC Uganda;
- d) 41 staff trained in communication and dissemination of research results;
- e) 8 staff were facilitated to attend international conferences; and
- f) Annual subscription fees were paid for 40 staff who subscribe to different professional bodies including ICPAU, ACCA, Institute of Internal Auditors, Human Resource Managers' of Uganda, Institute of Professional Engineers and Uganda Veterinary Association.

7) Performance Management

During the financial year, a new performance management framework that requires each to sign an annual performance agreement with his or her supervisor and which provides for outputs to be delivered in a financial year, performance indicators to measure the output and performance targets to quantify the expected level of attainment of the output. Jointly a new performance management policy and performance appraisal guidelines were approved.

8) Wage Enhancement

During the FY 2016/17, NARO received a total of UGX 3.5 billion for purpose of enhancing staff salaries: The funds were utilized as follows; 2.1bn was applied to increase staff salaries ranging between 10 - 14%, 938 million was used to pay the salaries of the 64 staff recruitment during the year while 384 million covered the increase in the wage bill occasioned by the promotion of one hundred thirty two (132) staff.

Salary enhancement was effected from July 2016 for existing staff; (Directors & Scientists received 14% increase; Technicians and Middle Level Support Staff 10% increase and General Support Staff 10% increase).

9) 6.1.8 Employee Separation

During FY 2016/17, a total of 37 staff separated from the organization for reasons summarized in the table below: -

Table 46: Summary of Staff Departure by Reason.

Reason	Scientists	Technicians	Support Staff	Total
Resigned	5	0	9	14

End of contract	0	0	1	1
Retired	3	2	9	14
Death	1	2	1	4
Contract Terminated	1	0	1	2
Absconded	1	0	1	2
Total	11	4	22	37

Source: NARO 2017

From the table above,

- 1) Seventeen 17 staff left the organization voluntarily through resignation, absconding and non renewal of contract,
- 2) Twenty (20) staff left for reasons beyond the control of the organization through death, retirement contract termination.
- 3) The overall annual turnover rate was 4.1% while the voluntary turnover rate was only 2%.
- 4) The very low voluntary turnover rate of 2% depicts a good working environment where staff is committed to stay with the organization.

3.6.1.8 Infrastructural Development

NARO has made more progress in infrastructure development. Twenty two (22) civil works structures were completed as follows.

1. Construction of Office Blocks, Laboratories, Conference facilities, Training Facilities in Bulindi, Kamenyamigo. At 70 % completion.
2. Construction of Animal Infrastructure Facilities (Cattle Shed and Construction of a Milking Parlour) at Nakyesasa. At 50 % completion.



Water Pump House



Perimeter Fence for Critical Infrastructure



Administration Block



Newly renovated staff house



New workshop for vehicles



Staff accommodation connected to power

Plate 3: Infrastructural Development at Nabuin ZARDI

3.6.1.9 Outcomes/Impact

A number of principal outcomes were registered during the FY 2016/2017, some of which are highlighted hereafter: -

7) Spurred Technology Uptake Through Increased Knowledge Dissemination

The NARO-led activities conducted under component 2 led to increased awareness and understanding of NARO's undertakings and technologies developed and available for uptake by various end-user categories. This increased knowledge gain continues to spur uptake of NARO's technologies, and hence increasing its visibility and that of its development partners that support its research and development projects. The events and avenues used to boost dissemination of the technologies included, but were not limited to the adaptive trials and demos at ZARDIs and district levels, the agricultural and trade show held in July, world food day show in October and agricultural dissemination conference in November 2016; then the World Bank Open Day in May and Agritec show in Nairobi held in June 2017.

8) Increased Productivity and Production

- e) Much as the project impact study is not yet conducted, it is anticipated that farmers who gained knowledge from the above-mentioned and other sources in NARO; and those who accessed quality seed, livestock dry-season feeding technologies and SLM-smart agriculture

technologies; and applied it as recommended, had and will have increased productivity of their enterprises.

- f) There is increased productivity on the farmers' fields as a result of developing and implementation of sustainable land management technologies such as tree planting, water harvesting and irrigation, terraces and contour bands, rehabilitation of degraded water sheds and grazing lands; generating informative soil erosion hazard maps, and passing bylaws.
- g) Additionally, the release and commercialization of higher yielding, disease/pest resistant/tolerant and better adaptable varieties for crops commodities such as sorghum, cassava, green grams and others has contributed to the increase in productivity in the country.
- h) There is increased production resulting from an increased availability of improved NARO technologies through early generation seed production which is accessed by seed companies (Breeder seed), community seed multipliers and farmer groups (Foundation seed).

9) 8.2 Increased Human Health

There has been an increase in human health as a result of release and commercialization of bean varieties with enhanced amounts of iron (Fe) and Zinc (Zn), which are very essential for human health especially among pregnant women and children.

10) Labour Saving Technologies

There is a reduction in drudgery through the development of labour saving machinery such as the light-weight rice thresher and hydraulic ram pump technologies by NARO's Agricultural engineering institute at NARL-Namalere. There is increased knowledge about use of appropriate irrigation and water management technologies through guidelines that were developed and disseminated to farmers.

There is also better Agro-processing of fish with the development of the NARO PAH-safe fish smoking kiln prototypes.

11) Increased Knowledge (Patenting IP)

- d) There has been an increase in knowledge through novel scientific findings generated through competitive grant scheme (CGS) which have presented an opportunity for the first time in NARO to patent and protect intellectual property rights. This is likely to contribute towards internal financing of NARO research.
- e) There is an increase in knowledge and understanding on fisheries production management through provision of updated information such as draft policy brief for management of the Kariba weed, geo-referenced information and map for fish breeding areas, appropriate harvesting technologies, efficiency of *Mukene* fishing rig and performance of floating and submerged light attraction technologies.
- f) There is also an increase in knowledge and understanding on Invasive Alien Species (IAS) including the deadly *Parthenium hysterophorus*, *Salvinia molesta* and the Fall Army Worm

(FAW) through provision of appropriate and updated information to the stakeholders. This has boosted awareness levels amongst farming communities leading to sustained destruction of the invasive species from both public and private lands by the informed citizenry.

12) Increased Efficiency Through Enhanced Research Capacity

- c) There is a noteworthy enhanced research capacity within NARO resulting from support for long term capacity building interventions, which have contributed to the pool of resources already available to deliver on the mandate of NARO. The PhDs have added capacity in the fields of Agriculture and Natural Resources, Entomology, Plant breeding and Pathology, Knowledge Management, Aquaculture and Veterinary Tropical Diseases.
- d) There is also an enhanced research capacity as a result of construction of 22 buildings within the PARIs, which has contributed to an improved working environment for NARO scientists and technicians. Basic research laboratory analysis is now handled within the institutes cutting back on the time and resources spent on travel to major analysis centres overseas.

