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The Ministry of Agriculture, Animal Industry and Fisheries

Agriculture Sector HANDBOOK

5 Years OF TRACKING PERFORMANCE

National Agriculture Policy; Uganda investing strategically for the future

Growing investment opportunities in Uganda's agricultural sector

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MINISTRY OF AGRICULTURE, ANIMAL INDUSTRY AND FISHERIES

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Acknowledgement

The compilation of this monumental handbook was not an event, but a process right from conceptualization, data collection, designing, editing, proofreading and eventual printing,

Far from this, however, we wish to acknowledge the cooperation and contribution of different actors in the agriculture sector most notably Ministers, CEOs, MDs and heads of respective state agencies, the private sector and other stakeholders whose input could not go unnoticed.

We also wish to acknowledge the role of the public relations office Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) who were selflessly receptive to the management and editorial team that frequented their offices either seeking appointments with their bosses or information.

Lastly, we appreciate the teamwork exhibited by GK Media Investment and The East Africa Agribusiness Magazine teams: Godrick Dambyo - CEO; Muyunga Herman - MD; Geoffrey Kaujju - Regional Business Development Manager/Editorial Coordinator as well as the writers/contributors and the Client Relations Managers for their tireless effort in the compilation of this valuable Agriculture handbook.

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“If we focus on the three elements: production, processing and marketing, we shall kill so many birds with one stone; employment, food security, foreign exchange, tax revenue and, as a consequence of all this, social transformation”

H.E.Yoweri Kaguta Museveni, President of the Republic of Uganda

Publishers Word

Remarkable progress has been made by the public and private sector towards development targets set under national, regional and international arrangements including the United Nations and the African Union.

The GK Media Investments in collaboration with the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) brings you a representative project of the progress achieved within an environment created by the Government of Uganda.

This annual platform is crucial in providing a comprehensive look at the sector , where result-bearing initiatives continue to push the country towards achievement of sustainable agricultural development and making even more progress.

As highlighted by this publication, the participation of the private sector alongside Government under the Public Private Sector Partnership is one of the elements building a larger synergy for growth in the agricultural sector, as is the case in other sectors of the economy.

It should be noted that publication of such vital information not only enlightens the population but also offers a cushion against effects of misguided agricultural production and investment.

We appreciate collaboration from all featured agencies and organizations that made the publication of the Agriculture Sector Hand book 2020 possible.

I wish to implore technocrats, experts in academia, investors, Members of Parliament and the general public to make use of this pro-development project to forge ways of joining hands in fast-tracking partnerships and policy recommendations aimed at further agricultural transformation in Uganda.

I am grateful to the MAAIF for focusing on streamlining agricultural information systems as a key ingredient for the realization of goals embedded in the National Development Plan, National Agriculture Policy and Vision 2040.

Godrick Dambyo

Chief Executive Officer,

The East Africa Agribusiness Magazine & G.K. Media Investments Ltd.

Top: Mr. Godrick Dambyo Chief Executive Officer,

The East Africa Agribusiness Magazine & G.K. Media Investments Ltd.

Editor's Word

The 2020 agriculture sector handbook comes at a time of increased need to showcase the achievements that Uganda has made this far, especially through the far reading initiative that improves livelihoods for smallholder farmers and promotes further commercialization of agriculture.

My sincere appreciation goes to the government of Uganda for recognizing the role of agriculture information providers among other key areas linking farmers to agro-inputs, suppliers, agriculture information, development agencies, insurance, financing, policymakers, and market access platforms, etc.

This kind of publication is aimed at improving production and productivity needed for a strong presence on the international market, pushing for knowledge exchange, increased access to finance and business support services as well as channeling communication from policymakers to the public.

Publishing by GK Media Investment Ltd and The East African Agribusiness magazine has for the past 8 years since 2012 steadily enhanced the flow of information based on value chain development, gender mainstreaming, and good farming practices. National and international themes for agriculture have always been well covered to maintain a farming population that comprehends the benefits of commercial agriculture and the expected standards for export-driven production.

From the staff, our model has extended across the region and we have diversified to partner with MAAIF in highlighting the progress in Uganda and the region.

The performance highlighted herein, therefore, serves as a basis for further enlighten of sector analysis, private sector actors, diplomatic missions to Uganda, and readers all over the world.

I extend my thanks to all the partners who contributed in the compilation of this publication including MAAIF agencies, Projects, regional and international agriculture marketing bodies, the private sector, and line ministries. Your role is highly appreciated and we look forward to your continued commitment to an information-based service delivery system through such platforms as this brainchild of GK Media Investment Ltd and MAAIF.

Geoffrey Kaujju

Top: Mr. Geoffry Kaujju
Editor

The East Africa Agribusiness Magazine & G.K. Media Investments Ltd.

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Hon. Col. (Rtd) Bright Rwamirama
MINISTER OF STATE ANIMAL INDUSTRY

Ministry of Agriculture, Animal Industry and Fisheries

Vision

A competitive, profitable and sustainable agricultural sector.

Mission

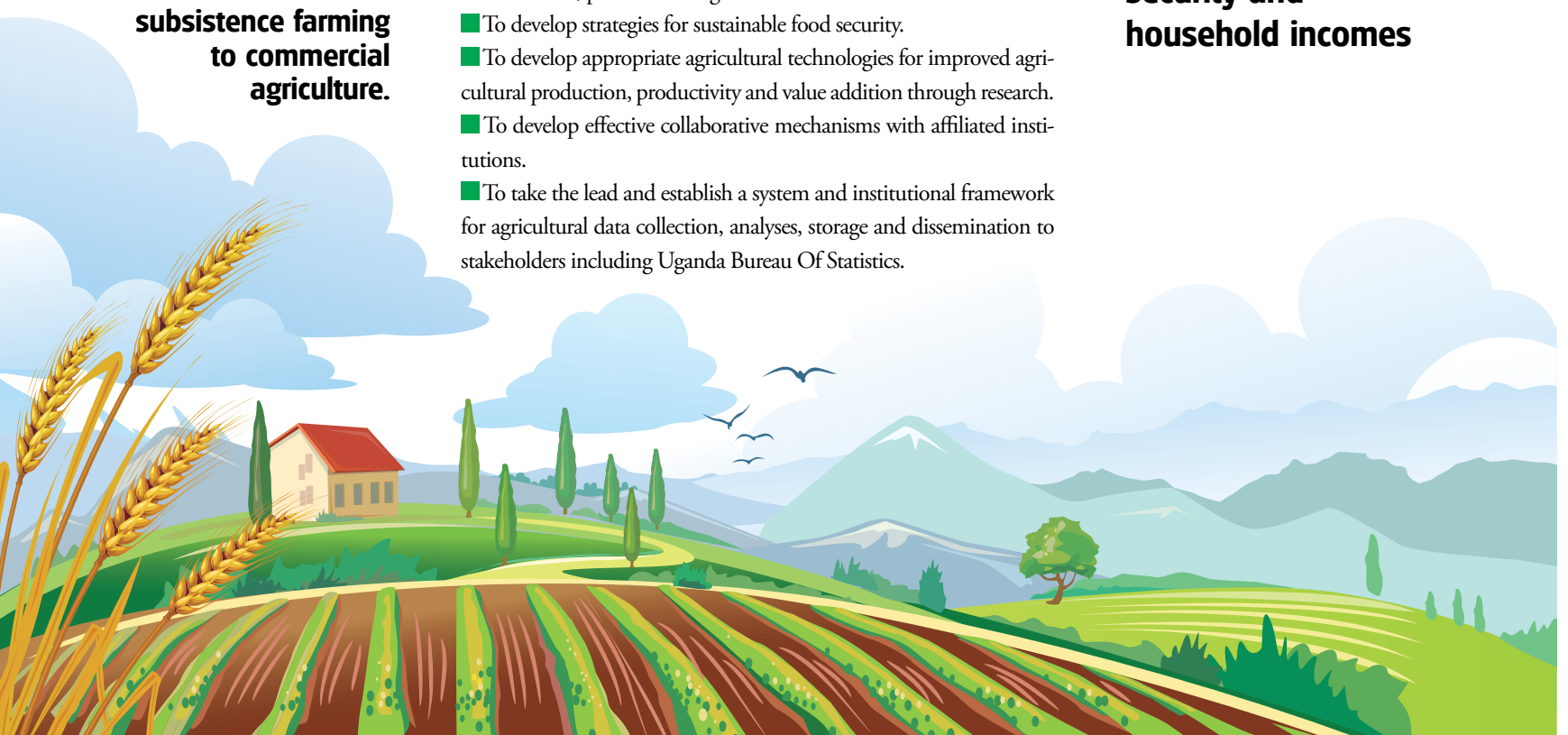
To transform subsistence farming to commercial agriculture.

Strategic Objectives

- To initiate the formulation and review of the policy and legal framework of the sector.
- To establish and implement systems for service provision in the sector.
- To strengthen and implement strategies, regulatory framework, standards, institutional structures and infrastructure for quality assurance and increased quantities of agricultural products.
- To access and sustain local, regional and export markets.
- To design and implement sustainable capacity building programmes for stakeholders in the agricultural sector through training, re-tooling, infrastructure, provision of logistics and ICT.
- To develop strategies for sustainable food security.
- To develop appropriate agricultural technologies for improved agricultural production, productivity and value addition through research.
- To develop effective collaborative mechanisms with affiliated institutions.
- To take the lead and establish a system and institutional framework for agricultural data collection, analyses, storage and dissemination to stakeholders including Uganda Bureau Of Statistics.

Mandate

To promote and support sustainable and market-oriented agricultural production, food security and household incomes



MAAIF Structure

The structure for the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) constitutes the following: 4 directorates with 13 departments; 4 standalone departments and 3 specialized units as the main organizational entities of the Ministry described hereafter as follows.

DIRECTORIES

1 Directorate of Animal Resources, with 3 departments

1. Animal Health
2. Animal Production
3. Entomology.

2 Directorate of Crop Resources, with 3 departments

1. Crop Inspection and Certification
2. Crop Production
3. Crop Protection.

3 Directorate of Fisheries Resources, with 3 departments

1. Aquaculture Management and Development;
2. Fisheries Control, Regulation and Quality Assurance;
3. Fisheries Resource Management and Development (Natural Stocks).

4 Directorate of Agriculture Extension Services

1. Agricultural Extension and Skills Management
2. Agricultural Investment and Enterprise Development.

DEPARTMENTS, SPECIALISED UNITS, INSTITUTIONS & SEMI-AUTONOMOUS AGENCIES

Four (4) Stand Alone Departments

1. Finance and Administration;
2. Agricultural Policy and Planning
3. Agricultural Infrastructure and Water for Agricultural Production
4. Human Resource Management.

Two (2) Specialized Units

1. Procurement and Disposal of Public Assets Unit
2. Internal Audit Unit.

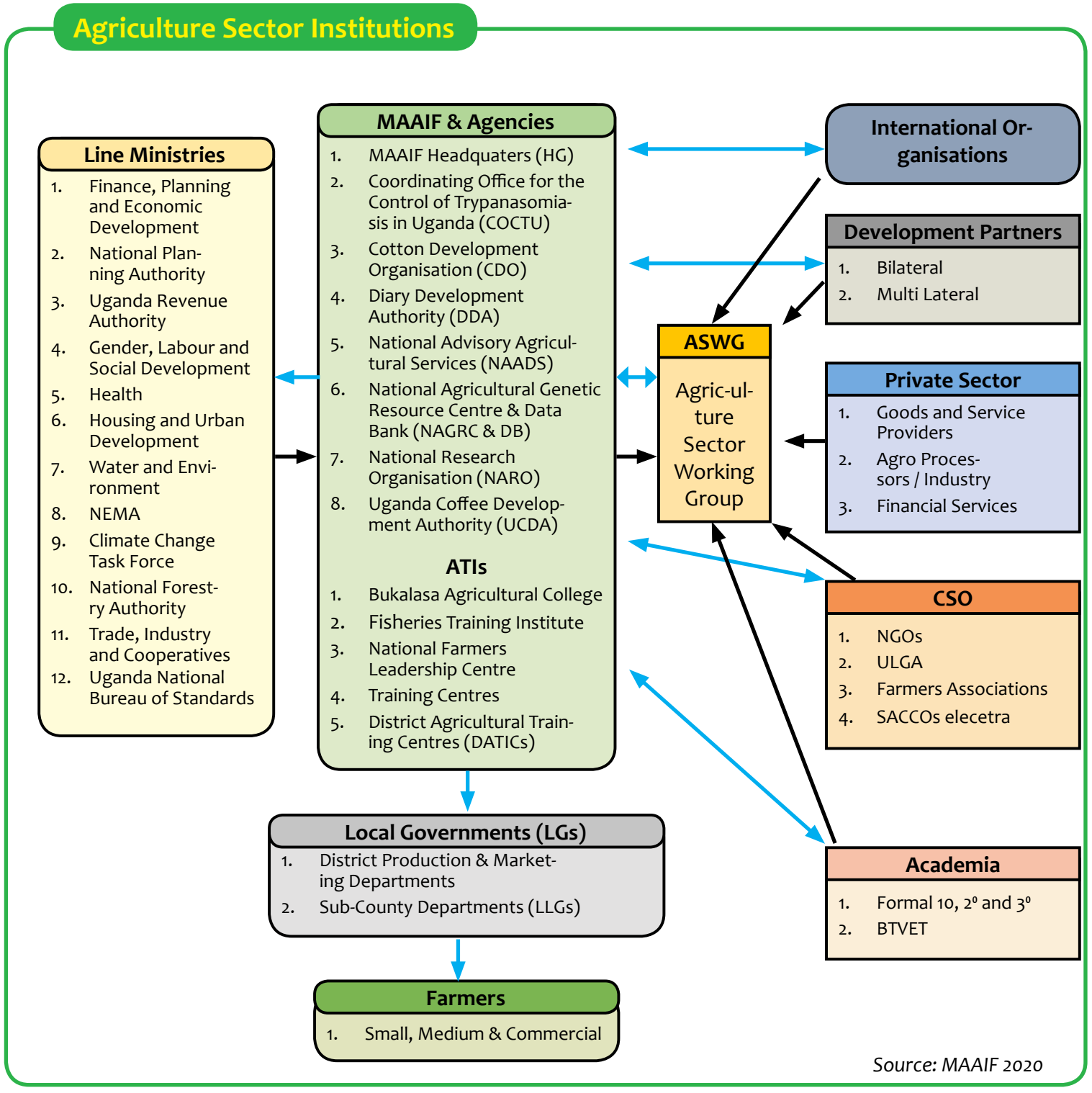
Two (2) Agricultural Training Institutions (ATIs)

1. Bukalasa Agriculture College (BAC)
2. Fisheries Training Institute (FTI)

Seven (7) Semi-Autonomous Agencies

1. Coordinating Office for the Control of Trypanosomiasis in Uganda (COCTU)
2. Cotton Development Organization (CDO)
3. Dairy Development Authority (DDA)
4. National Agricultural Advisory Services (NAADS)
5. National Agricultural Genetic Resource Centre and Data Bank (NAGRC & DB);
6. National Agricultural Research Organization (NARO); and
7. Uganda Coffee Development Authority (UCDA).

The institutions and relationships with MAAIF and public agriculture institutions:



Source: MAAIF 2020

CROP RESOURCES SUB-SECTOR

The Directorate of Crop Resources drives 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, farm development,agricultural mechamisation as well as availability of water for agricultural production.