3.6.1.10 Challenges and Opportunities encountered in the FY2016/17

The principle challenges that affected implementation of activities were: Institutional, Socio-economic and Policy as shown in the following table: -

Table 47: Challenges and Opportunities

Challenges	Opportunities
Livestock research has no committee for release of technologies or practices.	Appointment of a livestock technology release committee
1. The recurring disease and pest epidemics. 2. High pest incidence and damage especially for stem maggot, defoliation beetles, flower beetles and storage weevils	1. Strengthen national capacity for surveillance for pests and diseases 2. Establishing Mitigating measures to control pests and in long term develop varieties that could resist pest damage
Poor soils.	Strengthen soil management development frameworks
Low funding (characterised by unsustainable investment for science and technology, Delayed release of funds, budget inadequacy, Non-sustainable and unpredictable funding, occasional budget shortfalls).	strengthen agricultural research funding including ring-fencing the funds for research including a mandatory 1% of the National Budget as proposed by Research Agenda for Agriculture in Africa
Weak research-extension farmer – linkages (characterised by Weak dissemination of research findings (<i>first causality for every budget shortfall</i>), weak up-scaling on farm and on-station research demonstrations, Low technology uptake, Low self-motivation (negative mindset) on the part of farmers to embrace opportunities, weak gender and youth engagement).	1. Strengthened the agricultural extension system at all levels 2. Ring face funds for technology up scaling and promotion 3. Avail Funds for farmer, women, youth engagements (There are regular budgetary restrictions <u>on workshops and travels</u> which in turn affect off station engagements with these groups afar off)
Policy	Delay in enactment of the Biotechnology and Bio-safety Bill 2012
Climate change and Prolonged dry spell and intermittent rainfall in nearly all production agro-ecologies.	1. Establish early warning, response and recovery systems (drought, floods, landslides, food and nutritional insecurity, pests and diseases). 2. Setting up a comprehensive irrigation facility
Low participation and investment by the private sector in R&D	Strengthen linkages with the private sector in research

Challenges	Opportunities
Inadequate human resources and equipment.	In line with #4, agricultural research funding should continue to attract, retain, maintain, train and motivate Ugandan scientists and support staff.
Inadequate equipment.	In line with #4, agricultural research funding should continue to facilitate the acquisition of the state-of-the art and state-of-the range equipment.
Inadequate basic/foundation seed	Increased investments in basic and foundation seed production
Conflict with community over grazing areas - Nabuin	Community sensitisation and boundary opening and fencing the institute

Source: NARO 2017

3.6.1.11 Proposals to Bridge Yield Gaps

1) Gaps and opportunities

NARO recognizes the fact that there are still gaps in research and development that are yet to be fully addressed. These present opportunities for further investment as indicated below;

a) Gaps

- i. Changing trends in biotic and abiotic environments necessitating improvement in existing technologies and /or development of new technologies
- ii. Low adaptability of crop, tree, livestock and fish varieties/ breeds to climate variability
- iii. Low yielding varieties and their steady genetic degeneration due to increasing pathogen/virus load
- iv. Low nutrient density of some crop varieties
- v. Poor genetic quality of animal genetic resources, coupled with poor nutrition
- vi. Low understanding of the farming systems in the different AEZs and NAROs contribution to improving them
- vii. Inadequate capacity for pest and disease surveillance
- viii. Inadequate pathogen diagnostic capacity
- ix. Lack of control/ management packages for old and new disease and pest epidemics
- x. Devastation of crops, livestock, forestry and fisheries resources by outbreaks of pests and diseases
- xi. Low density and coverage of adaptive trials and demos to promote NARO technologies
- xii. Persistent yield gap between on-station and farm level productivity
- xiii. Low capacity to produce quality seed (breeder & foundation seed of crops, forage and fish) and conduct core field based research all year round
- xiv. Lack of capacity for postharvest processing, storage and packaging of seed produced by PARIs
- xv. Low energy and drudgery/draught power saving technologies for improving productivity
- xvi. Declining Soil fertility and low coverage natural resource management interventions
- xvii. Inadequate research capacity in scope of prevailing challenges (human resources, infrastructure such as specialised Laboratory Equipment and finances)
- xviii. Inadequate ICT integration in agricultural research

b) Opportunities

- i. Understanding of farming systems in the different AEZs and establishing the extent to which previously released and adopted technologies have improved the farming systems and impacted people's lives.
- ii. Development of new or improvement of existing technologies with increased resilience to biotic and abiotic constraints.
- iii. Increased focus on bio/fortification through development of crop varieties with enhanced nutrition.
- iv. Development of durable technologies to boost production and productivity in different environments.
- v. Improvement of pest and disease surveillance through development of integrated options including but not limited to use of computerized early warning systems.
- vi. Improvement of pathogen diagnostic capacity through development of NAROs laboratory capacity.
- vii. Urgently respond to the FAW by understanding its distribution, genetic diversity, effect on yield, response to selected pesticides, host plant resistance, developing a surveillance strategy and exploring bio-control strategies.
- viii. Development of more up-to-date and relevant Integrated Pest/Disease Management (IPDM) packages for the control of old and new pests and diseases.
- ix. Develop agro-engineering technologies that reduce drudgery, save power and increase productivity for resource poor farmers.
- x. Increase the development and dissemination of sustainable land management (SLM) technologies and interventions for increased productivity.
- xi. Increase density and coverage of adaptive trials and demos for an increased promotion and diffusion of NARO technologies.
- xii. Develop capacity of NARO PARIs in production of early generation seed and conducting core field based research through installing of irrigation systems to enable all year round seed production and field trials.
- xiii. Develop the capacity of NARO in seed postharvest handling through establishment of a seed processing facility.
- xiv. Further development of NAROs research capacity in human resources and infrastructure.
- xv. Research leadership in gender and youth responsiveness to boost productivity while at the same time creating employment.
- xvi. Responding to increasing political demand for tighter connections between agricultural research and industries.
- xvii. Exploiting the potential of the youth and women as a trigger for accelerated agricultural research for people impact.

3.6.1.12 JASAR 2016 Issues Raised and Updates on Progress

The following table presents the issues that were raised in HJASAR 2016 and the manner in which NARO addressed them. Some of the actions have been carried forward to this FY for reasons of need for action by other key MDAs.

Table 48: Issues Raised and Updates on Progress

Issues Raised	Update on progress
National Concerns	
Persistent Land Encroachment	<ul style="list-style-type: none"> • A survey company has been hired to open boundaries in locations where there is high threat: Kigumba and Botanical Gardens • Engaged Uganda Land Commission and the Minister for Lands where NARO obtained assurance for lease offers of 99 years. • NARO has continued to defend matters in court (Mbarara ZARDI- two cases; Ikulwe – one case; Senge- NARL) • Management has interfaced with the Commission of inquiry on land issues, investigations still on-going.
Persistent Land Encroachment	<ul style="list-style-type: none"> • A survey company has been hired to open boundaries in locations where there is high threat: Kigumba and Botanical Gardens • Engaged Uganda Land Commission and the Minister for Lands where NARO obtained assurance for lease offers of 99 years. • NARO has continued to defend matters in court (Mbarara ZARDI- two cases; Ikulwe – one case; Senge- NARL) • Management has interfaced with the Commission of inquiry on land issues, investigations still on-going.
1. Delayed Biotechnology and Bio-safety Bill Enactment	The bill is still before parliament awaiting consideration and possible passing.
2. Poor Information Dissemination of Proven Technologies	<ul style="list-style-type: none"> • NARO has seventy demonstrations across the nine ZARDIs (Maize, beans, rice, cassava, pasture, sorghum, sweet potatoes) each covering one acre • Farmer field days were conducted in Namutumba, Tororo, Pallisa, Bukedea and Kasese • 4013 stakeholders from 28 districts have been trained in crops, fish, soil and forestry and nursery management
3. Limited access to and availability of Technologies	<ul style="list-style-type: none"> • Seed production (Found/Basic/Breeder) • Beans = 12.3 MT; Pasture Seed = 24.5 MT; Potato = 10 T; Sorghum = 2 MT; Pigeon Peas = 229 Kg; Coffee = 1.2 MT; Nerica4 = 0.4 T; Potato pre-basic = 15.3 MT, Nile Tilapia seed (1,387,900), African Cat Fish (237,820) produced and distributed and Sexed reversed tilapia produced and distributed to eight farms • Generated improved planting materials: 223,020 coffee seedlings have been availed to farmers
4. Inadequate Funding	<ul style="list-style-type: none"> • DG presented the spending pressures to presidential Advisory Committee on Budgeting (PACOB) to sustain research and commit at least 1% of the national budget • Efforts are in place to mobilize funds through the ECAAT Project; a committee has been appointed to develop a national irrigation project;
Regional Concerns	
5. Improve and enhance Research-Extension-Farmer Linkage	<ul style="list-style-type: none"> • Partnership framework with the MAAIF • Technology up-scaling carried out at the ZARDIs in collaboration with MAAIF and District Local Government Extension Staff • ATP restructured and staff recruited • Increased density of on-farm trials and demos <ul style="list-style-type: none"> • ZARDI realignment to have outreach programme
6. Promote commercialization of Technologies	<ul style="list-style-type: none"> • About 46 projects on commercialization of technologies are currently being implemented under the CGS (Annex on the 46 CGS is available)
Issues Raised	Update on progress
National Concerns	

7. Intensify and popularize piggery, Fish and poultry farming technologies	<ul style="list-style-type: none"> Initiated work on improving, diversifying piglet nutrition options and up-scaling pig Artificial Insemination (AI) Efforts are in place to develop and improve the productivity of egg and meat for local chicken
8. Cost-Benefit Analysis of Technologies on-station and on-farm	<ul style="list-style-type: none"> Work has been initiated on house garden farming technologies and vegetables Cost benefit analysis conducted on cassava and beans

Source: NARO 2017

3.6.2 National Agricultural Advisory Services (NAADS)

3.6.2.1 Introduction

Since the commencement of FY 2014/15 to date, the major component of the NAADS/OWC programme for the Agricultural Sector has focused on the following major output areas: -

- 1) Management of agricultural input distribution chains;
- 2) Strategic interventions for priority commodities under the commodity approach, including multiplication of planting and stocking materials;
- 3) Agribusiness development; and
- 4) Value chain development focusing on the upper end of the chain.

At the beginning of the Financial Year 2016/17, Government provided strategic direction aimed at concentrating resources on strategic priority areas to ensure greater impact on household incomes and national export earnings. Accordingly, emphasis of the NAADS/OWC programme interventions was on the key strategic crops for income/export, namely, coffee, Tea, Fruits (Citrus, Mangoes, pineapples, apples) and cocoa.

Hence the greater part of the NAADS/OWC budget for the Financial Year was allocated to supporting the key strategic crops through mostly provision of planting materials. Also note that Interventions for food security were prioritized particularly during season A 2017 due to the fact that a number of Districts were affected by the prolonged dry season during season b 2016. Under food security interventions, seed/planting material for a number of commodities, including maize beans, cassava and banana was distributed to over 78 Districts; and for sorghum, cowpeas and rice to a few districts in Karamoja and Acholi Sub-regions. These interventions emphasize use/promotion of early maturing crop varieties and ensuring early field operations.

3.6.2.2 Performance

During the FY 2016/17 (July, 2016 to June, 2017), the NAADS Secretariat procured and distributed various agricultural inputs, planting materials (seeds/seedlings) and stocking materials. These outputs were conducted in line with the national, zonal and district priority and specific commodities as well as the agricultural inputs requirements identified under Operation Wealth Creation (OWC). The performance from July, 2016 to June, 2017 (FY 2016/17) is summarized below;

3.6.2.3 Provision of Agricultural Inputs to Farmers

3.6.2.3.1 Crop Enterprises

Table 49: Summary of Food Security Enterprises

Planned Enterprise (Food Security)	Delivered Quantities	Expected Acreage to be established	Expected number of Households to be supported	Acreage after Survival Rate	Expected Yield per Year
Provision of Maize (Kgs)	9,278,530	927,853	3,711,412	603,104	904,656,675
Provision of Beans (Kgs)	1,644,820	41,121	164,482	26,728	21,382,660
Provision of Sorghum (Kgs)	21,000	5,250	21,000	3,413	2,730,000
Provision of Simsim (Kgs)	59,129	14,782	59,129	9,608	3,074,708
Provision of Rice (Kgs)	10,000	400	800	260	390,000
Provision of Cow peas (Kgs)	72,000	3,600	14,400	2,340	1,872,000
Totals	11,085,479				

Source: NAADS 2017

Table 50: Summary of Crops that were Strategic in Nature

Planned Enterprise (Strategic interventions)	Delivered Quantities	Expected Acreage to be established	Expected number of Households to be supported	Acreage after Survival Rate	Expected Yield per Year	Expected Revenue per year
Tea (Seedlings)	133,412,140	26,682	53,365	17,344	41,624,588	226,437,756,979
Citrus (Seedlings)	17,818,210	146,051	292,102	94,933	1,737,275,475	868,637,737,500
Mangoes (Seedlings)	12,637,128	180,530	361,061	117,345	3,159,282,000	1,579,641,000,000
Cocoa (Seedlings)	4,657,971	10,351	41,404	6,728	6,728,180	94,194,524,667
Apples (Seedlings)	994,121	2,485	9,941	1,864	41,007,491	123,022,473,750
Pineapples (Sucker)	13,890,000	1,389	5,556	1,042	31,252,500	31,252,500,000
	183,409,570	367,488				

Source: NAADS 2017

3.6.2.3.2 Other Strategic Intervention

Other agricultural inputs for Strategic interventions supported include: -

- 1) 40 tractors and matching implements to support strategic interventions in the dairy value chain for pasture development were delivered and distributed in 9 DLGs in South Western Uganda

- 2) 5,000 Kgs of pasture and legume seeds *Chloris gayana* (Rhodes grass and) and 1,000kg of Dolichos Lab lab seeds were distributed to 40 farmer clusters in 8 districts of South Western Uganda.
- 3) 400 acres of pasture seed multiplication sites were prepared and planted with *Chloris gayana* and Centrosema in eight Districts

3.6.2.3.3 Livestock

Procured and distributed Livestock under Operation Wealth Creation including;