CROP SUBSECTOR: The Directorate of Crop resources

The Directorate of Crop Resources drives 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, farm development, agricultural mechanization as well as availability of water for agricultural production.

The Directorate of Crop Resources constitutes three (3) Departments namely; Crop Production, Crop Protection and Crop Inspection and Certification, each headed by a Commissioner. Two of MAAIF's agencies namely Uganda Coffee Development Authority (UCDA) and Cotton Development Organization (CDO) are directly linked to the Directorate. In the Department, there are a number of projects which include: The Agriculture Cluster Development Project (ACDP),Vegetable Oil Development Project -Phase 2(VODP 2), National Oli Palm Project(NOPP) Uganda Multi-sectoral Food Security and Nutrition Project (UMFSNP), Banana Livelihoods Diversification Project, Northern Uganda Farmers' Livelihoods Improvement Project, Sustainable Cashew nut Value Chain Program, Enhancing National Food Security through increased Rice Production in Eastern Uganda, Rice Development Project (PRiDe).

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.

Subsector Performance in the following areas; Policies, Laws, Guidelines, Plans and Strategies.

Policies

i. National Organic Agricultural Policy finalized, approved by cabinet, printed and disseminated.

ii. Draft National Tea Development Policy and Implementation Strategy developed awaiting Cabinet approval.

iii. The National seed policy 2018 was approved by Cabinet and launched by Hon, Minister for MAAIF and was being popularized in the 6 regions of Uganda. A popular version of the National Seed Policy was developed.

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

Photo: From 200,000 Pinapple suckers from NAADS, Luwero farmer owns 100 acres.

iv. The National Sanitary and Phytosanitary (SPS) Draft Policy 2018 was tabled to TPM and Regulatory Impact Assessment (RIA) has been conducted and submitted to TPM.

Under Strategies and Guidelines

i. One (01) Food and Nutrition Security strategy in the advent of Covid-19 pandemic drafted.

ii. Standard Operating Procedure for School Demonstration Gardens developed, printed, launched and disseminated and farmer guides for Coffee, beans and maize were developed, printed and disseminated to 57 districts.

iii. Handbooks for Cassava, Rice; finalized and those for Food and Nutrition, Home economics and Banana value addition and utilization reviewed

iv. National Seed Implementation strategy 2018 finalized and approved by cabinet.

v. Disseminated a popular version of the National Seed Policy across the country to key stake holders such as the DAOs and district farmer leaders.

vi. A training manual on safe use of agricultural chemicals were finalised, approved by the Agricultural Chemicals Board (ACB) and now used for training of agrochemicals dealers and backstopping of agricultural extension staff.

vii. Registration guidelines for exporters of fresh fruits and vegetables were finalized and disseminated.

viii. Developed the Sanitary and Phytosanitary Communication Strategy currently at MAAIF Technical Committee review level before forwarding to the MAAIF Top Policy.

Under Laws

i. Regulations on Agricultural Chemicals (Control) Act 2006; with three sections (Regulation on pesticides, Regulations on fertilizers, Regulations on application equipment) were reviewed finalized and currently at Solicitor General awaiting to be approved and signed by Honourable Minister for MAAIF, gazzetted and disseminated.

ii. The Plant Protection and Health Import and Export Regulations were finalized and gazetted

Commodity Performance in FY 2019 – FY 2020

The performance of the commodities is presented in respect of specific priority and strategic crop commodities namely: Bananas, Beans, Maize, Rice, Cassava, Irish Potatoes, Tea, Coffee, Fruits and Vegetables, cocoa, cotton, oil Seeds and Oil palm.

Plantain Banana

The production of plantain banana1 increased from 4,803,000 tons in 2017 to 5,263,800 tons in 2018 reflecting an increase of 9.6%.

This was attributed to the relatively stable weather, increased capacity building on Good Agronomic Practices, increased surveillances, trainings in climate change mitigation and adaptation strategies and use of clean quality disease free planting materials especially tissue culture banana planting materials. At the 5-year average rural price for Matooke at UGX 800/kg the matooke consumed on farm or traded domestically was valued at about US$1.01 billion. This is around 18% contribution to Uganda's agricultural GDP for 2018. With industrialization, it is expected that this

The production of plantain banana increased from 4,803,000 tons in 2017 to 5,263,800 tons in 2018 reflecting an increase of

9.6%.

contribution will significantly rise due to the many potential industrial value chains that are possible

Government is putting a lot of emphasis on adding value on the priority and strategic priorities. The Ministry in collaboration with UNIDO provided state of the art equipment to enable quality banana juice and wine processing.

Beans

The production of the major pulses which includes; beans, field peas, cow peas, pigeon peas increased by approximately 5% in 2018. However, the production of beans is known to have decreased from 728,000MTs in 2018 to 627,000MTs in 2019.

Cereals

Cereal crops in Uganda include; maize, rice, millet, sorghum and wheat. The production of maize increased from 2.6 million MT in 2018 to 5 million MT in 2019. The improved performance was attributed mainly to distribution of seeds by Government, increased adoption of improved maize varieties by farmers, increased value addition by the private sector and vigilance by the Ministry in the control of pests and diseases.

The National Rice Development Strategy (NRDS) enabled stakeholders develop and implement interventions in the sector. Many of these were in Research, Irrigation Infrastructure and capacity building. The interventions resulted in doubling rice production over the last ten years (2008 -2018) from 177,000MT to about 350,000MT. The Formulation of the NRDS II (2019-20 -2029/30) policy framework is ongoing.

Root Crops

Cassava is one of the priority crops especially for food security. Production of the major root crops (sweet potatoes, Irish potatoes and cassava) increased from 5,862,280 tons in 2017 to 6,155,390 in 20182 indicating a 5% increment. This positive shift was attributed to the relatively stable rainfall.

Tea and Cocoa Production from 2018 to 2019

The production of tea increased from 69,000 MT in 2016/17 to 70,338 MT in 2019/20 and Cocoa increased from 25,712 MT in 2016/17 to 35,318MT in 2019/20. This increase is attributed to Governments interventions in supply of quality Tea and Cocoa seedlings to farmers. Additionally, for cocoa, it was also attributed to extending Cocoa production to the new Cocoa producing Districts.

Photo: One of the Wine Filling Machines and Storage Tank to a Banana Wine Processing Facility at Silgard in Mbarara District. Constructed and supplied by MAAIF/UNIDO

Coffee

The volume of coffee produced increased from 6.95 million in FY 2018/19 to 7.75 million in FY 2019/20 an increase of 23.4%. This is on the account of the coffee planted in the previous FYs which started yielding and favorable weather leading to increased procurement and closing stock.

The total volume of coffee exports for FY 2019/20 was 5.103 million (60-kilo bags) compared to 4.176 million exported in FY 2018/19. This represented a 22% increase in export volume. Actual export performance in FY 2019/20 was 99% and 94% of the projected quantity and value respectively.

The increase in exports was attributed to the increased production for the main season in Central and Eastern Regions and a fly crop from regions south of the equator on account of the fruition of the newly planted coffee.

The realized value of exports was US$ 496.14 million compared to US$ 415.13 million in the previous year, this represented a 20% increase in value.

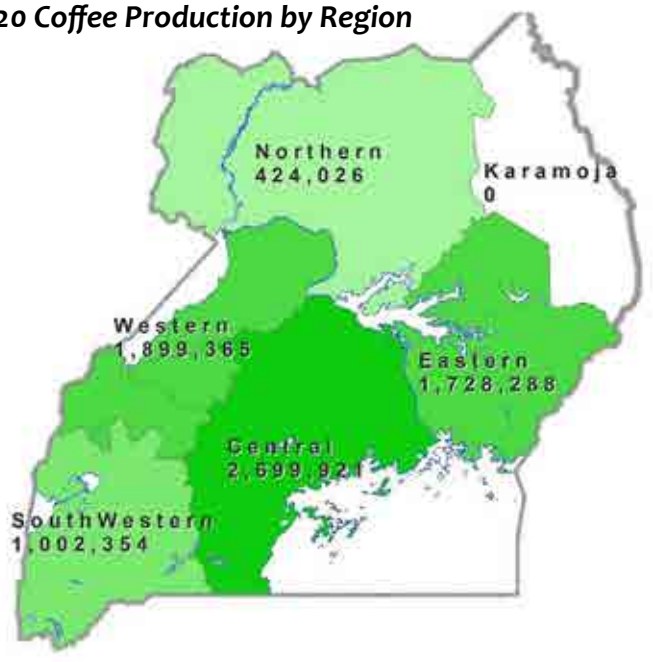
Cotton

The Targeted production during the year was 200,000 lint bales and actual production was 173,457(86.7%) which contributed over Sh. 138 Billion to household incomes.

The low production was caused by erratic rainfall patterns experienced during the early part of the cotton growing season (July & August, 2019) which affected crop establishment and performance. Furthermore, heavy rains received during the latter part of the season (November & December, 2019) resulted in boll rots.

A total of 169,407 lint bales valued at US$ 41M were exported compared to the target of 180,000 lint bales. The low production translated into low exports.

Map: 2019/20 Coffee Production by Region



It had been planned to increase the proportion of cotton graded in the top 3 grades by 10%. Actual performance decreased from 84% in FY 2018/19 to 79% in FY 2019/20. This was attributed to heavy rains received during November and December 2019 which resulted in harvesting of wet cotton that deteriorated in quality during storage.

The target for the domestic consumption was 20,000 lint bales of which 7,508(37.5%) was achieved. Under the Revolving Lint Buffer Stock Fund for supplying raw materials to local textile manufacturers, a total of 4,050 bales of lint were procured. 2,050 bales were procured for Fine Spinners (U) Ltd while 2,000 were procured for Southern Range Nyanza.

The two textile mills manufacture yarn, woven and knitted garments for both local and export markets. The COVID-19 outbreak and subsequent global lockdown resulted in closure of many textile-related factories, garment and apparel retail shops worldwide and locally. Since the two local textile manufacturing companies serve both domestic and international markets, the closure of garment and apparel shops led to cancellation or postponement of orders and consequently reduced the demand for cotton.

Oil Seeds and Oil Palm

The major Oil seeds were Sunflower and Soya bean. The key achievements were:

The area under production increased from 2,204 hectares in the projects baseline year to 60,710 hectares in 2019 for Sunflower. The income per Sunflower hectare per year increased from UGX 188,225 in 2015 to UGX 1,141,210.

Soy bean production increased from 3,408 MT in 2015 to 131,220 MT in 2019 in the project area. The area under production increased from 4,632 hectares in the projects baseline year to 72,369 hectares in 2019. The income per Soy bean hectare per year increased from UGX 203,950 in 2015 to UGX 1,599,700

Oil palm development in Kalangala and Buvuma islands.

In Kalangala District, the total area established was 11,348 hectares consisting of Nucleus estate - 6,500 and Smallholders - 4,848. The cumulative Fresh Fruit Bunch (FFB) harvested from the smallholders since 2010, was 225,220 MT, worth UGX 110,520 Billion with an income on average, UGX 4.5 Million per ha per year. The loan recovered was UGX. 34.008 Billion Out of the UGX 57 Billion disbursed.

For Buvuma District, 7,783 Hectares of land acquired and 902.17 Ha additional land was identified for purchase. The nursery was established with 193,500 seedlings.

The volume of coffee produced increased from 6.95 million in FY 2018/19 to

7.75 million in FY 2019/20 an increase of

23.4%.

Fruits and Vegetables

Citrus and mango fruit processing at Soroti Fruit Factory and Nwoya fruit farm were supported, Promoted Hass production of Hass Avocado in Mayuge and Ssembabule districts, nucleus model farming in Buikwe for capsicum. Promoted commercial production of Mangoes, Citrus, Pineapples and Apples in suitable areas of the country.

Strategic Interventions:

Supply of Critical Farm Inputs

The Ministry through its departments, Projects and Agencies supported provision of various inputs for productivity enhancement. These included 345,089 kilograms of Bean seed, 166,718 kilograms of Maize seed, 17,215 kilograms of Rice seed, 7,171 bags of cassava cuttings, 55,561 pieces of Tarpaulins, 18,326 pieces of Machetes /Pangas, 43,266 pieces of air tight bags (Hematic bags), 102,372 litres of Herbicides, and 22,752 litres of Insecticides, 162 litres of Fungicides, 3,224 litres of Fumigants under ACDP, established nursery for 193,500 oil palm seedlings under NOPP, 3,137 Mt of cotton seed under CDO and 13,733 kgs of Arabica seed (4,33kgs in Elgon; 5,500kgs in Rwenzori; & 3,900kgs in Kigezi) under UCDA. Eighty (80) Banana mother gardens of one acre each established using Tissue culture plantlets in Buhweju, Bushenyi, Isingiro, Rubirizi, Mitooma, Sheema, Ntugamo and Mbarara Districts supervised

Photo: A farmer receiving 8 bags of NAROCAS1 in Otipe Ward, South Division, Kumi Municipal Town Council in March 2020

Food and Nutrition Security

The Ministry planned to conduct food and nutrition security surveillance in 30 Districts of which 24 were assessed. The results indicated that the Northern and Eastern regions of Uganda had limited food reserves and were likely to be food insecure. Farmers were advised to store enough food reserves and plant early maturing crops and Vegetables. Other food and nutrition security innervations included:

i. Developed a unified protocol for enhancing the quality of planting materials, management of demonstration plots, seed processing and storage at primary schools and community levels. Dissemination for the Protocol completed in Yumbe, Iganga, Arua and Bugiri districts.

ii. Multiplied micronutrient rich seeds through the parent groups, schools and lead farmers and have adopted new agriculture technologies being promoted (CSA and GAP). A total of 146,096 benefited

iii. A minimum of 350 pupils of school going children received regular school-based health services and nutrition education sessions through

schools, giving a total of 450,000 pupils.

iv. Schools (1,500) planted trees for environmental protection purposes.

v. Nutrition/cooking startup packages (sauce pans, plates, forks etc.) were procured to support Nutrition education and cooking demonstrations at school and community level. A total of 10,286 Nutrition forums have been conducted at community level.

vi. Procured 4500 drip irrigation kits for school and community level to promote year-round production

vii. Constructed 3,000 energy saving stoves at primary school and community level

Crop Pests and Disease Control

Lately, Uganda has experienced many new pest problems. Key ones include Fall army worm, Desert Locust, Maize lethal Necrosis, Banana Rust Thrips and Bronze bug. This is probably influenced by climate change that make these pests able to establish once the gain entry to Uganda. In a bid to control these pests, MAAIF conducted the following activities and interventions to mitigate the pests and disease problems:

i. Effective management of Desert Locust (Schistocerca gregaria): Since the outbreak, of the desert locusts in February 2020, the ministry under took interventions that enabled control operations intended to control the pest.

These included procurement of 10,000 litres of Fenitrothion 960g/l ULV pesticide for aerial spraying, 24,000 of litres of Chlorpyrifos 480g/l EC and Cypermethrin 5% EC pesticides; 500 motorized sprayers; 2000 knapsack manual spray pumps and 4,000 sets of personal protective equipment (PPE) to facilitate the ground spray teams (UPDF and UWA). Training of 2,000 UPDF and UWA on ground spraying; 265 agricultural Extension workers on pest biology, ecology, surveillance, management and control and forecast

ii. Management of the fall armyworm (Spodoptera frugiperda): This has been the most destructive pest of maize and cereals since its invasion to the country in 2016. The Ministry has been able to reduce damage from >70% in 2016 to <10% currently

iii. Control of Giant looper caterpillars (Ascotis selenaria): This is a sporadic pest for Uganda. During this FY, there was a serious outbreak in Districts of Kayunga, Mukono, Wakiso and Luwero. Controlled measurers were undertaken and these included; Capacity building of Districts production staff on the effective management of the pest, procurement of 2,000 litres of pesticide and 100 manual spray pumps

Photo: UPDF taking control of Desert Locust (Schistocerca gregaria) in Karamoja region.

Photo: UPDF taking control of Desert Locust (Schistocerca gregaria) in Karamoja region.

iv. Control of Sweet potato caterpillars (Acraea acerata) in Busoga sub-region: This is an endemic pest in the country especially in sweet potato predominantly growing districts of Busoga. Its prevalence at the time of the outbreak was at less than 60% amongst sweet potato fields.

MAAIF, under the Crop Protection Department procured and supported DLGs with 6,000 litres of Cypermethrin 5% EC pesticides, 80 motorized pumps and 100 manual pumps for control of the pest. The pest epidemic was brought under control, with now prevalence at <2% and with minimal effect.

v. Banana Bacterial Wilt (BBW): The BBW was maintained under control, with the incidence at 3%.

vi. Quelea birds: This one of the most serious migratory pests of cereals. During the year, the country was invaded by the birds. The Ministry procured 1000 litres of Fenthion ULV (600g/l) to control the birds

vii. General Management of other pests: The Ministry continued to control other pests like False codling moths, Black coffee twig borer, Cassava Brown Streak Virus (CBSV), Snails and Slugs, Variegated grass hopper.

Quality assurance (seeds; agro-chemicals; plants and plant products inspected and certified).

The Ministry under took the following;

i. Conducted 154,000 inspections through pack house to comply with fresh fruits and vegetables Sanitary and Phytosanitary export standards and 1500 field inspections of horticultural crops for Sanitary and Phytosanitary compliance for export market, 37,551.6 metric tonnes seed stock at ware houses of 20 seed companies, 2,975.5 hectares of field seed crops, 524 agro input dealers and their premises for registration in the entire country.

ii. Certified the following for export: 4,267,560 metric tonnes of cocoa; 233,918,988 metric tonnes of Coffee; 2,232,000 metric tonnes of Tobacco; 31,032,568 metric tonnes of tea; 65,000 metric tonnes of flowers; 45,052 metric tonnes of fruits and vegetables, 1,626 samples of seed to ascertain seed quality; as result of which a total of 21,207 metric tonnes for maize, beans, vegetables, soya beans, sorghum, sunflower and ground nuts were certified.

iii. Registered exporting companies for fresh fruits and vegetables which doubled from 60 in 2019 to 122 by June, 100 new dealers and 100 new premises

iv. Conducted 9 workshops for private sector to enhance SPS compliance for horticultural exports and reduce interceptions

v. Conducted country wide inspection enforcements and impounded 10 metric tonnes of maize for lack of certification labels, low seed germination and viability and impounded 20,000l/ kg and of suspected counterfeit fertilizers and pesticides

vi. Conducted Distinctness, Uniformity, and Stability (DUS) trials for 54 candidate varieties at Ngetta, Namalere and Serere. 10 new varieties were released National Variety Release Committee (NVRC). The 6 of the varieties were from the private companies while 4 varieties were for the National Programme (NARO).

vii. Completed the evaluation of 9 candidate sunflower varieties for sunflower varieties, while evaluation for 5 maize varieties, 5 rice varieties and 5 sorghum varieties was on going.

viii. The Agricultural Chemicals Board (ACB) approved 66 agrochemical products, 180 agrochemical dealers country wide, 253 premises for dealership in agrochemicals for registration. The Board also renewed 167 agrochemicals, 102 dealers and 128 premises by the Agricultural Chemicals Board (ACB).

ix. Conducted country wide enforcement inspections. The challenge remains largely with fake foliar fertilizers which are yarned for by unsuspecting farmers due to extremely low prices offered ; Conducted

x. Conducted 2 training for 80 agronomists of exporters of fresh fruits and vegetables on good agricultural practices and procedures and 8 trainings for a total of 600 dealers on safe use of agrochemicals in Masaka, Bugiri, Kasandha, Gomba, Mbarara, Masindi, Mukono, Wakiso (kabanyoro) and Kabarole districts, 140 extension officers and DAOs from 50 districts on seed inspection and quality assurance, 25 Phytosanitary Inspectors on comprehension of COVID-19 by COLEACP, 21 inspectors in Sanitary and Phytosanitary measures, 250 exporters and Agronomists in electronic application and registration for Fresh Fruits and Vegetables export and 5 sensitization workshops for stakeholders (extension workers, input-dealers, farmer's associations, and political leaderships) in 30 districts on counterfeit and banned products.

xi. Harmonized regional guidelines for evaluating Biopesticide which is a step towards fast tracking registration of safer products and reducing the use of hazardous products.

Key Challenges

i. Inadequate staffing, for instance there was total of 68 Inspectors against the required 168 to effectively perform regulation and certification seed, agricultural and exports and imports of plants and plant products.

ii. Inadequate laboratory equipment for seed and pesticide laboratories.

iii. Interceptions on global markets due quarantine pests like False Codling Moth (FCM) and stringent international market demands on MRLs and presence of HOs, affecting export volumes, and even leading to shrinking of market.

iv. Lack of modern equipment for pest and disease diagnosis and analysis of pesticide residues and other contaminants.

v. The production and productivity of most crops has remained low due to climate change effects, erratic weather patterns, limited use of improved seeds, low use of fertilizers and poor agronomic practices.

vi. Poor Post-harvest handling techniques utilized.

vii. High incidence of pest and diseases especially (Bacterial wilt, Late blight)

viii. The COVID 19 lockdown which reduced demand for vegetables and movement of farmers resulting into reduction of prices and losses.

ix. There is little or no value addition done

Certified Exports:

1. Cocoa: 4,267,560 metric tonnes
2. Coffee: 233,918,988 metric tonnes
3. Tobacco: 2,232,000 metric tonnes
4. Tea: 31,032,568 metric tonnes
5. Flowers: 65,000 metric tonnes
6. Fruits & Vegetables: 45,052 metric tonnes
7. 1,626 samples of seed to ascertain seed quality; as result of which a total of 21,207 metric tonnes for maize, beans, vegetables, soya beans, sorghum, sunflower and ground nuts were certified.

x. Price fluctuations due to Bumper harvest of commodities.

Recommendations to Address the Challenges

i. Recruit adequate staffing for the three divisions of the department to move from current total of 68 Inspectors to the required 168 Inspectors that were submitted to Ministry of Public service to effectively perform regulation and certification seed, agricultural and exports and imports of plants and plant products.

ii. Farmers should work with research organizations to obtain clean root stock and scion

iii. Continue developing and disseminating guidelines, and providing trainings and equipment on post-harvest handling of commodities.

iv. Upscale the promotion of new crop production technologies to increase production and productivity on farms.

v. Increase publicity on Aflatoxins prevention, mitigation and control using various methods such as Radios, (Talk shows, news clips) Televisions, and Newspapers in order to boost public awareness on Aflatoxins and Its impact on Agriculture, Health and Trade.

vi. Strengthen/support the Joint task force formed to address the challenge of fake agro inputs (MAAIF, UNBS, URA, MTIC, NDA, MOH)

vii. Equip the seed and pesticide laboratories with modern equipment

viii. Procure modern diagnostic tools to strengthen its Laboratories capacity and train continue to train its human resource.

ix. Strengthen Agricultural Police to support the enforcement of Agricultural laws as a priority.

x. Engage and sensitize farmers on issues quality chemicals and also inform them to desist compromising quality in exchange for cheap substandard products.

Photos: (Top) A farmer group carrying out a field practical exercise on Soil and Water Conservation in Mpigi District

(Below) Coffee field of Mr. Mugambwa John, in Bugaaki s/c in Kyenjojo district.
Photo by ACDP

BIYINZIKA PEARL CHICKEN

Pearl Chicken, yet another premium product from Biyinzika

A leader in the poultry industry in Uganda, we produce our own quality chicks and feeds to supply to our farms where the Pearl Chicken birds are reared, before being processed through our abattoir. This level of integration enables us to consistently provide superior quality Dressed Chicken to the market.

We launched into the Dressed Chicken market in 2020, an investment that makes us a vertically integrated poultry company from supplying eggs, to hatching and breeding chicks and finally to providing a superior quality Dressed Chicken.

With an initial investment of over UGX 4 billion in our Dressed Chicken operations, combined with our new state-of-the-art abattoir, we are excited about our very own high quality Dressed Chicken, 'BIYINZIKA PEARL CHICKEN', a home-grown brand.

We are becoming an active player in this market segment by providing consumers with a quality Dressed Chicken product.

Our delicious Pearl Chicken can be bought at any Biyinzika Pearl Chicken shop or at any supermarket in your neighbourhood. It can also be enjoyed by ordering online through Jumia.

Tel: 0713 243 632 or 0414 220 607/8
Email: info@bpearlchicken.com
Website: www@pearlchicken.com

LIVESTOCK SUBSECTOR

The Directorate of Animal resources; in line with Ministry's strategy of a commodity value chain approach, the Directorate of Animal Resources is the arm of the Ministry that rolls out interventions in areas of dairy, meat, sericulture, apiculture as well as hides and skins

Photo: NAGRIC & DB

LIVESTOCK SUBSECTOR; The directorate of animal resources

The Directorate of Animal resources; In line with Ministry's strategy of a commodity value chain approach, the Directorate of Animal Resources is the arm of the Ministry that rolls out interventions in areas of dairy, meat, sericulture, apiculture as well as hides and skins.

The Directorate of Animal Resources is comprised of three departments and three agencies namely;

i. The Department of Animal Production, with three divisions, Animal nutrition Division, and Veterinary Public Health and the division of Dairy and Meat.

ii. The Department of Animal Health has three divisions; Regulation and Enforcement Division, Disease Control Division and the Division of Epidemiology and Diagnostics.

iii. The Department of Entomology has two divisions; Vector Control Division and the Division of Productive Entomology

The three agencies include; Dairy Development Authority (DDA), Coordinating

Photo: Breeding and multiplication of pure Jersey, Friesian, Brown Swiss at LES in Wakiso District

Centre for Control of Trypanosomiasis in Uganda (COCTU) and the National Animal Genetic Resources Center and Data Bank (NAGRC & DB).

Mandate of the Directorate

Support sustainable animal disease and vector control, market-oriented animal production, food quality and safety; for improved food security and household income.

Key Functions

i. Provide technical guidance for formulation, review and implementation of policies, legislation, standards, plans and strategies in the areas of animal production, animal health, veterinary regulation, inspection and enforcement;

ii. Coordinate the monitoring, inspection, evaluation and harmonization of national programs and projects in the sub sector;

iii. Advocate and mobilize resources and assistance for the sub sector;

iv. Provide technical guidance for human and institutional capacity enhancement for delivery of services in the sub sector;

v. Establish and promote collaborative mechanisms nationally, regionally and internationally on issues pertaining to the sub sector;

vi. Provide guidance on the generation, dissemination and application of appropriate technologies and the provision of advisory services for the development of value chains in the sub sector.

Subsector Performance areas are as follows;

Policies, Laws, Guidelines, Plans and Strategies.

i. Regulatory Impact Assessments for Meat Development, Livestock Identification and Traceability, Animal Breeding, Animal Diseases, Animal Feeds and Veterinary Practitioners was undertaken to guide the regulatory frameworks.

ii. Veterinary practitioners Bill and Animal Feeds Bill undergoing legal drafting

iii. Pastoralism Policy finalised, to be submitted to cabinet.

iv. Hides and skins Policy yet to be validated by stakeholders

v. Meat Investment Plan finalized, awaiting stakeholder validation

vi. Regulations for Animal Breeding Act drafted, yet to be legally drafted

vii. Draft Dairy Policy awaiting national stakeholder consultations

viii. Guidelines for inspection of meat slaughter and processing facilities, to improve the quality and safety of meat produced for human consumption finalised

ix. Protocols for establishing slaughter facilities for both public and private investments drafted.

Photo: Patrick Bigirenkya's goat farm in Hoima.

x. Registration and licensing of both hides & skins and cattle traders undertaken, register updated

xi. Inspection, certification and technical backstopping of 7 meat and piggery production establishments undertaken in central, western and eastern regions of the country.

xii. A Residue Monitoring Plan (RMP) to guide systematic collection and analysis of meat samples to detect food safety hazards including veterinary drugs, pesticides and other chemical residues was developed

xiii. New draft Policy on Tsetse flies and Trypanosomiasis reviewed and submitted to MAAIF top policy management.

Commodity Performance;

Meat

Production: According to UBOS (2018), livestock accounted for about 4.3% to National GDP. The total value for meat was USD 4,303 million. More than 60% of the rural households in Uganda derive their livelihoods from livestock.

The livestock population, in the year 2018, consisted of 12.1 million cattle, 15.6 million goats, 4.4 million sheep, 4.5 million pigs and 48.3 million poultry (Annual Agriculture Survey 2018 UBOS). Annual production of meat in 2017 was estimated at 453,541MT; with beef (211,358MT), goat's meat & mutton (39,990MT), pork (24,197MT) and Poultry (65,481MT) (MAAIF, 2017; FAOSTAT 2017).

Consumption: The demand was 530,134MT which left a net deficit of 76,593MT. The per capita consumption for all meat is 12.1kg (FAO, 2010), with beef averaging 6.5Kg, pork 3.5kg, goat's meat 3.9kg, mutton 0.3kg and poultry 1.52kg. The demand for beef exceeds current levels of supply. This is attributed to a rapid population growth (at 3.3% per annum), increasing urbanization, increased purchasing power and changes in consumption habits.

Currently, beef consumption per capita is 6.5 Kg and the GDP per capita is USD 709.7 (UBOS Statistical Abstract 2018). The central region has the highest beef consumption because it has a very high population, high income and high level of urbanization. According to projections (FAO, 2018) the Uganda human population will grow from 40 million to 106 million (more than double) by 2050 and 44 percent of the people will live in urban areas. GDP per capita will increase by 175 percent.

Exports: There was an increment in Animal and animal product Exports from UGX 672.9 billion in 2018/19 to 729.7, generating a non-tax revenue of 0.32 billion, despite the COVID-19 lockdown. This was due to increase in export of processed milk products. The value of imports also increased from UGX 142.6 billion to 165 billion in year under reporting.

Photo: In order to strengthen breed improvement in the country, Artificial Insemination has been strengthened through production of dairy and beef semen from superior bull at the National bull stud at Entebbe, the produced dozes of semen are extended to farmers in all regions of Uganda.

Photo: NAGRIC & DB

The poultry industry dominated the Import portfolio with day old chicks and concentrates taking over 60% of the imports, while milk and milk products made 85% of the export value.

Gelatin exports (made from hides and skins) increased from UGX 12 billion in FY 18/19 to 19 billion in FY19/20

Dairy

Milk Production: Milk production has been steadily increasing over the years. The increase in milk production is attributed to key interventions by the Authority, other Government players , Development partners and the private sector.

Some of the interventions that led to increased milk production included provision of improved pasture seeds and planting materials, skilling dairy farmers in good dairy farming practices; among others.