- 1) 4,414 dairy heifers delivered in 115 DLGs;
- 2) 118 beef bulls procured and distributed in 17 DLGs;
- 3) 3,194 improved goats (boar/savannah) delivery and distribution completed in 23 DLGs (delivery yet to be made in two DLGs of Kotido and Kiruhura);
- 4) 15,500 Kuroliers birds procured and delivery of poultry materials to special interest groups (women and youth groups), Kamuli and Amudat DLGs on-going
- 5) 26 Artificial Insemination (AI) Kits procured awaiting delivery to 22 District Local Governments and KCCA
- 6) Staff from 28 DLGs are undergoing training in Artificial Insemination technical /skills at Ruhengere field station in Kiruhura DLG
- 7) 11,200 day old broiler chicks delivered to special interest groups
- 8) 22,400 Kgs broiler starter mash and 44,800 Kgs broiler finisher mash delivered to special interest groups
- 9) 212,200 day old layer chicks have been procured and delivery & distribution on-going to special interest groups and 46 DLGs
- 10) 509,280Kgs of chick and duck mash, 439,400kgs of growers' mash procured and being distributed special interest groups and 46 DLGs
- 11) 2,975,518 tilapia fingerlings, 1,605,233 cat fish fingerlings and 81,551 mirror cap fingerlings procured and being distributed in 59 DLGs
- 12) 212,560Kgs fish feeds have been procured and being delivered in 59 DLGs
- 13) Delegated procurement of 3,000 young bulls for fattening at National Enterprise Corporation (NEC) Katonga under the Meat Export Support Services (MESS) Project.
- 14) Delegated procurement for design and construction of holding grounds and quarantine stations for slaughter stock at National Enterprise Corporation (NEC) Katonga (Gomba DLG) under the Meat Export Support Services (MESS) Project.

3.6.2.3.4 Support Agricultural Value Chain Development

- 1) 2 tractor operated chaff cutters and 2 fodder cutters were procured and distributed to 4 farmer groups and clusters as part of pasture improvement programme for dairy feeding in South Western Uganda.
- 2) 15 milk coolers procured in financial year 2015/16 were delivered and installed at sites of 15 dairy farmers' groups in 10 District Local Governments of Masindi, Luuka, Ngora, Gomba, Nakaseke, Sembabule, Lyantonde, Kiruhura, Isingiro and Mbarara around the country.

- 3) Construction civil works for the proposed structure to house the Nangabo Poultry Hatchery Project, Wakiso District commenced.
- 4) Six (6) solar water pumping systems were installed at 6 beneficiary sites in Wakiso, Luwero, Moroto, Kitgum, Soroti and Katakwi District.
- 5) Installation of 10 Community Aggregation stores under the partnership between NAADS and WFP is ongoing on all sites in the Central, Southwest and Mid-western Uganda.
- 6) Due diligence on food and nutrition solution ltd as potential private partner in establishment fruit processing plant in Yumbe District conducted
- 7) One cassava drier delivered and installed at Tubur Farmers' Cooperative site in Soroti District.
- 8) Seventeen (17) milk coolers procured in financial year 2016/17 were delivered and installed at sites of 17 dairy farmers' groups in 13 District Local Governments of Kyankwanzi, Kiryandongo, Bugiri, Sironko, Kabong, Kamuli, Serere, Oyam, Sembabule, Kayunga, Kamwenge, Buhweju, and Kiruhura around the country.
- 9) Construction works for the proposed Nalugugu Fish Hatchery at Nalugugu fish farm in Sironko District initiated.

3.6.2.4 Challenges

- 1) Several parts of the country experienced unfavorable weather conditions which affected timelines of delivery and distribution of planting materials particularly in the Teso and Karamoja sub regions sometimes resulting into wastage of planting materials and low crop survival rates.
- 2) Inadequate Extension services-weak linkage between provision of agricultural inputs and provision of agricultural extension services as some districts have hitherto not yet completed the recruitment of extension workers while mobility and general functionality of the extension service in Local Governments is still constrained by lack/limited budget facilitate operations.
- 3) Unguided massive production of planting materials among nursery operators (especially for tea, mango and citrus seedlings) way beyond what the available resource could support to procure and distribute.
- 4) Overwhelming demand for inputs against a limited budget; although this is gradually being addressed with continuous increase in budget allocations to the programme.
- 5) Reported incidences of poor quality of stocking/livestock and planting materials.
- 6) Insufficient budget for programme coordination and management of input distribution, including mobilization of farmers and communities at both district and sub county LG
- 7) A serious mind-set problem, especially among the youth who have negative perception towards agriculture which they associate with poverty and hard work
- 8) Poor information flow and coordination among stakeholders and actors at the different levels
- 9) Growing incidences of pests and diseases notably the recent outbreak of the fall army worm which cause devastating effects crops
- 10) Inadequate farmer preparedness in many Districts.

3.6.2.5 Lessons

- 1) Involvement of farmer groups offers better results arising mostly from better use and/management of inputs, including creating a sense of ownership, consequently improved survival rates.
- 2) Team work and coordination amongst stakeholders leads to success in the distribution, targeting, implementation, monitoring and follow up and overall effective service delivery
- 3) Timely planting is key in attaining good crop performance.
- 4) The performance of the planting materials varies across agro ecological zones due to the different ecological conditions;
- 5) Survival rates for crop materials were approximately between 40 – 90% due to the adverse weather conditions experienced, with the improvement arising from the better weather conditions experienced during season A 2017.
- 6) Deepening delivery of agricultural inputs to parish level could improve access by beneficiaries and reduce losses arising from stress and multiple reloading
- 7) Timely identification, preparation, guidance and supervision of farmers will improve the implementation of the program.
- 8) There is need to conduct pre-delivery and post-delivery inspection by District Local Governments Subject Matter Specialists (especially pre-delivery inspection for vegetative planting materials must be adhered to.
- 9) Continuous quality assurance of stocking and planting materials is key for survival rates and overall improvement in the performance of the materials

3.6.2.6 Opportunities

- 1) Strong high level political and technical support of the NAADS/OWC Programs (agricultural emphasized in the ruling party manifesto)
- 2) Increased funding opportunity by the Government of Uganda and support from Development Partners
- 3) Existence of the NDP and ASSP 2015/16 – 2019/20 policy frameworks clearly stipulating the agricultural sector and NAADS activities in particular.
- 4) Commitment by the OWC team to ensure that the small holder farmers and other key stakeholders benefit from NAADS interventions
- 5) Improving collaboration among key stakeholders and actors in the implementation of the NAADS/OWC programme, particularly with regard to quality assurance through inspection and verification of the quality of materials.