The country's total milk production has increased from 2.5 billion litres in 2018 to 2.7 billion litres in 2019. Dairy exports increased from USD131.5 million in 2018 to USD 139.5 million in 2019

Processing: Milk processing constitutes part of the milk that is marketed. The percentage of the marketed milk that is processed stood at approximately 34% in 2019. Uganda's processing companies have increased from 120 with processing capacity of 2.72 million litres in 2017/18 to 135 with processing capacity of 2.8 million litres by end December, 2019.

This has been as a result of new players joining the market and some processors upgrading their processing capacities.

Dairy processers which range from large, medium, small scale and cottages processed a variety of products such as Powdered milk, Ghee, Butter; UHT milk; Casein/whey; Pasteurized milk; Yoghurt, Cream; Ice cream; Fermented Milk; Cheese, to mention but a few.

Exports: Dairy processing for export continued to grow and this resulted into an increase in foreign exchange. Dairy exports increased from USD131.5 million in 2018 to USD 139.5 million in 2019. The increase in the net exports was as a result of increased compliance of Uganda's milk and milk products on both regional and international market standards. Exports included casein, whey proteins, UHT, milk powder; among others. The Dairy exports mainly went to EAC, COMESA countries, SADC, UAE, Nigeria, Syria, Japan, Oman, USA, Nepal & Bangladesh.

Photo: Heifer improves nutrition and income in Mugisa's home. Photo by NAADS

Dairy imports have been fluctuating between

USD 5.4 million in 2015 and

USD 5.19 million in 2019

Imports: With an increase in the country's capacity to process various dairy products, imports drastically dropped. Plenty of products were being processed locally such as Powdered milk; Ghee, Butter; UHT milk; Casein/whey; Pasteurized milk; Yoghurt, Cream; Ice cream; Fermented Milk; Cheese ; among others. This greatly contributed to the reduction in spending on dairy imports and as a result, the country's BOP has improved in regard to dairy industry. The major dairy imports were the Infant Formula because it was not locally processed. Dairy imports have been fluctuating between USD 5.4 million in 2015 and USD 5.19 million in 2019

Consumption: Milk per capita consumption in Uganda had significantly improved. However, consumption was still relatively low as per international recommendation. The Government's effort through Dairy Development Authority is to have every one consuming at least 200 litres of milk annually; as recommended by the World Health Organization. This was being done through milk consumption campaigns and other initiatives such as School Milk Programme. Consumption has increased from 60 litres in 2015 to approximately 63.8 litres in 2019.

Honey

Honey production increased over the years from 12,000MT in 2014/15 to 15,600MT in 2019/20. This was attributed to increased uptake of bee farming among communities and support from projects namely; the Vegetable Oil Development Project, Farm Bee based project and the Regional Pastoral Livelihoods and Resilience project. Since the FY 2016/17, quantities exported were higher than the production because of the honey from eastern Democratic Republic of Congo through the West Nile subregion Details are as shown in table.

Strategic Interventions

Improved access to water for livestock production

Construction of 8 valley tanks and 1 valley dam were almost complete. Water for livestock storage increased capacity by 7.44 – 11.04 million m3.A total of 337 Water User Committees and Associations were established to ensure sustainable management of new water for production facilities. Further, 286 Water User Committees and Associations were strengthened to ensure sustainable management of existing water for production facilities

Vector and Disease control

Procurement of Vaccines: A total 3,011,000 doses (target 2,100,000) of vaccines procured against a susceptible 14.9 million cattle population. Of these 700,000 doses for FMD were distributed to 56 Districts that is: Abim, Bududa, Busia, Gomba, Isingiro, Kaabong, Kalungu, Kamuli, Katakwi, Kayunga, Kazo Kiboga, Kiruhura, Kiryandongo, Kotido, Kyankwanzi, Kyotera, Lamwo, Lwengo, Lyantonde, Manafwa, Masindi, Mayuge, Mbale, Moroto, Mubende, Nakapiripirit, Nakaseke, Nakasongola, Namisindwa, Napak, Ntoroko, Ntungamo, Pallisa, Rakai, Serere, Soroti, Wakiso, Bukwo, Sironko and Sembabule. Others were:500,000 cattle vaccinated against CBPP countrywide;500,000 goats and sheep vaccinated against PPR;50 dogs and cats vaccinated against rabies; 200 cattle vaccinated against Anthrax.

Mass cattle treatment with trypanocidals; Cattle are treated to kill the parasites so as to improve production and reduce human infection risk. Five hundred sixty-seven thousand, nine hundred eleven (567,911) heads of cattle were treated with diminazene acaturate to cleanse

FY	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Trend in production of beehive products						
Honey (MT)	12,000	12,220	12,330	12,440	13,000	15,600
Beeswax (MT)	720	735	742.5	799	850	920
Processed propolis (litres)	5,000,000	6,500,000	7,250,000	7,842,000	9,400,000	11,255,000
Bee venom (g)	1300	2800	3,550	3,960	5,500	6,700
Trend in export						
Quantity exported (MT)	3,000	4,100	52,000	61,500	75,000	82,700
Value (million US$)	9.6	13.12	18.46	22.75	27.74	30.6

Source: MAAIF

the herds of the trypanosome parasite in Bunyoro, Lango, Amudat, Kasese, Rubirizi, along river Katonga, Buganda and Busoga regions. This is done to protect the people and also improve herd production and productivity.

Trypanosomiasis surveillance: Trypanosomiasis surveillance to determine prevalence was carried out in Bunyoro, Lango, Amudat, Kasese, Rubirizi, Isingiro, along river Katonga, Buganda and Busoga regions. The average AAT prevalence in the areas mentioned is 17%. This is on a higher side and can potentially affect the production and productivity of cattle in terms of reduced growth rate, calf mortality, reduced milk production and infertility. The cattle screening was done using ITS-PCR as well as the rapid diagnostic tools.

Foot and Mouth Disease (FMD) outbreak investigations. These were undertaken in 53 districts .The FMD Quarantine restrictions in 18 districts to aid trade in animal and animal products.

These were, Nakasongora, Kiboga , Nakaseke, Kayunga, Kamuli, Butebo, Mayuge, Busia, Katakwi, Sembabule, Nakapiripiti, Bududa, Gomba, Abim, Kaabong, Masindi, Kalungi, Lyatonde; A total of 31 Districts were still under quarantine and measures had been put in place to contain the disease;

Anthrax outbreak investigations were undertaken for in Rubirizi, Kasese PPR in Moroto, ASF & CCHF in Palisa, Nakaseke, Moyo and Kabarole

Acaricide use at farms Investigations: Sixty seven (67) dip wash samples were tested; 11 (16.42%) samples tested within the recommended range of concentration, 35 (52.24%) tested below the recommended range of concentration, 21 (31.34%) tested above the recommended range of concentration

Reduce the tsetse vector and man- tse-tse-animal contacts: Eight hundred sixteen thousand, two hundred eighteen (816,218) heads of cattle were sprayed with deltamethrin based acaricide as a catalyst to stimulate the communities to spray their animals in Bunyoro, Lango, Amudat, Kasese, Rubirizi, along river Katonga, Buganda and Busoga regions.

As a result, 1,567,413 heads of cattle were sprayed by the youth, paid for by the communities. This activity makes a cow

Table: Honey Production and Export (2014-2020)

Photo: A field trial of Mini – mobile PCR machine to reduce the time between sample collection and result dissemination to the farmers.

to kill a tsetse fly rather than a tsetse fly killing a cow.

Certification & inspection of animals & animal products at stock routes and ports of entry & exit: Six thousand, three hundred and forty (6,340) inter-district and 1,520 international veterinary certificates were procured. Animal movement control enforced along major stock routes throughout the Country; Kamwenge-Fort portal- Kasese route; Karuma- Gulu; Karuma- Nakasongola- Kiryandongo-Kampala; Soroti- Mbale; Hoima- Wakiso-Kampala; Mbarara-Bushenyi- Kasese routes

Nine (9) borders supervised; Entebbe international Airport, Malaba, Busia, Katuna, Elegu, Portbell, Post office and Ware houses around Kampala, Pakwach Inland port and Mutukula.

Holding grounds and quarantine stations: In the year, it was planned to set up two holding grounds and quarantine stations on government farms for beef production.

A holding ground and quarantine station were constructed at Kyankwanzi NALI and certified to improve the availability and marketing and export of beef.

Genetic Improvement

The Ministry, through the National Animal Genetic Resource Centre and Data Bank undertook the following:

i. Multiplication of pure dairy animals and appropriate crosses: The target was to produce 2595 improved dairy calves. The achievement was 2000 improved dairy calves.

ii. Multiplication of pure beef breeds and appropriate crosses: A total of 3196 beef calves were produced against a target of 3500. The Outbreak of COVID-19 and the follow-up prevention measures negatively affected movements of AI technicians (the change agents in multiplication of pure animals and appropriate crosses).

iii. Production and distribution of chicks: The target was 2,000,000 improved bred multipurpose chicks i.e. Kuroiler and Rainbow Rooster produced and extended to farmer households in various agro-ecological zones of Uganda. The achievement was 293362 chicks. The low performance was due to the break down and extended downtime of the only hatchery stationed at the Livestock Experimentation Station (LES) in Entebbe.

The four poultry structures in Lusenke stock farm make up the poultry complex that will facilitate production and dissemination of high quality poultry genetics

i. Breeding and multiplication of meat goats: the target was 2899 improved breed goats produced and extended to goat farmer households in various agro-ecological zones of Uganda while 2000 improved bred goats were produced. The low performance was attributed to the outbreak of PPR (Pestes de Petit Ruminantia).

ii. Breeding and multiplication of pigs: A total of 1813 improved bred pigs were produced against a target of 2000. There is still low uptake of AI among pig farmers and also inadequate capacity in provision of AI services in the piggery value chain.

Three (3) sty structures have been set up in Kasolwe stock farm. These will facilitate production and dissemination of high quality pig genetics

Challenges

i. High costs of improved breeding services, due to few sources of breeding materials within the country; lack of breed societies/associations; high cost of utilities that service animal breeding (e.g. electricity); high taxation of related goods and services; and poor distribution network for the inputs and services (e.g. semen, liquid nitrogen);

ii. Weak policy and regulatory framework, occasioned by: lack of statutory instruments in the Animal Breeding Act; non-deterrent penalties provided under the regulatory framework; and inadequate funding for enforcement; and

iii. High prevalence of animal diseases and vectors.

iv. Poor enforcement of set standards, laws and regulations

v. Lack of reasonable funding coupled with understaffing

vi. Lack of facilities to undertake timely diagnostic and analytical services on animals, meat and other products

vii. Poor access to machinery and heavy equipment for construction and rehabilitation of water facilities.

viii. Limited Capacity for inspection of inputs in the beekeeping industry as well as honey and other products

ix. Limited Coordination among relevant stakeholders

Recommendation

i. Enforcement of standards, laws and regulations should be enhanced through better facilitation of law enforcers

ii. Increase sector funding to enable more recruitment and better remuneration

iii. Construct and equip more laboratories in different regions and provide consumables and technicians.

iv. Strengthen the capacity of District Entomologists to inspect inputs and products of the beekeeping industry

v. Strengthen coordination with other ministries and agencies.

vi. Build capacity for MAAIF and LGS technical personnel in harnessing commercial insects for food and feed

vii. Disease surveillance becomes very vital and critical, to develop rapid and mobile diagnostics tools so as to have real-time responses.

viii. Increase advocacy among MDAs and international partners for support in control efforts

FISHERIES SUB SECTOR

The Directorate is in charge of rolling out programmes in the fisheries subsector which is favoured by the biodiversity and location of Uganda characterised by good climatic conditions, over 250 valuable fish species and water area of 18% of total land surface of which over 5,650km is supportive of aquaculture

Directorate of fisheries resources; Promoting growth from Uganda's water resource

The Directorate is in charge of rolling out programmes in the fisheries sub-sector which is favoured by the biodiversity and location of Uganda characterised by good climatic conditions, over 250 valuable fish species and water area of 18% of total land surface of which over 5,650km is supportive of aquaculture

The Directorate of Fisheries Resources is mandated to "Support, Promote, Guide and Regulate the fisheries sub-sector, so as to improve quality and increase the quantity of fish and fishery products produced for domestic consumption, food security and export".

This mandate is executed in collaboration with other Ministries, Departments and Agencies (MDAs), private sector, development partners, civil society, training and research institutions, local governments, fishers and farmers' associations who are involved in guiding and supporting all fisheries and aquaculture development initiatives.

Functions of the Directorate

i. Provide technical guidance for formulation and implementation of policies, plans and strategies in fish production, marketing, inspection and certification.

ii. Supporting, supervising and monitoring of fisheries and fishery products;

iii. Sustain market-oriented fish production from capture fisheries and aquaculture.

iv. Fish quality assurance and inspection for quality and safety

v. Fisheries Control and regulation

vi. Support and promote aquaculture production and management

Top: On a daily basis, fishing industry provides incomes and livelihood support to over 800 households in Uganda

Performance in line with Industrialization and Job creation.

The overall performance of the fisheries subsector covers areas of capture fish production, aquaculture, fisheries licensing, quality assurance and exports. There was increased availability of fish both from capture fisheries and aquaculture. Sustaining enforcement of fisheries laws and regulations, led to a reduction in illegal fishing methods and gears. As a result, there was a progressive increase in fish stocks accompanied with better catches of commercial fish species mainly Nile Perch and Tilapia increased. The availability of raw material (fish) sustained operations of the 12 fish processing factories.

Policies, Laws, Guidelines, Plans and Strategies

i. The National Fisheries & Aquaculture Bill was approved by Cabinet. The bill was submitted to the Uganda Printing and Publication Cooperation for gazettement. The bill will provide for a better enabling environment for development for increasing fish production through of capture fisheries, aquaculture and reduction of post-harvest fish losses.

ii. Aquaculture rules were submitted to legal drafting, review of fishing rules was finalized and Standard Operating Procedures for fisheries enforcement were finalized.

Commodity Performance; Capture fisheries production

There was increase in fish catches on various water bodies. Data from Catch Assessment Surveys conducted on Lakes Albert, George, Edward and Kazinga Channel showed that a total of 6,637t of fish valued at 57.82 billion UGX was estimated, with Lake George contributing highest to the catch. On Lake Albert, the total annual catch was 33,547t valued at 761.5 billion UGX. On the other hand, fish production from Lake Victoria was 205,018.6t while Kyoga produced 36,408.7t. Overall, there was a notable improvement in fish production and the sizes of fish landed. Nile perch, Tilapia and Mukene fisheries continue to remain species of commercial value on all water bodies.

Generally, the catches of small commercial fish species decreased. The decline was attributed to the natural cycle where increased catches of large commercial species are accompanied by a reduction in catches of small commercial species. For these species, a progressive tendency towards value addition was observed with processed and packaged products of mukene including fried, powdered and sundried being available in supermarkets.

Aquaculture production

Aquaculture continued to grow with an estimated total production of 130,000MT from 5,000 cages and 25,000 fish ponds from an estimated 20,000 fish farmers.

Sustained enforcement of fisheries laws & regulations, led to a reduction in illegal fishing methods & gears.

Photo: **Fish at a stall in one of the markets in Uganda.**

Out of the total 23,138 fishing vessels targeted for fish species specific licensing, we licensed

10,523

which is 45% compliance.

Overall, the activities undertaken created a favourable environment for increased industrial fish processing and this resulted into increase in employment from which income is earned.