4.1 Overall Performance

In summary, the review revealed that: -

- 1) Under budgetary performance, MAAIF and its Agencies managed to By the end of June 2017, UGX 722.629 Bn had been released, of which UGX 712.114 Bn was spent on the various activities of the different institutions in the sector. Funds released were to the tune of 84.6%. The Ministry and its agencies managed to absorb 98.5% of the GoU funds for implementation of the various planned activities and outstanding commitments;
- 2) Largely due to the drought, the growth of the agriculture sector fell from 2.8% in 2015/16 to an estimated 1.3% in 2016/17 and all sub-sectors of the agriculture sector registered a decline or no growth from the previous year;
- 3) Export volumes and values of commodities under crops, livestock and aquaculture manifested significant increases. Capture fisheries, bananas and rice registered declines in volumes and values.
- 4) According to the MoFPED BMAU report the sector registered highest service delivery performance at 75.42 % when compared to 9 other sectors that are annually tracked;
- 5) Several policies were formulated, reviewed, approved and even launched while a number are at dissemination stage. However, most of policies are still at draft stage and still in the process of consultation or awaiting approval from the TPM. The Biotechnology and Biosafety Bill is still awaiting consideration in Parliament but MAAIF is optimistic that enactment is not far off;
- 6) The revamped agricultural extension system is finally off the ground with recruitment in almost all the LGs structures. MAAIF is now in the process of acquiring logistics and other facilitation to address operationalization of the services.

4.2 Sub Sector Performance

4.2.1 Crop Subsector (12 Commodities)

4.2.1.1 Coffee

The cumulative volume of exports for the period July 2016 to June 2017 was 4,186,606 60-kilo bags (3,188,810 bags of Robusta and 997,796 bags of Arabica) compared to 3,556,692 bags in 2015/16, representing an increase of 18%. The performance of coffee exports for the FY 2016/17 was 112% of the projection.

The cumulative value of exports realized was USD 490 million (Robusta USD 350 million; Arabica USD 140 million) compared to USD 351 million (Robusta USD 249; Arabica USD 102) for the previous FY, a 40% rise over the previous period. The export value performance was 99% of the projection.

During the FY, a total of 54.544 MT of seeds comprising of 50.504 MT of Robusta and 4.04 MT of Arabica were distributed to 556 nursery operators spread across the five coffee growing regions. This represents a total of 285 million coffee seedlings generated and out of this, 172 million were distributed and planted by 521,540 coffee farming households spread across the five regions in the 96 coffee growing districts. Generally, seedlings generation capacity increased from 44 million in FY 2012/13 to 285 million in FY 2016/17. The seedlings planted has also increased from 13 million in FY 2012/13 to 104 million in FY 2016/17 assuming a survival rate of 70%.

4.2.1.2 Cotton

Cotton lint production increased from 27,950 MT in FY 2016/17 as compared to 20,339 MT that was produced in FY 2015/16. The quantity of lint exported was 25,994 MT in FY 2016/17 as compared to 19,242 MT that was exported in FY 2015/16. The value of lint exported was USD 41.64 Million in FY 2016/17 as compared to USD 25.81 million in FY 2015/16. Approximately, 1,956 MT of Lint were consumed locally in FY 206/17 compared to 1,097 MT that was consumed in FY 2015/16.

4.2.1.3 Tea

Tea production trends in Uganda were 65,900 MT in 2014; 67,000 MT in 2015 and 69,000 MT in 2016 showing consistent increment over the years.

4.2.1.4 Cocoa

Cocoa production trends were: 19,430 MT in 2013; 22,010 MT in 2014; 24,008 MT in 2015 also representing a consistent increment over the years.

4.2.1.5 Vegetables Oil Crops

In 2016 alone, the oil palm development activities in Kalangala (nucleus estate and smallholders) produced 106,867 MT of oil palm fresh fruit bunches from which 27,198 MT of crude palm oil was produced valued at USD 24.5 million. The private sector partners, Oil Palm Uganda Limited and BIDCO Uganda Limited also paid Government of Uganda income and value added tax worth UGX 157.4 billion.

A total of 120 (M=88 F= 32) smallholder oil palm farmers with mature oil palm farms benefited from the commercial loan have paid back UGX 537,426,281, and the loan is completed.

4.2.1.6 Rice

Rice production decreased by 0.33 % from 238,190 MT in 2015 to 237,390MT in 2016. Most of the rice is consumed locally. The area under rice cultivation increased by 1.9% from 95,277 Ha in

2015 to 97,140 Ha in 2016. The volume of Rice exported was only 22.2% (52,754 MT) of total production in 2015 as compared to 57,053 MT in 2014.

4.2.1.7 Maize,

Maize production increased from 2,812,920 MT in 2015 to 2,912,540 MT in 2016. The Volume of export for Maize was 358,308 MT registered in 2015. There was an increase in area planted under maize from 1,125,168 Ha (2015) to 1,137,410 Ha in 2016. Maize export volumes also increased from 134,903MT in (2014) to 358,308MT in (2015, valued at USD 42.565M and USD 90.897M. (MAAIF Stat. Abstract, 2015/2016).

4.2.1.8 Beans

Beans production output increased from 1,079,943 MT in 2015 to 1,104,770 MT in 2016. While the area planted under beans increased from 674.290 Ha in 2015 to 683,120 Ha in 2016. The export volumes for beans and other pulses increased from 39,483 MT (2014) to 157,152MT in 2015, valued at USD 26.050M (2014) and USD 62.693M (2015) respectively.

4.2.1.9 Cassava

Cassava production increased from 2812 MT in 2014 to 2983 MT in 2015, while MAAIF established a cassava seed system and cassava propagation base for 1000 farmers where 40 mother gardens of NASE14 were established in Kiryadongo, Masindi, Hoima and Buliisa.

4.2.1.10 Banana

Banana production output trends were: 4,574,470 MT in 2014; 4,623,370 MT in 2015 and 4,530,880 MT in 2016. The decrease in production in 2016 was due to the prolonged dry spell which affected the major banana producing areas in South Western Uganda.

4.2.1.11 Fruits and Vegetables

Vegetable production and productivity increased (compilation of statistics was still ongoing).

4.2.1.12 Irish Potatoes

There was a slight increase in potato production, from 173,092 MT in 2015 to 173,610 MT in 2016 with the highest output achieved in 2012 (185,100 MT).

4.2.1.13 Pests and Diseases Control

A number of achievements registered including; despite high prevalence levels of FAW infestation in the first season of 2017, its damage was contained at 16.5% except for Karamoja

where the damage was >50% due to limited presence of pesticide stockists; a reduction in BBW prevalence from 7.8% in 2016 to 6.3 % in 2017; MLN prevalence is currently at 2.5% down from 3.4% in 2015/16 FY; a reduction in coffee twig Borer prevalence from 38.9% in 2015/16 to 22.7% in 2016/17 FY while the Bronze Bug has affected all LGs in in South-Western, Central and eastern Uganda are all affected and pest prevalence amongst eucalyptus plantations is at >70%.

4.2.1.14 Crop Inspection and Certification

A number of guidelines were developed for the Agricultural Chemicals and (Control) Act 2006 and Seed and Plant Act 2006 but awaiting approval by TPM; an inspection and Certification Manual ready for TPM approval as well as SOP for false codling moth also awaiting approval by TPM. The counterfeit products are emerging in the market and are difficult to detect. This is because the approved labels are scanned and reproduced making them very similar to the approved labels. There was reduction of repackaged products constituting 3% of the total quantity impounded as compared to last FY 2015/16, as result of improved enforcements and inspections coupled with court prosecutions.