Key Interventions;

Aquatic Weed Control

The ministry, under the SSFD Project, supported fisheries monitoring, control and surveillance patrols by the UPDF, controlled fishing effort through species specific licensing and encouraged community participation in control of invasive aquatic weeds through procurement and distribution of manual aquatic weed removal equipment (wheel barrows, pangas, life jackets, forked hoes and spades.

Top: Fish ponds strategy for increased controlled harvests.

As a result, navigation and fishing operations were eased. To further the need for integrated approach to aquatic weed control, the ministry working with NARO, continued to maintain trial stations for the biological control of the Kariba weed on Lake Kyoga.

Monitoring, Control and Surveillance

The Ministry supported enforcement of fisheries laws and regulations with the Fisheries Protection Force. In the year under review there was continued monitoring, control and surveillance patrols on land and water.

Lake Kyoga was closed to fishing to allow recovery of fish stocks but also make reforms in the size of fishing boats. As a result of these interventions, improvement in fish stocks has been reported on all lakes. A change in the slot size of fish marketed has been observed. Most of the fish caught and marketed is of harvestable slot size.

Challenges

i. Increased costs of fishing and loss of livelihoods resulting from flooding and infestation of water bodies by invasive aquatic weeds especially Kariba weed and water hyacinth. These have led to loss of fishing gear, destruction of fish handling and processing infrastructure and households.

ii. Limited capacity for regulation and enforcement of laws and guidelines on all water bodies hence continued use of illegal destructive gears that catch immature fish.

iii. Aquaculture is constrained by limited investment in fish farming; high cost; limited access to high quality fish seed and feed; and inadequate extension services.

iv. Both capture and aquaculture production systems face challenges of high post-harvest losses; inadequate human, technological and infrastructural capacity at all stages of the value-chain leading to low production and productivity overall.

v. Limited response and financing for the control of the Kariba Weed spread on Lake Kyoga, Albert and now in ponds riparian to Lake Victoria.

vi. Lack of financing to fish landing site infrastructure developments

vii. Overwhelming demand beyond budgetary allocations for inputs by fish farmers and fishing communities.

viii. Inadequate transport vehicles for field activities

ix. Loss of livelihoods in fishing communities as a result of strong enforcement operations

Actions Undertaken

The Directorate undertook an assessment of impacts of flooding and aquatic weeds on the fisheries and aquaculture. Following the assessment, a request was made to Cabinet to approve emergency funding for addressing the negative impacts of flooding and aquatic weeds. This funding will address various management and development issues in relation to control of invasive aquatic weeds, sustain enforcement, manage fish post-harvest losses and aquaculture management.

Photo: Jimmy Siya, a satisfied and successful fish farmer in Budaka district.

DIRECTORATE OF AGRICULTURE EXTENSION SERVICES

Promote adoption of appropriate information, knowledge, and technological innovations for commercialization of agriculture in Uganda.

DIRECTORATE OF AGRICULTURE EXTENSION SERVICES; Empowering Farmers

Promote adoption of appropriate information, knowledge, and technological innovations for commercialization of agriculture in Uganda.

Agricultural extension is and remains one of the most important tools for agricultural sector transformation as it serves as a knowledge conveyer belt from research and educational institutions to farmers.

Government of Uganda 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 MAAIF.

Under this policy, the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) through the Directorate of Agricultural Extension Services (DAES) is mandated to reorganize the agricultural extension service into a harmonized, well-coordinated and integrated delivery system. The Policy goal is strengthen and establish a sustainable farmer-centered agricultural extension system for

Photo: Weaving Spinning Banana fibre to threads

increased productivity and household incomes with four main objectives:-

i. To establish an effective and efficient pluralistic agricultural extension delivery system

ii. To build institutional capacity for effective delivery of agricultural extension services

iii. To develop a sustainable mechanism for packaging and disseminating appropriate and relevant technologies to all categories of beneficiaries.

iv. To empower farmers and other value chain actors to effectively participate in agricultural extension processes and build their capacity to demand for services.

The Directorate has two departments namely:-

i. Department of Extension and Skills Management (This department has three divisions namely; Division of Information Communication, Division of Skills Management and Division of Agricultural Extension Coordination)

ii. Department of Agricultural Investment and Enterprise Development (With two divisions; Division of Agribusiness Services and Division of Primary Processing and Value Addition).

Mandate and Functions of the Directorate of Agricultural Extension Services

The mandate of the Directorate is to: "Promote adoption of appropriate information, knowledge, and technological innovations for commercialization of agriculture."

The Directorate has several functions and these include;

Policy formulation and reviews on matters related to agricultural extension

i. Strengthen coordination of local government production departments, NGOs and private

ii. Provide technical advice on agricultural extension and advisory services

iii. Setting standards for service delivery in local governments and private sector

iv. Quality assurance of agricultural extension services

v. Support agricultural enterprise development nationally

vi. Provide information and communication services to MAAIF and local governments

vii. Strengthen inter-institutional linkages between research, educational and farmer institutions

viii. Promote agribusiness services and agricultural value chain development with private sector

ix. Support farmer institutional development through capacity building programs

x. Support skilling and manpower development in the agricultural sector

xi. Identify investment opportunities in the agricultural sector

Subsector Performance under the following areas;

Policies, Strategies, Guidelines and Laws

During the FY 2019/2020, the draft Cabinet paper on the principals of the National Agricultural Extension Bill 2017 was completed and presented to MAAIF Top Policy Management. Most policy documents were disseminated online and

To empower farmers and other value chain actors to effectively participate in agricultural extension processes and build their capacity to demand for services.

Photo: **Quality assurance and distribution of Tea seedlings under Government strategic interventions.**

these included the: National Seed Policy and Strategy, National Agricultural Extension Policy and the National Agricultural Extension Strategy.

To operationalize these policy documents, a number of policy instruments were disseminated.

These included among others:

i. Guidelines and standards for agricultural extension services

ii. Ethical code of conduct for extension officers and the process of registration and accreditation of service providers.

iii. Profiling and mapping of Cottage industries conducted in the Central Region districts concentrating on the value chains of dairy, poultry and piggery enterprises. The participating districts included: Luweero, Kiboga, Nakasongola, Kayuinga, Mukono, Buikwe, and Nakaseke and in the corresponding sub counties.

iv. Gross Margin Analyses conducted for Maize, Beans and Bananas, including livestock enterprises (beef, Dairy, Poultry and Piggery) in Mukono, Wakiso, Kampala, Nakaseseke, Luwero, Mubende and Kiboga.

Strengthening Coordination, Collaboration, Partnerships and Linkages

The pluralistic nature of the agricultural extension services demand that actors along the entire value chains are coordinated, harmonized and supported. The DAESM continued to work with Development Partners and Non-State Actors in FY 2019/2020.

This relationship showed marked improvements;

i. MAAIF was one of the Organizers and funders for the 3rd National Agricultural Extension Symposium. This Symposium brought together many actors both Public and Private. The Launch of the 7 day activities was done at MAAIF Premises and e-Registration of the of the Agricultural Extension Service Providers was also launched by the Hon. Minister for Agriculture, Animal Industry and Fisheries, Hon. Vincent Bamulangaki Ssempijja. This was followed by a series of virtual meetings, which were attended by and concluded by another meeting at Hotel Africana.

ii. Technical Support was given to all the 135 District Local Governments and their Municipalities. To achieve this, we used the approach of having DAESM staff attachments to Districts Clustered under the 9 ZARDIs, the Department also participated in the Joint inter-ministerial Inspection of Local Governments. 121 Districts were able to submit their reports on the Agricultural Extension activities carried out in the districts, especially with support of the Agricultural Extension Fund.

iii. Recruitment of Agricultural Extension staff. The Recruitment status for Agricultural Extension Officers currently stands at 4,100 (641 female

and 3,459 male) compared to the approved number of 5,000 Extension Officers. The ideal number would be 12,000 Extension Officers.

iv. The Ministry adopted and scaled up Village Agent Model (VAM) in order to enhance value chain development in the agricultural sector. In view of the existing gap between the extensions: farmer ratio. The model has brought on board the private sector working closely with farmers at the grass roots (village). A total of 6,528 village agents, traders and extension staff were trained across the country.

Numbers of Trained Traders, Village Agents and Extension workers

i. Enhanced institutional capacity to facilitate scaling up of rural-based agricultural commercialization and agribusiness development among actors in the targeted value chains (maize, rice, Soybean and oranges).

ii. Pre-season review and planning meeting for all the 135 Districts. The Department carried out an assessment of DLG performance based on reports submitted and the field visits undertaken. The districts were ranked by a team of DAESM staff and the feedback was given in this Pre–season meeting. This was in an effort to improve performance of LG.

iii. Benchmarking. Three Officers from DAESM went for benchmarking in Kenya; Kisumu and Busia counties. This activity was very useful because the Officers shared and learnt a lot as far as Agricultural Extension Service delivery is concerned from the officers and farmers from these two counties. Subsequent visit to Rwanda by another Team of Officers was not possible due to COVID 19 outbreak.

iv. Collaboration with Feed The Future USAID project on assessment of implementation of the National Agricultural Extension Strategy (NAES 2018) in 9 districts from the follow-

Photo: A 57 year old housewife turns into a pineapple commercial farmer after getting extension services/ knowledge from NAADS.

A total of

6,528

village agents, traders and extension staff were trained across the country.

ing 7 zones: Buginyanya; Kamuli, Sironko, Nabuin, Amuria, Ngetta, Lira, Bulindi; Masindi, Abi; Adjumani, Muzardi; Mubende, Mbazardi; Rakai, Mitooma. More dissemination and awareness training on the strategy to the key implementers is still necessary as more than 50% of respondents to the assessment could not easily interpret the ramifications of the strategy to the sector

v. Validation of potential sites for inclusion in the establishment of value addition and processing plants in collaboration with Colas and Alvan Branch. Concentrating on grains, tea, fruits and cassava planning to partner with over 196 private sector partners.

Agricultural Information and Communication materials developed and disseminated

Agricultural Extension manuals for Extension Officers were developed for Poultry, Coffee, Aquaculture, Post-Harvest Handling and access to markets. Dissemination of these materials was done mainly in soft copies.

Support skilling and manpower development

i. Two Officers in were supported to successfully undertake Post Graduate Diploma courses at UMI in Public Administration & Management and Information Technology.

ii. Participated in curricula review with Makerere University department of botany and zoology which helped to refine the curricula to meet the current needs of the agriculture sector.

iii. Capacity building of extension staff on soil testing and agronomic practices in 57 districts with resources from the Agriculture Cluster Development Project (ACDP).

Setting Standards and Quality Assurance of Agricultural Extension Services

A total of 5000 copies of the ethical code of conduct were printed and disseminated to all the 135 DLG. The Ministry was also working with DLG to enhance uptake of technologies developed through NARO through establishment of demonstrations gardens and Field days.

Provision of value addition extension services

i. Mobilization of farmer groups and cooperatives to support the established food processing and incubation center at the National Agricultural Research Laboratories at Kawanda supporting maize, rice and soya beans processing into instant flour, food research development among others.

Photo: Rwenzuru Queen Mother Admires the Art of Using the Spinning Wheel to Make Thread

Photo by UIRI

ii. Value chain studies on sheep, cattle, goats, poultry, apiary) (maize, groundnuts, sunflower, vegetables) carried out in all the districts in the Karamoja sub region.

Key Outstanding Challenges Experienced During FY 2019/2020

i. Inadequate staffing and infrastructure capacity limiting effective delivery of extension services at both central and Local Government level

ii. Whereas the Directorate has been able to develop extension materials, the lack of financing has affected sensitization and wide dissemination.

v. Un-coordinated movements of teams in Extension service delivery due to uncoordinated parallel programmes being implemented by MAAIF, its agencies like NAADS, OWC, UCDA, NARO and other MDAs

vi. The e–diary is an effective means of tracking DLG staff performance however, the directorate is lacking funds to roll out this intervention to other districts other than the pilot ones namely Kalungu and Ntungamo.

vii. Due to lack of the financial muscle, there is weak supervision and ineffective monitoring.

viii. Some of the very important documents being used as reference documents like the National Agricultural Extension Strategy (NAES) 2018 need review because the indicated period of application has expired yet there are no funds for this.

iii. The delays to enact the national Agricultural Extension Bill 2017 has weakened the capacity of the directorate to register, accredit and coordinate service providers.

iv. COVID 19 has compromised the speed at which extension service delivery was progressing, because of the requirement to meet just a few people at a go and also observe all the MoH provided guidelines as far as the control of the spread of this pandemic is concerned.

Proposed appropriate recommendations to address the challenges

i. Avail more resources to DAESM to support recruitment of staff, infrastructure development at both Central and Local Government Levels; support staff to deliver extension services safely in the new normal, for sensitization, review, multiplication and dissemination of extension materials; and also, for supervision and effective monitoring of extension service delivery.

ii. Expedite the process of enactment of the National Agricultural Extension Bill 2017 to strengthen the capacity of the directorate to register, accredit and coordinate service providers

iii. Adopting e-extension for increased coverage

Photo: A robust yield of groundnuts after using quality planting material.

National Agriculture Policy; Uganda investing strategically for the future

The National Agriculture Policy (NAP) was passed by cabinet in September 2013 and launched by His Excellency the President of the Republic of Uganda in September 2014.

The NAP offers a long-term vision for Uganda's agricultural development in crops, livestock, agro – forestry & fisheries.

Photo: President Museveni hands over a cheque of primary processing equipment for farmer organisations, Namalere mechanisation Centre

Q How will the government ensure improved agri-cultural production and productivity?

- Promote access to and use of better-yielding seeds, planting and stocking materials and other inputs.
- Promote agricultural enterprises that enable daily, periodic and long-term household income.
- Promote production of nutritious food and enterprise mixing to meet household nutrition needs and income earning.
- Strengthen capacity for control of pests, diseases and vermin in crops, livestock, agro-forestry fisheries.
- Promote agricultural extension and agribusiness advisory services to all farmers.
- Promote labour-saving technologies and agricultural mechanization.
- Promote irrigation and water for livestock and fish farming.
- Enhance research and capacity to generate new knowledge and technologies for agricultural development.
- Promote financial products and services that are appropriate for use by the actors in the agricultural value chain.
- Promote large-scale farming, cluster farming, block farming and out grower schemes where appropriate.
- Support development and sustainable use, management and maintenance of water and land resources for agriculture.
- Develop capacity at all levels for planning and implementation of activities to address climate change and its impact on agriculture.
- Facilitate farmers to organize themselves into production and marketing groups.

Q What will the government do to strengthen agro-processing?

- Support the establishment of appropriate agro- processing and storage facilities to improve post-harvest handling and enhance value addition.
- Provide basic infrastructure and reliable access to utilities (water and electricity) to encourage investment in agro-processing.

The NAP offers a long-term vision for Uganda's agricultural development in crops, livestock, agro – forestry & fisheries.

Promote Uganda's products as a recognizable national brand in domestic regional and international markets and promote labeling of products as "Product of Uganda"

- Develop and disseminate efficient, cost-effective and appropriate technologies for commodity processing and preservation.

Q How will the government support improvements in domestic, regional and international trade?

- Improve agricultural product handling, marketing and distribution systems and linkages to all types of markets.
- Develop and expand a sustainable nationwide market information system that is transparent and easily accessible to all stakeholders.
- Improve strategic locations of physical market infrastructures for crops, livestock and fish.
- Develop supportive transport infrastructure.
- Promote Uganda's products as a recognizable national brand in domestic regional and international markets and promote labeling of products as "Product of Uganda".

Q How will the government ensure effective use and management of our agricultural resources now and in the future?

- Local governments will enact and enforce ordinances and by-laws regarding local utilization and management of agriculture resources within ecologically sustainable levels.
- Continuously sensitize households and communities on appropriate land management and conservation technologies and practices.
- Continuously disseminate meteorological data at all levels and establish a sustainable network of community-level meteorological stations across the country.
- Promote irrigation and water harvesting for agricultural production.
- Promote land use and farm planning services among farmers.
- Strengthen the capacity of the central and local governments to plan and implement activities that address climate change impacts on agriculture.

Q What other investments and services should the government and non-state actors make towards the realization of agricultural development?

- Investment in new energy as well as expand existing energy infrastructure and associated services for agriculture and agriculture-related services.
- Investments in the local manufacture of fertilizers that will greatly improve agricultural yields.
- Construction of roads that will support increased agricultural and industrial production.
- Delivery of financial products that can be used in the short, medium and long-term which will help to address the current agricultural financing gap.
- Investments in off-farm bulk water development like larger reservoir dam construction, bulk water transfer systems, water diversion systems and aquifer exploration to support improved crop production, meet livestock production needs and support fish farming.

- Investments in programmes and interventions that mitigate the impact of climate change on agriculture in high-risk areas.
- Investments in new constructions, rehabilitations and improved management of marketing infrastruc- ture, ensuring that the facilities are located at strategic points for optimal access by producers, processors, traders and consumers.
- Investments in the development of efficient, sustainable and timely market information systems for farmers, traders and processors. In addition, education for market information users on optimal utilization of the information provided.
- Investments in deepening and increasing coverage of the Warehouse Receipt System (WRS)
- Reorientation of the curricula at agribusiness-related training institutions to respond to the needs of the agriculture sector.
- Investments in the development and implementation of a national agricultural trade and marketing information systems so that Uganda's products are effectively positioned in the regional and international markets.
- Investments in strengthening the link between primary and tertiary agro-processing levels, as well as support to start-up agro-processing enterprises in agricultural zones.
- Investments in building the capacity of farmers and farmers' organizations in management, entrepreneurship and group dynamics skills so that they can increase production and productivity as well as engage in higher-level value chain activities including collective marketing.
- Investments in training and skills development in agricultural education, research and advisory services.
- Investments in health service delivery so that farm- ing households are empowered to adopt positive behaviors that mitigate the effects of disease and poor nutrition.
- Aggressive awareness creation on sustainable use and management of agricultural resources.
- Investments in programmes and interventions to timely respond to disasters in the country.

Photo: Government interventions have given hope to farmers through good yields

Q How can you support the government in making the national agriculture vision a reality?

- Implement all the decentralized and devolved agriculture services, including regulatory and advisory services.
- Develop and implement appropriate bylaws to regulate food security, animal movement, monitor and

The Agricultural sector is regulated by the following laws and guidelines:

SN	Law/Regulation
1.	The Agricultural and Livestock Development Fund Act, 1976
2.	Agricultural Seeds and Plant Act, 1994
3.	Animal Breeding Act, 2001
4.	Animal Diseases (Amendment) Act, 2006
5.	Animal Diseases (Selective Importation of Livestock, Livestock Products, Co-products and By-Products) Regulations, 2003
6.	Animal Diseases (Quarantine) (Amendment) Rules, 2005
7.	The Plant Protection Act, 1962
8.	Animals (Prevention of Cruelty) Act, 1957
9.	Animal Diseases (Control of Bee Diseases) Rules. 2004
10.	Cattle Grazing Act, 1945
11.	Cattle Traders Act, 1943
12.	The Control of Agricultural Chemicals Act, 1989
13.	The Agricultural Chemical (Control) Act, 2006
14.	The Cotton Development Act, 1994
15.	Fish (Amendment) Act, 2011
16.	Fish Act, 1970
17.	National Agricultural Advisory Services Act, 2001
18.	National Agricultural Research Act, 2005
19.	The National Agricultural Research Organisation Act, 1992
20..	The National Drug Policy And Authority Act, 1993
21.	National Forestry and Tree Planting Act, 2003.
22.	National Tobacco Corporation Act, 1978
23.	Seeds and Plant Act, 2007
24.	The Uganda Tea Authority (Repeal) Act, 2006
25.	The Uganda Tea Growers Corporation (Repeal) Act, 2006
26.	The Uganda Trypanosomiasis Control Council Act, 1992
27.	The Veterinary Surgeons Act, 1958
28.	Diary Development Act, 2000
29.	Dairy Industry Act, 2000
30.	Food and drugs act, 1959
31.	Hides and Skins (Export Duty) Act, 1962
32.	The Animal Diseases Regulations, 2003.
33.	The Dairy Regulations 2003
34.	The Cotton Regulations, 2005
35.	Meat Policy, 2003
36.	The National Coffee Policy, 2011
37.	The National Meat Policy, 2003
38.	The Uganda Food and Nutrition Policy, 2003
39.	The National Veterinary Drug Policy, 2002
40.	The National Fisheries Policy, 2004
41.	The National Animal Feeds Policy, 2005
42.	Dairy Development Policy, 2011
43.	National Delivery of Veterinary Services Policy, 2002
44.	National Veterinary Drugs Policy, 2002

Table: Laws and Guidelines regulating the agriculture sector in Uganda

report animal and crop diseases and provide opportunities for public-private partnerships (PPP) with investors.

- Monitor implementation of agricultural plans and polices at the district and lower levels of governments. Mobilize and empower farmers and farmer groups to produce, process and market their commodities.
- Sensitize and guide communities and implementers to address traditional and cultural issues affecting the selection, promotion and utilization of strategic agricultural enterprises.
- Increase farmer awareness about protecting agricultural production natural resources especially land and water.

Q How can you support the government in making the national agriculture vision a reality?

As private sector:

- Invest in agricultural production at small, medium and larger scales.
- Invest in agricultural commodity processing and value addition.
- Participate actively in technology development, multiplication and dissemination.
- Participate in marketing both inputs and outputs domestically, regionally and internationally.
- Provide agricultural finance services to support in investment in production, processing and marketing of agricultural produce.
- Advocate for improved policy, regulatory and institutional frameworks that effectively support private sector activities.
- Dialogue with the government and other stake- holders on strategic actions needed for agricultural development.
- Improve farmer access to key agricultural support services.
- Invest in rural infrastructure through public-private partnership.
- Promote the formation of strong, self-regulating professional associations, guilds and partnerships committed to agricultural development.

Photo: A new bridge connecting Kayunga district to Kamuli town.

Photo: The World Bank mission team meeting with the Hon Minister of State for Agriculture, March 2019.

Q How can you support the government in making the national agriculture vision a reality?

As civil society:

- Mobilize farmers to access financial products and services, farm inputs, markets and other relevant agricultural goods and services.
- Monitor implementation of government programmes.
- Develop and implement complementary agricultural programmes in line with government policy and plans.
- Contribute to policy formulation and reviews at all levels.
- Advocate for improvement in agricultural services within the prevailing policy and regulatory environment.

Q How can you support the government in making the national agriculture vision a reality?

As a development partner:

- Share good practices and alternative approaches to agricultural development.
- Provide financial and technical support to the agriculture sector.
- Adhere to partnership principles between government and development partners.

Q How will the Ministry (MAAIF) lead in agricultural development?

- Develop and implement policy and regulatory frameworks.
- Advocate and implement policy and programme coordination and monitoring.
- Provide farmer extension and training services.
- Support agricultural research.
- Promote and support value chain development and commercialization.
- Support the local governments in enacting and enforcing by-laws and ordinances on household food security.
- Mainstream the needs of vulnerable groups in sector plans and interventions.
- Review, deepen and operationalize sub-zone specific agriculture production zones in Uganda.

Changing trends in the Financial Sector; A wake call for financial institutions

Digital Banking A Solution to the unbanked

Wow, 2020 was a year that all the rules in financial service markets were brought to a hold. Traditional financial institutions were faced with challenging moments. Walk in services, face to face or over the counter services were suspended or operated at 20% capacity due to the lockdown restrictions. Such a move to the sector saw a reduction in the quarterly earning in all banks across the board.

Robert Kintu. M. J.
Country Manager /
CEO Maalicard Digital Banking Solution.

Maalicard is a subsidiary Service Promoted by FIT Insights Limited

As we move into the 2021, the financial sector needs to rethink and repackage its service offers. Increasingly the walk-in services are becoming expensive as cost of doing business. Bank need to relocating their budgets into technology infrastructure setups and seek partners to propel their existance. It can be predicted that in the next 2 to 3 years, financial institutions will be spending more than 45% of their budgets on IT infrastructure setups and maintainance support.

Today, it is noted that banks are now moving fast to embrace and transform their traditional walk-in service users to mobile app and web-based platforms. Most of the banking halls are limited with staff; as banks were forced to down side the non-critical staff and allow other staff to work from home.

The Ugandan market has not been left untouched, with only 21% of the population banked, institutions are slowly focusing the conversion of these individuals to mobile apps, Unstructured Supplementary Service Data (USSD), for feature phone users and to web-based platforms. Yes, this is possible for the bank since over 53% of the population in Uganda has access to mobile phones. It is not a surprise that the Mobile Network Organization (MNO) are making transactions that are three times bigger than all banks combined in a month. These companies have access to the numbers of registered users due to the alterative service offers predesigned in their business models.

The individual bank consumers are looking for convenience and less mindful of the cost of service. It is true that mobile based transactions are more expensive than banking costs, the users of mobile services are happy with the service due to availability, reliability, outreach and presence in their remote areas of aboard. It is time for the banks, sector regulators , to rethink the service delivery models for the common individuals and more so the unbanked 79% of the Ugandan population.

MAAIF IMPLEMENTING AGENCIES

Ministry of Agriculture, Animal Industry and Fisheries is a macro - level structure with centralised planning for the entire agricultural sector. The impact of the programs rolled out by the Ministry in areas of Crop, Animal, Extension Servives and Fisheries is made possible by agencies which derive their mandate from the Ministry.

The identification of priority areas for each program is therefore channeled through agencies. The Ministry has made remarkable progress in respective subsectors through the agencies.

Mandate: Coordinating, overseeing, and guiding agriculture research in Uganda.

Vision: To increase farmers access to information, knowledge and technology for profitable agricultural production.

Vision: Optimize livestock production and productivity through animal breading to improve food security and eradicate poverty in Uganda.

Mission: To play a leading role in establishing a comprehensive national animal breeding program in Uganda.

Vision: A decentralised farmer owned/ controlled agricultural advisory service system with increasing participation of the private sector.

Mission: To increase farmers' access to information, knowledge and technology for profitable agricultural production.

Uganda Coffee Development Authority

Vision: Making Uganda a distinguished producer of high value coffee .

Mission: To promote and oversee the development of the entire coffee subsector through support to research, propagation of clean planting materials, quality assurance, value addition and timely provision of market information to stake holders.

Vision: Building a sustainable cotton subsector in Uganda.

Mission: To promote and monitor production, processing and marketing of high value cotton and its biproducts for the welfare of our society.

Mission: A dynamic, profitable and well-regulated dairy sector.

Vision: To provide dairy development and regulatory services that will ensure increased production and consumption of milk, sustainable and profitable dairy industry sector that contribute to economic development and nutritional standards in Uganda

Vision: Healthy and prosperous people in Uganda free from tsetse trypanosomiasis with highly productive agricultural sector that ensures improved quality and improved quantity of food for all people and good returns for investment.

Mission: To create tsetse fly free zone and eliminate sleeping sickness and nagana in Uganda.

Cotton Development Organisation; Paving the Agro-industralisation pace

The National Development Plan II (2015/16 – 2019/20) has ended. A review of progress made in Cotton Sub-sector indicates major achievements in cotton research, quality and domestic value addition.

As we move forward, Government has developed NDP III with 18 Programs.

Cotton, having one of the longest agriculture commodity value chains, has been identified as a strategic commodity under NDPIII's Agro-industrialization Program.

Over the next five years, focus will be put on generating improved cotton production technologies, increasing production and productivity, improving quality and promoting increased domestic value addition.

It is expected that this will result in increased household incomes, creation of employment opportunities, increased returns from cotton, increased foreign exchange earnings and import substitution.

Highlights of key Cotton Sub-sector achievements under NDP II

a) Two new cotton varieties; BPA 2015A and BPA 2015B were released.

b) A Bio-pesticide laboratory was es-

Photo: Gogonyo, Pallisa District - An Extension Officer training farmers on harvesting and quality of cotton

tablished with support from the India/Africa Cotton Technical Assistance Program (TAP) at the National Semi-Arid Resources Research Institute (NaSARRI) in Serere for formulation, testing and preparation of Bio-pesticides and Bio-fertilizers. The lab also runs activities on soil testing to facilitate recommendation of appropriate fertilizers.

c) Cotton production increased from 110,707 bales of lint in 2015/16 to 202,357 bales in 2017/18 but dropped to 173,457 bales in 2019/20 largely due to climate change and fluctuations in farm-gate prices. Farmers' incomes rose from Sh. 88 billion in 2015/16 to Sh. 181 billion in 2018/19 while foreign exchange earnings increased from US$ 26 million in 2015/16 to US$ 58 million in 2018/19.

d) The quality of cotton improved as a result of intensive sensitization and training of farmers and Ginners on post-harvest handling on cotton. The proportion of total bales classed against International Standards in the top 3 grades increased from 71% in 2015/16 to 79% in 2019/20.

e) Using the Revolving Lint Buffer Stock Fund (an incentive provided by Government since 2015), CDO has so far procured a total of 33,752 bales of lint for the two textile manufacturers; Fine Spinner (U) Ltd and Southern Range Nyanza (NYTIL). This contributed to the increase in domestic consumption of lint from 5% in 2015/16 to the highest of 10% in 2017/18.

f) CDO constructed a new and modern cotton planting seed processing plant in Pajule, Pader District in Northern Uganda. The Plant, which employs over 100 people, has a total seed processing capacity of 2,500 Mt of graded and packaged cottonseed in 4 months and provides about 70% of the total national cotton planting seed requirement.

Specific achievements during FY 2019/20

1. **Quantity of cotton produced** – a total of 173,457 bales of lint (@ 185 Kg) were produced during FY 2019/20 which contributed Sh. 114 billion to household incomes and USD 42 million in lint exports. In addition, a total of 11,562 Mt of cottonseed valued at Sh.12 billion was produced. Cotton production was affected by erratic rainfall patterns during the early part of the growing season (July & August) and heavy rains during the latter part of the season (November & December).

2. **Cotton production support services** – during FY 2019/20, CDO continued to collaborate with Uganda Ginners and Cotton Exporters Association (UGCEA) to implement cotton production support activities under the *Cotton Production Support Program* (CPSP). Funding from UGCEA supported procurement and distribution of production inputs (seed, fertilizers, herbicides, pesticides, spray pumps) as well as facilitating cotton-targeted extension services.

   Government funding to CDO focused on technical backstopping, monitoring and supervision of the cotton production support activities.

Mrs. Jolly Sabune
Managing Director

The following achievements were realized:

i) About 3,137 Mt of delinted, treated and packaged cotton planting seed were supplied to farmers. During the period, cotton farmers in 67 districts in Eastern, Northern, West Nile, Mid-West & Central and Kazinga Channel Regions including 278 women, 165 youth groups and about 278 PWDs were served. Out of the 3,137 Mt of seed, 240 Mt were supplied to farmers in 10 hard-to-reach districts namely; Amuria, Katakwi, Abim, Karenga, Koboko, Zombo, Adjumani, Moyo, Yumbe and Ntoroko.

ii) Under multiplication of cotton planting seed, over 9,500 acres were planted. Thirty-eight (38) Prison Farms were participated in seed multiplication with approx. 4,000 acres planted under medium/large-scale cotton production. A total of 4,870 Mt of fuzzy cotton seed were produced under seed multiplication for planting in the 2020/21 season.