There was also improved compliance by the flower farms towards conformity to EU required standards as result of sensitization, regular inspections and audits by Inspectors. The acreage under seed crops 25,265 Ha increased by 20.6% compared to FY2015/16 This increase was largely due to more land allocated to seed crop production. There was also improved compliance to seed regulations as result of regular inspections and enforcements while 23 crop varieties were approved by Variety Release Committee and released for commercialization.

There was an increase of 29.5% phytosanitary certificates issued. Horticultural exports were about 6,193,451 kg equivalent to USD 15,483,627.50 while there was improved enforcement by working with Agriculture Police.

4.2.1.15 Food and Nutrition Security

The national food security analysis report of January 2017 indicated that the number of food secure households reduced from 83% to 69% of the national population. This was classified as being minimally food insecure (**Phase one**), this population has access to a stable food security and access to a variety of adequate food both from household stocks and markets. However, 26% of national population was facing stressed food insecurity (**Phase two**), accessing minimum adequate food consumption and employing insurance strategies; and 5% of the population was found to be in crisis (**Phase three**), this population had widening food consumption gaps with deteriorating dietary diversity and high malnutrition rates. The Uganda Demographic and Health Survey (UDHS, 2016) indicated that 29% of children below five (5) years are stunted (short-for-age). Stunting ranges from a high rate of 41% in Toro region to a low rate of 14% in Teso region. The report also indicated that stunting is higher in children from rural areas (30%) as compared to children in urban areas (24%).

4.2.2 Fisheries Subsector

Under capture fisheries, the FY witnessed continued decline in fish production from 396,205 MT in 2015 to 389,244 MT in 2016 with decreases in total fish production caused by increased enforcement by the Fisheries Protection Force. Small pelagic fishes have continued to emerge as predominate catch while the main commercial species caught included Nile perch, Tilapia and Mukene on all major water bodies.

In the year 2016, exports of various fish products to international markets decreased from 18,785 MT in 2015 to 16,168 MT in 2016. This resulted in decline in value from 123.117 million USD in 2015 to 88,970 million USD in 2016. Over 50 potential fish breeding areas identified and demarcated in collaboration with NaFIRRI.

Under aquaculture, a comparison of production figures for 2014 and 2015 shows that aquaculture production grew by 8.4%, although this fell short of the set target of 15% per annum. The growth resulted in a total increase in yield for both fish ponds and fish cages to an estimated 120,360 MT. The estimated number of farmers involved in aquaculture has increased from 15,000 in FY 2015/16, to 16,200 farmers in FY 2016/2017, it's important to note that these number are evenly distributed through the country. Currently these farmers own 27,000 ponds and 3,500 fish cages which produced about 120,360 MT in 2016. This earned fish farmers UGX 47.26 Bn in 2016 as compared to UGX 43.6 Bn. in 2015.

4.2.3 Livestock Subsector

9) Policies, Bills and Regulations

Finalized national stakeholder consultations on the draft Animal Feeds Bill, Animal feeds standards were not enforced; Pastoralism & Rangelands Management policy (PRMP) awaiting presentation to TPM; Dairy policy not drafted; the draft Meat Development Bill was not revised; First draft Hides and Skins Development Policy was formulated and presented to DAP for comments

10) Meat and Meat Products

Beef exports declined significantly from 54,906 Kg in 2015 to 18,314 Kgs in 2016, pork from 7,086 Kgs to 2,067 Kgs, dressed chicken increased from 21,765 Kgs to 32,538 Kgs while eggs significantly increased from 8333,907 Kgs to 2,994,160 Kgs in 2015 and 2016 respectively.

11) Milk and Milk Products

Records indicate that milk and milk product exports increased significantly for example milk from 1.9m Kg in 2015 to 6.8m Kg in 2016 while ghee and milk powder increased from 1.9m Kg to 3.7m Kg in 2016 while butter and butter oil as well as casein also registered increases.

12) Apiary

In FY 2016/2017, a total of 132 beehives, 10 overalls, 10 pairs of gloves, 10 pairs of gumboots, 3 sets of hive tools and smokers were procured and distributed to the districts of Masaka, Lwengo and Kalungu. 24 Entomologists/project focal persons were trained in farm-based bee reserves management. A total of 440 beneficiary beekeepers were trained, of which 30% were women and youth. This was under the Farm-Based Bee Reserve Establishment Project (FBBEP). A total of 18 honey samples were collected, analysed for pesticide residues. The honey analysis results were submitted together with National Residue Monitoring Plan (NMRP) for Uganda to EU as a requirement to maintain Uganda on list third countries allowed to export honey into the EU market.

13) Silk

There are about 2,300 farmers with mulberry gardens and about 210 farmers actively rearing silkworms and producing cocoons in 12 districts in western, central and eastern Uganda. 3.6 tons of mulberry planting materials were produced at the National Sericulture Centre and distributed to 6 farmer groups in Luwero and Mubende districts. On average 18 acres of mulberry were planted in the 2 districts.

14) Hides and Skins

Exports of wet blue hides and skins that had registered declines in 2015 increased from 8m Kgs to 12.7m Kgs in 2016 and 1.5m Kgs to 2.8m Kgs in 2016 respectively. However, chrome tanned leather volumes declined from 1.1m Kgs to 1m Kgs in the same period.

15) Pest, Vectors and Diseases

A number of outbreaks were investigated including FMD, Rabies, African Swine Fever (ASF), Anthrax, Brucellosis, CBPP, Lumpy skin disease, black quarter and were followed by provision of vaccines in addition to sensitization as appropriate.

16) Veterinary Regulation and Enforcement

A Draft Veterinary Practitioners Bill, Draft Standard Methods, guidelines and procedures for Quarantine of Animals and Regulation of Animal products; Draft Policy on Regulation of Veterinary Medicines, Biologicals, chemicals and devices were formulated or reviewed during the FY and are to be presented to stakeholder for consultation.

MAAIF also inspected, approved and registered a number of animal and animal handling and processing establishments engaged in production for local and export markets.

4.2.4 Agricultural Extension

During the FY 2016/2017, the institutional processes to mainstream the agricultural extension services into the Ministry's and Local Governments' administrative, planning and budgeting frameworks were undertaken. The Vote Function of DAES became operational and the departmental program codes were also created. Two more Technical officers were posted to the Directorate on assignment of duties to operationalize the Division of Skills Management. This increased the technical manpower to 18 out of the required 34 approved in the structure. Effective 2016/2017 the DAES started receiving budget allocation. The major activities undertaken by the Directorate during the FY 2016/2017 were funded from Agricultural Technology, Agribusiness Advisory Services Project (ATAAS) and off budget support from development partners.

The National Agricultural Extension Policy (NAEP) 2016 was approved by Cabinet and launched in December, 2016, National Agricultural Extension Strategy (NAES) 2015/16-2020/21 approved by Cabinet and launched in December, 2016; Principles for the National Agricultural Extension Bill 2017 approved by TPM in June 2017; National Agricultural Knowledge Management and Communication Strategy approved by TPM in June 2017; Agro Processing and Marketing Strategy for Rice and Maize approved by TPM in June 2017; DAES guidelines and standards for the regulation and quality assurance of the Agricultural extension services developed and approved by TPM; Strategy for youth involvement in Agriculture developed and approved by TPM in June 2017 and The Accreditation Guidelines developed and approved by MAAIF TPM.