Photo: Kikorongo, Kasese District – An Extension Officer demonstrating to farmers how to spray cotton

iii) A total of 4,000 one-acre demonstration plots were established for training farmers on cotton production technologies in Eastern, Northern, West Nile, Mid-West & Central and Kazinga Channel Regions. Over 12,646 training sessions were conducted at the demonstration plots for about 123,000 farmers. Members of 278 women groups, 165 youth groups and about 278 PWD were among the farmers who were trained at the demonstration gardens. In addition, extension messages were broadcast in 10 local languages on crop establishment and management, pest control, post-harvest handling and indicative farm-gate price using local radios stations.

iv) Provision of cotton-targeted extension services – CDO trained 450 UGCEA extension workers who were deployed in the 67 cotton growing districts. Out of the 450 extension workers 20 were deployed in 10 hard to reach districts. In addition, 90 Local Government (LG) extension staff in 67 cotton growing districts were trained on cotton production technologies.

v) Provision of cotton production inputs – with support from UGCEA, 582 Mt of fertilizers, 1,701,275 one-acre-units of pesticides, 5,564 spray pumps and 4,484 litres of herbicides were supplied to cotton farmers including 278 women, 165 youth groups and 278 PWDs in the 67 districts. Over 123,000 farmers including members of 267 women groups and 158 youth groups were trained on proper use and storage of inputs at the demonstration gardens.

vi) Mechanization of land opening - a total of 1,805 acres ploughed by tractors in 67 cotton growing districts under the CDO/UGCEA tractor hire scheme. In addition, a total of 117,982 acres were ploughed by ox-ploughs distributed in the previous seasons; 65,954 acres were ploughed for cotton and 52,028 for other crops.

vii) Project 1219 for construction of a Cotton Planting Seed Processing Facility in Pader District - construction of the bale shed was completed and the structure was handed over to CDO by the contractors. Construction of the mechanical workshop commenced however work was interrupted by the COVID-19 lock down. The additional 8 gin stands were delivered but installation was postponed due to the COVID-19 lock down. Procurement of workshop machinery was also interrupted by the COVID-19 lock down.

3. **Quality of cotton** - 79% of the total lint produced was classed against International Standards in the top 3 grades. Heavy rains during November and December 2019 affected the quality of cotton harvested.

Photo: Lira District - Tractor ploughing and land preparation using oxen

4. **Regulatory services –**

The following were registered during the 2019/20 cotton marketing season

- 27 ginneries,
- 22 ginners, and
- 19 lint exporters.

5. **Support to domestic value addition to lint –** a total of 4,050 bales of lint were procured and supplied to the two local textile manufacturers using the Government Lint Buffer Stock Revolving Fund. 2,050 bales of lint were procured for Fine Spinners Uganda Ltd and 2,000 bales for Southern Range Nyanza (NYTIL). NYTIL produces knitted garments, woven garments, fabrics in different varieties and bed linens while Fine Spinners produces cotton spun yarn, cotton sewing threads, knitted fabrics and knitted garments. Both companies produce for export and local markets.

Photo: Inside the Ginning and Seed Delinting Halls at the Cotton Planting Seed Processing Facility in Pader District

National Animal Genetic Resources Centre & Data Bank (NAGRC&DB); Driving animal breeding in Uganda

NAGRC&DB is a key implementing section of the Ministry of Agriculture, Animal Industry and Fisheries that leads and implements projects for animal breeding, guided by the vision of national food security and poverty eradication with optimum livestock production and productivity in Uganda.

Photo: An artistic impression of the National Gene bank under construction at NAGRC&DB

About NAGRC&DB

- NAGRC&DB was established by the Animal Breeding Act, 2001.
- A semi-autonomous agency under the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF).
- Responsible for commercialization of animal breeding activities in Uganda.
- Carries out development activities that enhance animal genetic improvement and productivity.

Vision: A leader in profitable production and efficient delivery of animal genetic resources and services in Eastern and Central Africa.

Mission: To establish a comprehensive and sustainable National Animal Breeding programme which meets the commercial and developmental interests of the actors along the livestock sub-sector value chains.

Status of Animal Genetics Improvement: Currently NAGRC&DB aims at availing the following superior genetics to farmers

- Market responsive beef breeding stock with slaughter weight gain potential of 800-1000g/day.
- Market responsive dairy breeding stock with milk production potential of 30 liters per cow/day.
- Goats with an average daily weight gain of 165-200g, which can reach market size in one year.
- Fast growing pigs with an average litter size of 14 piglets.
- Multipurpose poultry that can produce up to 180 eggs per year/hen and reach market size within 3-4 months.

Key Achievements in the FY 2019/20

Promotion of dairy and beef cattle breeding. In order to increase availability of appropriate breeding stock;

- A total of 2,595 dairy cattle were produced on and off NAGRC&DB Center Farms

A total of 2,450 cross bred cattle were produced on and off centre farms(Ruhenygere, Kasolwe, Lusenke, Aswa and Maruzi, Sanga, Rubona, and Njeru and Bulago)

- A total of 3,196 pure beef bred animals were produced from the Government Centre farms and ranches
- A total of 2,647 farmers were trained in cattle breeding in the Districts of Mbarara, Kabale, Koboko, Nakasongola and Kayunga

Production and distribution of chicks to enhance rural poultry development

- NAGRC&DB embarked on construction of Two (2) regional hatcheries [Lusenke-Kayunga, Kasolwe-Kamuli] to scale up production of chicks for distribution to communities
- A total of 293,362 multi-purpose (Kuroiler & Rainbow Rooster) chicks were produced and distributed to farmers (youth, elderly and people with disabilities) in Busoga , North-Buganda, West Nile , Bukedi, Lango,Teso and Karamoja
- A total of 20,000 rainbow rooster parent stock was imported and stocked at Kasolwe and Lusenke stock farms. These will produce 200,000 day old chicks (DOCs) per month at optimum capacity [Valued at UGX520M]
- NAGRC & DB constructed a total of 7 poultry rearing structures in the Animal Genetic Resource Centres of Lusenke and Kasolwe. These structures serve as local benchmarking facilities for modern poultry farming techniques and production systems.

Breeding and multiplication of meat goats

- A total of 2,899 goat kids were produced at the NAGRC&DB Animal Genetics Resource Centres across the country.

A total of 200 breeding goats (worth UGX 500,000@) were distributed to Koboko; and another 900 to different Districts across the country.

Black Mubende goats at Ruhengyere field station

- Black spotted Mubende (Bitanga) goats with high milk production potential (2ltrs/day/goat) are being developed at Ruhengyere field station.

Breeding & multiplication of pigs to avail appropriate breeding stock

- A total of 1,813 piglets were produced and distributed to pig farmers
- Six (06) piggery units i.e. pig maternity and pig grower structures were established at Lusenke and Kasolwe Animal Genetic Resource Centres
- A total of 115 pig farmers were trained in pig husbandry practices

Pig maternity structure at Lusenke Animal Genetic Resources Centre

Industrial production of animal feeds for increased production and productivity

- A feed processing plant was established at Kasolwe to scale up industrial production of livestock and poultry feeds.
- The high capacity feed mill installed can produce 3MT/hr for mash feeds and 2 MTs/hr for pellet feeds (dry extrusion).

Two hay barns were also constructed in Kasolwe and Lusenke center farms. Each Hay Barn will have capacity for storage of 35,000 bales of hay

Maintenance of a National Livestock Registry and National Data Bank to characterize, inventorize and monitor risks and trends of animal genetic resources

- A total of 8,220 animals on and off NAGRC&DB Centre farms were selected as a reference population

Production and sale of founder brood stock of fisheries resources

- Three (3) fish ponds were established and stocked with 22,000 fish fingerlings at Kasolwe and Rubona centre farms.

Training, refreshing and facilitating AI and MOET technicians

- A total of 286 AI technicians were trained and refreshed country wide
- A total of 15 scientists were trained in MOET.

Provision of breeding-training to farmers and other stakeholders along the ARTs value chain

- A total of 5,212 farmers were trained along ARTs value chain at Entebbe bull stud, LES, Njeru Stock Farm, Sanga, Nshaara ranch, Ruhengyere ranch, Lusenke, Rubona and Kasolwe

Day old chicks ready for distribution

Free distribution of day old chick to the youth and women after training in Busoga sub region

- A total of 58,973 farmers were trained in ARTs under the community breeding outreach programme (AI, Heat detection, Animal husbandry practices, Record Keeping, Animal health, business incubation)

Production, procurement and sale of semen, eggs, ova, embryos and their associated equipment

- A total of 70,954 doses of bovine semen were produced at the National Bull stud and genetic evaluation center ,and distributed to actors along the ART value chain

Semen collection at bull stud

Production, procurement and sale of liquid nitrogen and associated equipment

- A total of 57,429 liters of liquid nitrogen were produced and utilized in delivery of ARTs across the country (cryopreservation -196 degrees Celsius, freeze branding)
- Established two new Liquid N2 plants at MBAZARDI and Njeru stock farm – Capacity 7000ltrs/day

Strengthening and maintenance of state-of- the-art ARTs laboratories

- Three (3) laboratories were equipped and maintained i.e the gene bank laboratory, the semen laboratory at the bull stud and a diagnostic laboratory at the bull stud
- Twenty-three (23) LN2 containers and twenty-five (25) [T= sets of AI equipment were procured and distributed

Dairy breeding, promotion of dairy breed societies and dairy breeder associations

- Fostered establishment of Bushenyi Dairy Breeders Association, Rwenzori dairy breeders association, Rewa animal genetics and Kitojo dairy breeders association *(Aim: Advocacy, breed standards and quality maintenance, institutional protection, market access)*
- Established five (5) community breeding satellite centres with liquid nitrogen and associated ART services in Karamoja (Moroto), West Nile (Moyo), Teso (Soroti), Busoga (Iganga) and Acholi (Gulu) sub-regions

Strengthening and maintenance of bull, buck & boar studs

Bucks for semen collection

Aryshire bull for semen collection at the bull stud

Proposed buck stud to be set up at Lusenke AnGR Centre

Infrastructure development on NAGRC& DB Centre Farms

- The entity embarked on establishing infrastructure on the center farms. These ranged from Cattle sheds, Hatchery units , Spray race , Animal maternity infrastructure, Farm staff houses, milking parlors , office blocks, etc

Spray race at Kasolwe

Administration Block constructed at Maruzi ranch to host administrative functions and laboratories for breeding soundness evaluation and herd health programs within Lango sub-region.

Old farm structures replaced with modern ones

New farm structures coming up on all NAGRC&DB AnGR Centres

Specialized Machinery & Equipment for Community Breeding

- Five (5) Specialized Mobile Diagnostic & ART system (MDAS) were procured
- Hatchery equipment for Kasolwe and Lusenke was procured

Production and distribution of liquid nitrogen

- A total of 25,887 out of the annual target of 80,000 litres of liquid nitrogen were produced at NAGRC&DB liquid nitrogen plant and extended to farmers countrywide

The liquid nitrogen plant in Mbarara (and Njeru) were also commissioned

Production and distribution semen for breeding and production

In an effort to promote Artificial Insemination (AI) and community breeding in general, a total of 18,389 out of the annual target 72,000 doses of semen were produced at the Bull stud.

Promotion of dairy cattle and cross breeding

- A total of 409 out of the annual target of 1000 pure dairy calves were produced on NAGRC&DB Centre farms.

Pure Friesian calves produced at Bulago stock farm in Bulambuli District

Pure jersey calves produced at LES centre farm in Wakiso District

- Community breeding activities were conducted countrywide, with the aim of promoting livestock production productivity in hard to reaches areas in Busoga and Karamoja sub regions.

Promotion of beef cattle breeding

- A total of 174 farmers (112 men and 62 women) were recruited as elite beef farmers across the country.
- A total of 1,104 out of the annual target of 3,500 beef calves were produced on NAGRC&DB Centre farms.
- A total of 6000 doses of assorted synchronisation hormones were acquired to facilitate AI for beef breeding.

  Mass Artificial Insemination (AI) on and off NAGRC&DB centre farms was conducted to enhance production and productivity

A Brahman belonging to one of the recruited elite beef farmers in Lyantonde

Production and distribution of chicks to rural poultry farmers:

- A total of 260,959 out of the annual target of 1,000,000 chicks were brooded from NAGRC&DB hatcheries and extended to rural farmers for income generation.
- A total of 3,300 (males = 2016, females = 1284, youth = 2,089) out of an annual target of 10,000 poultry farmers were trained in poultry breeding and production techniques in Busoga and Buganda sub regions.

The trainings will be rolled out to cover great Karamoja in the subsequent quarters.

Establishment of Livestock Farm Infrastructure:

- Construction works on gene bank laboratories, establishment of farm structures and administrative infrastructure on NAGRC&DB centre farms is ongoing.

A newly constructed Admin block at Rubona stock farm

Evaluation and multiplication of improved pasture and fodder germ-plasm

- Established and maintained 375 acres of improved pasture on NAGRC&DB farms; Lusenke, Kasolwe, Njeru, Aswa and Rubona, out of the annual target of 1,250 acres.
- Bush clearing activities are ongoing to establish more pasture gardens for enhanced animal feeding.

A total of 961 out of 6000 farmers were trained in pasture establishment and dry season feeding Industrial production of animal feeds

- Procurements to operationalise the Kasolwe feed mill will be concluded in Q3 and 4. The feed plant has already been connected to a power line to effect production of feeds.

CONTRIBUTION OF NAGRC&DB TO SUSTAINABLE DEVELOPMENT GOALS (SDGS)

NAGRC&DB integrates SDGs in its programmes and projects and majorly contributes to SDG1, SDG2, SDG8 and SDG13 as summarised in the table below;

SDG Goal	NAGRC&DB's Contribution
SDG 1: Zero Poverty	Through breeding and production initiatives on NAGRC&DB Centre farms, NAGRC&DB extends improved livestock and poultry to the local communities. These improved breeds are characterized by high productivity and households have been able to start up farms, to earn a living; something that has improved household incomes from the grass root level.
SDG 2: Zero Hunger	One of the primary reasons of NAGRC&DB's existence is to introduce, multiply and distribute superior livestock breeds that are market responsive. The entity has been supplying raw materials to dairy and beef subsectors. The meat and dairy processing facilities have directly benefited from the NAGRC&DB interventions and this has contributed to the reduction of hunger locally, regionally and internationally.
SDG 8: Decent Work and Economic Growth	Through breeding and multiplication of livestock and poultry, NAGRC&DB supports dairy and beef sub sectors that have significantly contributed to the economic growth, as evidenced by the increase in dairy and beef exports.
Goal 13: Climate Action	NAGRC&DB runs 12 centre farms country wide and has been promoting planting of forage trees, fodder trees and woodlots, to promote appropriate soil conservation and soil management practices for adoption by all communities, in the vicinity of all centre farms, in all regions of Uganda. This has greatly contributed to the mitigation of adverse effects of climate change.

NARO; Co-ordinating, Overseeing and Guiding Agricultural Research in Uganda

Modern Agriculture can move Uganda's economy to a cash economy.