Collaborated with the World Bank and developed a Solutions Finder Database that is used to share knowledge captured. USAID Feed the Future EEA – Provided support during the development of: principles, guidelines, standards and ethical code of conduct of agricultural extension service providers. Negotiated with IFAD to restore funding for ATAAS that was withdrawn following the reform of agricultural extension to support mobility and capacity building of recruited extension staff in local governments. The funding was restored to the tune of USD 8.1 million

4236 Demonstrations established in February to June, 2017 in all the 116 districts and 1,396 sub-counties. Engaged more than 20 FM Radios and 5 Television Stations (UBC, STAR, WBS, NBS and DELTA) and publicized agricultural programs MAAIF is implementing. The Ministry constructed storage facilities for Farmers Groups as pilot demonstration centers in Masindi and Jinja

4.2.5 Agricultural Infrastructure and Water for Agricultural Production

35 Valley tanks of 174,750 cubic meters of water constructed; 945 acres of bush clearing/opened for agriculture; 38 farm roads of 136Km opened by ministry equipment; Low bed carrier and pick up double cabin procured; Water User Associations (WUAs) trained in Doho and Mubuku irrigation Schemes.

3 Medium Scale Irrigation Schemes rehabilitated under FIEFOC, Agoro irrigation schemes in Lamwo, Doho in Butaleja, Mubuku in Kasese were completed and the Olweny Irrigation scheme in Dokolo/Lira which is still under construction.

4.2.6 Human Resource Management

The restructuring exercise was concluded and the new Ministry structure approved. Out of **886** approved establishment, **572** positions have been filled, representing 64.56% and out of the 340 vacant positions reported in FY 2015/2016, 50 were filled in FY 2016/2017 within the available resources. Out of the **314** vacant positions **60** positions are already with Public Service Commission (PSC) for filing. To improve linkages and collaboration with stakeholders, MAAIF conducted monthly Agriculture Sector Working Group (ASWG) meetings on a regular basis. These were informed by meetings of the Top Policy Management (TPM) team that includes MAAIF HQ senior management, Agencies, Development Partners and other key stakeholders.

Arrangements to establish a National Agricultural College are in advanced stages while iv. The World Bank and GoU, under Skills Development Project, are supporting Bukalasa Agricultural College to become a National Centre of Excellence in Agricultural training. MAAIF has supported the Fisheries Training Institute (FTI) and Bukalasa Agricultural College (BAC) to review their curricula in line with the NDP II, ASSP and the Skilling Uganda initiative. The draft curricula have been submitted to Top Policy Management for approval.

Construction of the new MAAIF office in Kampala was cancelled following GoU policy on construction of Government offices in one designated area for efficiency and ease of communication. MAAIF also conducted a number of short and long term training for senior and middle level staff in line with the 3 Year Capacity Building Plan. Furthermore, MAAIF has Analysed and costed all vacant posts against available wage at DLGs and Sub County levels to guide recruitment and provided technical guidance and overall monitoring of the recruitment of 3,062 District Local Government extension staff out of 5,000 approved positions

4.2.7 MAAIF Agencies

4.2.7.1 National Agriculture Research Organization (NARO)

During the FY 2016/17, progress was made in plant variety and animal breeding genetic improvement; developing improved animal and crop management practices; plant and animal health management; product development and diversification along the value chain; fisheries; forestry; climate smart agriculture; agro-machinery and cross-cutting research areas. A total of 162 technological innovations were generated. Some of these technological innovations are ready for commercialization and dissemination, and twelve (12) products are ready for patenting. NARO has delivered on all targets set against the key performance indicators for the FY 2016/17.

1) Crops

- a) Under crop varietal development, NARO has submitted 35 varieties to the variety release committee during the reporting period. By the end of 2016/2017 varieties of 3 coffee, 5

maize, 2 rice, 4 sorghum, 6 finger millet, 5 sweet potato, 5 cow pea, 2 groundnuts and 2 mango varieties were generated and submitted to the Variety Release Committee. In the same period, 19 varieties were released for commercialization including 4 maize, 2 cassava, 8 potatoe, 5 beans and 2 sweet potatoe.

- b) NARO is conducting research in production of off-season mango for increased income & nutrition using KNO₃ to produce 48kg/ tree. Flower induced mango have been profiled and declared safe for consumption. The variety Tommy Atkins responded to KNO₃ application in Namulonge, Masindi & Soroti. The technology of off-season mango production has been disseminated to 200 farmers (87 women, 113 men) 10 (4 women, 6 men) LG extension staff in 3 districts. NARO has developed a fruit bait baits for management of fruit flies in mangos while a vegetable seed facility 50-100 ton of grain seed at Namulonge was launched.
- c) Results on economic viability of apple enterprise and the associated determinants indicated that gross margin of apple enterprise in Kabale and Kanungu district had a positive ratio of return on investment of 1.5 and 1.7, respectively. Kisoro and Rukungiri districts had a negative ratio of return on investment of (0.9 and 0.3, respectively).

2) Livestock

- a) Two diagnostic kits for detection of Foot and Mouth Disease (FMD) and African Swine Fever (ASF) were developed;
- b) Two bio-acaricide formulations were developed and evaluated to manage the emerging challenge of tick resistance to available acaricides. A national tick distribution map, to guide tick control programs and initiatives was produced.
- c) NARO has developed, evaluated and availed to farmers a milk enhancing ration, with the potential to increase milk production from local animals by 30%. One (1) milk-enhancing ration based on sorghum *stover* and *tithonia*.
- d) NARO piloted the rehabilitation and restoration of at least 42 ha of unproductive and degraded grazing land to enhance nutritive and palatable pastures in the central cattle corridor. This has contributed to increased pasture availability from 0 – 4t/ha.
- e) In livestock, 5.5 tons of milk enhancing dairy pellets produced and availed to farmers. 45 smallholder dairy farmers (18 females and 27 males) engaged in 1day forage exposure visit in Mbale.

3) Forestry

NARO generated an assortment of improved planting materials for stakeholders (coffee=223,020 seedlings, coffee seed=1,250kgs); banana suckers=2,042, cassava cuttings=1000 bags; 34,551 CWDr seedlings availed to farmers and 2,144 ready for planting; Potato=56,574 plantlets

4) Agro Machinery

NARO has solved the problem of physical rice grain loss, drudgery and labor shortage during rice threshing by adapting and disseminating two gender responsive designs of rice threshers: NARO

lightweight rice thresher and ASI rice thresher, a design obtained through collaboration with Africarice.

5) Food Biosciences and Agribusiness

A fish product (fish powder) formulated from fish wastes (skins and bone) was characterized and culinary profiling successfully completed with an acceptability rate of 6.2. Its commercialization is ongoing. In addition, one (1) bean product; two (2) maize based products and two cassava based products were developed.

6) Sustainable Land Management (SLM)

NARO has developed and demonstrated technology packages on Conservation agriculture (CA). The use of Permanent Planting Basins (PPBs) and rip lines in combination with improved seed and crop residues to create a mulch cover that reduces evaporation losses has consistently increased average grain yields by 50–200%, depending on the amount of rainfall, soil type, and fertility. With average yields of about 4 t ha⁻¹ for maize and over 1 t ha⁻¹ for beans these packages are helping farmers to bridge the yield gap between potential output vis-à-vis farmer outputs.

Under updating of the Uganda Soil map, six soil sheets out of 17 that comprise Uganda have been digitized and updated. The updated soil maps are now finer and more specific, and layers of information added include climate and weather. Three irrigation facilities, to determine the most cost effective irrigation method and to assess the yield performance of key commodity crops, have been established in three locations (Nakasongola Prison's Farm, Nakasongola District, Kiteredde, Kalungu District and NARL – Kawanda, Wakiso District).

7) Managing Invasive Species

NARO has conducted nation-wide work to manage plant and animal invasive species. Uganda has been invaded by animal invasive species largely by the **Fall Army Worm (FAW)**, and plant invasive species mainly **Salvinia molesta**. Following the invasion of the Fall Armyworm (FAW) (*Spodoptera frugiperda*), NISCU chaired and coordinated the National Task Team to assess the present and potential damage due to this rapidly unfolding emergency, and to discuss and devise a holistic national response action plan to control the FAW menace.

A master plan detailing salient action points and recommendations on the major areas identified as essential for effective management of FAW in Uganda, with strong inter-linkages among actors was developed and presented to government for action.

NARO has developed recommendations for managing the pest as follows: -

- | | |
|---------------------------------------------------|---------------------------------------------------------|
| a) Early planting | d) Placing sand/soil mixed with ash/lime into the whorl |
| b) Keeping gardens weed-free | e) Destruction of crop residue |
| c) Physical removal and destruction of egg masses | f) Pesticide application -. |

- g) Deployment of transgenics

8) Engagement of Agriculture Research Service Providers

NARO has increased the capacity to respond to demands for improved technologies, methods and practices through collaborative and competitive projects with agricultural research providers in the value chains. Ninety (90) research projects on commercialisation have been implemented by scientists from NARS; from universities (27%); private sector (19) and NARO (54%). Transformational outputs are accruing from the CGS activities including, but not limited to:

- a) Baits for management of fruit flies in mangos;
- b) Transformation of traditional ghee processing into an economically viable business;
- c) Production of feed pellets for improved performance of dairy calves and cows;
- d) Isolation of compounds in plants with wound healing properties;
- e) Development and commercialization of soil test kits;
- f) Development of fish floating feeds a partnership with Makerere university;
- g) Production of NARO honey bee; and
- h) Others

9) Promotion of Agricultural Technologies

- a) Under breeder and foundation seed multiplication, NARO has spearheaded the development, multiplication and distribution of seed to stakeholders in the farming community.
- b) Through dissemination of high end adaptive trials and demonstrations, NARO has been strengthening the research-extension interface by providing access to clean planting materials and agricultural information;
- c) Interventions to strengthening technology uptake include establishment of Innovation Platforms;
- d) Under interventions to increase access to technologies, NARO has generated an assortment of improved planting materials for stakeholders (coffee=223,020 seedlings, coffee seed=1,250kgs); Banana suckers=2,042, cassava cuttings=1000 bags; 34,551 CWD seedlings availed to farmers and 2,144 ready for planting; Potato=56,574 plantlets; and
- e) Under increasing access to agriculture research information, NARO has initiated the development of an information system to support research and seed traceability. The Uganda Agriculture Research Information and Seed Traceability System (UARISTS) has been presented to NITA Uganda for validation and input for refinement.

10) Enhancing NARO Research Capacity

- a) In accordance with the approved recruitment plan for the FY2016/17, a total of 64 staff were recruited;
- b) In the financial year 2016/17 a total 132 members of staff in the various categories were promoted based on results of performance evaluation for support staff and technicians. For scientists an additional criterion of publication in peer reviewed journals was considered. Due

to budgetary constraints, only staff who had not received any promotion in the last four years were considered;

- c) On long term training, NARO supported 31 staff on PhD and eight (8) on Masters. Out of the 31 PhD students, 12 are female and 19 are male, while out of eight (8) Masters Students, two (2) are female and six (6) are male.
- d) During the financial year, a new performance management framework that requires each to signs an annual performance agreement with his or her supervisor which provides for outputs to be delivered in a financial year, performance indicators to measure the output and performance targets to quantify the expected level of attainment of the output;
- e) During the FY 2016/17, NARO received a total of UGX 3.5 billion for purpose of enhancing staff salaries: The funds were utilized as follows; 2.1bn was applied to increase staff salaries ranging between 10 - 14%, 938 million was used to pay the salaries of the 64 staff recruitment during the year while 384 million covered the increase in the wage bill occasioned by the promotion of one hundred thirty two (132) staff;
- f) During FY 2016/17, a total of 37 staff left the organization for various reasons; and
- g) Under infrastructure development, 22 civil works were completed.

4.2.7.2 National Agriculture Advisory Services (NAADS)

During the FY 2016/17 (July, 2016 to June, 2017), the NAADS Secretariat procured and distributed various agricultural inputs, planting materials (seeds/seedlings) and stocking materials. These outputs were conducted in line with the national, zonal and district priority and specific commodities as well as the agricultural inputs requirements identified under Operation Wealth Creation (OWC).

- 9) Under food security, 11m Kgs of maize, beans, sorghum, Simsim, rice and cow peas expected to cover an acreage of approximately 1m acres were delivered to an estimated 4m farming households. It is expected that with survival of 645,453 acres, the annual yield will be in the region of 0.9m Kgs;
- 10) Under promotion of strategic crops, 183m seedlings and suckers expected to cover 367,488 acres were delivered to an estimated 763,429 farming households. It is expected that 239,256 acres will survive with anticipated revenue of UGX 2 Tn annually;
- 11) 40 tractors and matching implements to support strategic interventions in the dairy value chain for pasture development were delivered and distributed in 9 DLGs in South Western Uganda;
- 12) 4,414 dairy heifers delivery and distribution on going in 115 DLGs; 118 beef bulls procured and distributed in 17 DLGs; 3,194 improved goats (boar/savannah) delivery and distribution completed in 23 DLGs; 15,500 Kuroliers birds procured and with poultry materials delivered to special interest groups (women and youth groups);
- 13) 26 Artificial Insemination (AI) Kits procured delivered to 22 District Local Governments and KCCA;
- 14) 2,975,518 tilapia fingerlings, 1,605,233 cat fish fingerlings and 81,551 mirror cap fingerlings procured and distributed in 59 DLGs and 212,560 Kgs fish feeds procured and delivered in 59 DLGs

- 15) Delegated procurement of 3,000 young bulls for fattening to the National Enterprise Corporation (NEC) Katonga under the Meat Export Support Services (MESS) Project; and
- 16) Delegated procurement for design and construction of holding grounds and quarantine stations for slaughter stock at National Enterprise Corporation (NEC) Katonga (Gomba DLG) under the Meat Export Support Services (MESS) Project.