The National Agricultural Research Organization (NARO) is an agency under the Ministry of Agriculture Animal Industries and Fisheries (MAAIF) mandated by the National Agricultural Research (NAR) Act 2005 to undertake research in all aspects of Agricultural activities in Uganda including crops, livestock, fisheries, forestry, agro-machinery, natural resources and socio-economics.

It is comprised of the Council as its governing body, committees of the Council as its specialized organs, and a Secretariat for its day-to-day operations. It has sixteen (16) semi-autonomous Public Agricultural Research Institutes (PARIs). These include seven (7) National Agricultural Research Institutes (NARIs) with a national research mandate, and nine (9) Zonal Agricultural Research and Development Institutes (ZARDIs) mandated to

Photo: A well maintained banana plantation. Use of appropriate technology and good planting material.

carry out applied and adaptive research for a specific agro-ecological zone.

The vision and mission statement of NARO emphasize a competitive society supported by a dynamic agricultural research innovation system and innovation for sustainable agricultural transformation. The goal of the organization is "to increase total factor productivity and access to agricultural research products and services for inclusive growth."

In an effort to fulfil her mandate, NARO undertakes periodic identification of research areas through demand articulation and priority setting of agricultural production and productivity constraints and opportunities. In addition, socio-economic, gender, market potential, consumer preference, environmental and social safeguards concerns are considered.

NARO Strategic Objectives

The principal strategic objective of NARO focuses on contributing to agricultural transformation hinged on niche markets and industry. Specifically,

i. Develop and promote demand-driven technologies, innovations and management practices that increase niche markets for communities in agricultural sector,

ii. Increase research products and services suited for vertical integration into industries,

iii. Improve access and sustainable utilisation of improved agricultural technologies and innovations by communities,

iv. Increase Total Factor Productivity to accelerate community institutional orientation to agricultural transformation.

NARO Performance by key interventions areas;

Physical performance

NARO submitted 27 varieties to the release committee, generated 114 technologies, undertook 40 research projects under CGS, and delivered 128 technologies along the technology uptake pathways

Generation of Agricultural Technologies;

1. Crops Research Interventions

In the crops sub-sector, a total of 27 candidate varieties were submitted to the National Variety Release Committee (NVRC) of MAAIF. The candidate varieties have superior attributes over the current existing varieties with respect to yield advantage, pest and disease resistance, adaptation to drought prone environments and culinary attributes. All the technologies developed target men, women, youth and children.

Production technologies generated

NARO achieved the targets of all the planned production technologies attributed majorly to off-budget projects contributions.

Rice

Seven (7) rice varieties have been submitted to the NVRC. These varieties include; NARO Rice 1 also known as Kafu (Code PR 107), NARO Rice 2 also known as TOCI (Code MET 12), NARO Rice 3 also known

Photo: Dr. Ambrose J. Agona, Director General - NARO

as Ayago (Code AGRA 55), and NARO Rice 4, also known as Oraa (Code ARU 1189), NARO Rice 5 also known as Achomai (Code IR 1052). The following varieties were released: Arize Gold 644, and Chiga-1.

The developed varieties have a yield potential ranging from 4.9- 6.5 tons/ha. Their key attributes include; maturing within 95-135 days with a good aromatic taste, texture that extends and soft on cooking and non-pasty preferred by majority of women. Unlike existing varieties, all the new varieties are aromatic and yield more by 1 ton per hectare. All these varieties are resistant to Rice Yellow Mottle Virus, Rice Blast and Bacterial Leaf Streak. These varieties will be most beneficial to farmers within the low land areas in Uganda. Figures 1- 4 show different rice varieties with their special attributes:

Relatedly, NARORICE-5, Code IR1052 (Achomai), has the following attributes; Early Maturity: 130 Days After Planting, 50% flowering: early (105 Days After Planting, Yield: 6,400 tons/ha, Culm length: 54cm, Plant height: Culm length, very short (54 cm), overall height. Panicle type: Panicle exertion. Flag leaf: large, short, attitude, semi erect Leaf: collar color-green; Ligule color: Yellowish green Color of internodes no ACYN underlying: light gold Grain: awnless, lemma color straw, size long big grains lines SUPA V88, Milled grain: white, short Milling: Milling % (65), Whole grain (85), Quality:

The developed varieties have a yield potential ranging from

4.9 - 6.5

tons/ha.

Figure 9.1 Code name: PR107, other name Kafu

Figure 9.3: NARORICE-3, AGRA 55, other names Ayago

Figure 9.2 NARORICE 2, MET 12, another name TOCI

Figure 9.4: NARO RICE 4 ARU 1189, ORAA

Amylose content (21.8), Alkali spreading value (7.2), Gel consistency (65 mm). Taste: Highly Aromatic. Texture: extends, soft on cooking, non-pasty. Resistance to: RYMV, Rice blast and BLS.

Maize

Four (4) Drought Tolerant Maize Varieties with yield potential averaging 8.5 tonnes per hectare have been submitted for release. These are; ADV2309W, ADV2310W, UH5961, and UH 5962. The varieties were developed to respond to biotic and abiotic stress, increase in the seed sector competitiveness for both regional and domestic market demand for exclusive variety promotion in addition to enhancing on-farm grains.

The ADV239W and ADV2310W (Photo 1) are tolerant to foliar disease of Grey Leaf Spot (GLS), Maize Lethal Necrosis Disease (MSN), Turcicum and common rust disease. The special attributes for ADV2309W and ADV2310W include 110-130 days to maturity and yield 6-8 t/ha, while the UH5961 and UH5962 (Photo 2) are bred for mid-altitude DT with maturity period of 120-130 days and yields of 7-8t/ha.

In maize farming, women and youth are more involved in weeding and harvesting. These early maturing varieties will require less weeding time hence giving women and youth more time to household activities.

Sorghum

Two candidate sorghum varieties were submitted to the NVRC. The released NARO sorghum hybrids varieties are; PAC 501 and PAC 537.

Photo 1: Varieties: ADV 2310W

Photo 2: Varieties: CKH135975 (UH5962)

The special attributes of Variety PAC 537 are; medium maturing 110-120 days, high yield potential of 3200-3500kg/ha, tolerant to shoot fly and stem borer, tolerant drought and lodging.

Six (6) low tannin sorghum lines are under NPT (other key traits are; striga and stem borer resistant, tolerant to drought). Women prefer the low tannin sorghum for food and the shorter plant height makes it easy to harvest by all

Photo: (Above) The NARO draught tolerant Maize variety

The special attributes of Variety PAC 537 are; medium maturing 110-120 days, high yield potential of 3200-3500kg/ha, tolerant to shoot fly and stem borer, tolerant drought and lodging

Vegetables

Vegetables are important sources of many nutrients necessary for growth and development of children as well as expectant mothers. These nutrients include potassium, folic acid, Vitamins A and C. In an effort to increase production levels of vegetables, NARO has submitted for release twelve (12) vegetables. These comprise of two varieties of each namely; tomatoes, eggplants, cabbage, Kale, cucumber and Chinese cabbage and high yielding of the varieties.

The Kale varieties of matjang and jelguijok are high yielding with more leaves on the plant, soft with a palatable test and they do not flower during the hot weather. Two eggplant varieties have been submitted for release (Miggeuni and Heukmi). Miggeuni is highly tolerant to the bacterial wilt and fusarium crown rot and a long fruit size. Heukmi is highly resistant to bacterial wilt and fusarium crown rot and big fruit size.

Additionally, the Chinese cabbage varieties, Bualm3ho and Noranja on average are high yielding 1.1 to 6.2 kgs and 0.9 to 5.8 kgs respectively. Generally, Noranja and Bulam3ho varieties have less disease infection as compared to local varieties. Noranja is more resistant to Diamond Back moth. Cucumber varieties - Gangryuk-samcheok and Sinbi-nakhap – were also released. Their special attributes include; resistance to cucumber mosaic virus, resistance to powdery mild dew, fruit yield tonnage for Gangryuk-samcheok and Sinbi-nakhap is 21.4 t/ha and 9.6 t/ha respectively.

Tea research

Tea research and development activities focused on identifying high quality specialty tea clones for commercialization, tea agroforestry, and climate and landscape smart tea practices.

A total of 140 tea accessions at Rwebitaba Tea Research Centre were analyzed and characterized using eight biochemical markers that included polyphenols, catechins flavonoids, fermentation rate, crude fiber, caffeine, colour, and brightness. Based on high fermentation rate and polyphenol content, 14 tea clones were found superior for black tea, and thus potential candidates for commercialisation. Further evaluation of these clones for agronomic and resistance traits, is on-going.

To understand the contribution of agroforestry trees in tea farming, a survey was conducted in tea growing areas of Kabarole and Kyenjojo. The results revealed a need for increased adaption of agroforestry trees in tea farming as one of the major promising climate smart practices contributing significantly to sequestration of greenhouse gases.

Furthermore, NARO in collaboration with its partners, especially Solidaridad, Rainforest Alliance, and Smallholder Tea estate factories developed a Manual on Tea Climate and Landscape Smart Tea Practices for Uganda. The manual will support sustainable climate and landscape smart practices for tea production in Uganda. NARO also built capacity of 250 key tea stakeholders in sustainable tea production.

Livestock research

During the FY 2019/20 livestock research in NARO focused on vaccine development, forage seed and feed production, maintenance of elite livestock herds, and reloca-

tion and operationalization of Nakyesasa and Maruzi campuses. The approach is from production to product support by circular research interventions.

Vaccine Research and Development

NARO has constituted a Vaccinology Research programme at NaLIRRI under which all vaccine research and development is being undertaken. The team has embarked on developing three vaccine products (Anti-tick, FMD and ASF vaccines research). Developing livestock vaccines will enhance food and nutrition security, household incomes and household insurance.

Ticks are the most economically important livestock pests, which affect livestock health. The death of an animal affects the stability of a household. Hence, women are safe and secure where their animals are healthy.

Key achievements are as follows: -

i. Four candidate anti-tick vaccine candidates namely Rhipicephalus appendiculatus (NARO-RA), Amblyomma variegatum (NARO-AV), Rhipicephalus decoloratus (NARO-RD) and a cocktile vaccine (NARO-CV) were formulated and evaluated on 50 experimental cattle comprising of indigenous and Friesian crosses in an on-station evaluation trial at Nakyesasa.

   The cross-protective efficacy of NARO-RA, NARO-AV, NARO-RD and NARO-CV vaccines against the three ticks (namely brown ear tick, blue tick and bont tick) was 88, 88, 50 and 63% respectively. Overall, the mean cross-protective efficacy for all the vaccine candidates was 75%. Other than NARO-CV, all the other vaccines performed better than the only commercial anti-tick vaccine whose efficacy against cattle tick species (Boophilus microplus) is 50%.

   It is worth noting that the latter vaccine is the only commercial anti-tick vaccine in the whole world currently used to control cattle ticks in Cuba. The two NARO vaccines namely NARO-RA and NARO-AV that demonstrated high efficacy levels against native tick species in Uganda present an exciting possibility for sustainable control and management of tick burdens in Uganda's livestock sector. The results of the study were synthesized into a high-profile manuscript, which was submitted to the world's leading journal in vaccinomics called "Vaccines" with Impact Factor 4.76. The manuscript has been reviewed and the authors have been asked to address minor comments prior to publication.

To understand the contribution of **agroforestry** trees in tea farming, a survey was conducted in tea growing areas of Kabarole and Kyenjojo.

Photo: Livestock improves nutrition and household incomes. *Photo: NAADS*

NARO has provided information to dairy farmers about the choice of method used in chemical acaricide application for more effective control of ticks and tick-borne diseases.

ii. Efforts towards the development of a Foot and Mouth Disease (FMD) vaccine during the FY 2019/20 focused on institutional capacity building for serotyping native FMD virus strains through acquisition of an Antigen Elisa Fast IZLER Kit capable of serotyping the circulating FMD virus serotypes in one day. NARO acquired serotype specific primer sets for serotyping four different serotypes (O, A, SAT1 and SAT2.).

A total of 42 suspected FMD field samples were screened and serotyped, and the results showed that O and A were the circulating FMD virus strains in three sampled regions of Uganda. Also, a reliable virus repository (pathogen bank) capable to maintain pathogens at negative 800C to enable long term storage of different viruses and pathogens has been established. In addition, NARO has established a National FMD vaccine evaluation platform to support the country in evaluation of imported FMD vaccines before they are used in the country.

Connectedly, the imported Foot and mouth disease Vaccines from Kenya and Botswana are being evaluated on station at Nakyesasa to guide Government on their effectiveness in the Ugandan environment.

iii. As a step towards developing efficacious vaccines against ASF virus of genotype X, NARO has developed the first-ever soft tick colony in Uganda. The soft ticks, collected from Western Uganda, are the primary reservoirs of the ASF virus from warthogs and are suspected to maintain ASF outbreaks from the wild to the domestic pigs.

The ticks are being multiplied and carefully prepared for isolation of circulating ASF virus strains in Uganda. In addition, NARO scientists collected viruses from an active outbreak from Eastern Uganda and these are currently being studied for development of the most common genotype IX ASF.

Improve tick control

NARO has provided information to dairy farmers about the choice of method used in chemical acaricide application for more effective control of ticks and tick-borne diseases. At an average herd size of 80 head of cattle, a farmer has to either invest UUGX 107.7 million (US$ 28,710) in motorised pump, UUGX 145.1 million (US$ 38,695) in a spray race or UUGX 266.4 million (US$ 71,040) in a bucket pump every 20 years.

However, for more cost-effective use of each of these methods, a farmer with a herd size of 40 - 112 should use a bucket pump, a motorised pump if the herd size is 35 - 170 or a spray race for a farm keeping 100 - 600 head of cattle.

Forage improvement and conservation

Livestock forages are very important in households practicing zero grazing. They are also known as primary boosters of milk production. Women, mothers, children, the elderly and the sick are the prime beneficiaries of milk and milk products.

In the effort to develop high yielding, drought resilient and highly nutritious forage varieties for livestock, NARO has established a vibrant forage improvement program. In the FY 2019/2020, NARO has developed four Lablab candidate lines namely NAROLAB-1, NAROLAB-2, NAROLAB-3 and NAROLAB-4 with high

levels crude protein amounting to 31, 28.6, 28.2 and 27.7% respectively as compared to commercial lablab variety (Rongai variety) with crude protein content of 24.5%.

The candidate lines are currently under multi-locational trials in preparation for official release by the national variety release committee.

As regards to conservation of native and exotic forage and pasture germplasm, NARO continues to maintain and conserve over 300 species of native fodder grasses, pasture grasses, herbaceous forage legumes and fodder tree species to safe guard against genetic erosion of indigenous germplasm. Current efforts are underway to assemble, characterize and evaluate over 1000 lines of forage germplasm in East and Southern Africa for food and feed.

Forage seed production and feed preservation

In an effort to address the challenge of scarcity of livestock feed, NARO continues to be the leading producer of forage seed and conserved feed in the country. In the FY 2019/2020, NARO produced over 315 Metric tonnes (MT) of hay and silage that was availed to farmers across the country to address the challenge of dry season feed scarcity.

NARO has also supported farmers with feed conservation equipment at a cost-recovery basis to enable mechanised hay and silage production on over 500 acres resulting into production of over 10,000 tons of conserved feed notably silage.

As regards to forage seed production, NARO continues to be the leading producer of elite forage/pasture seed to address the national forage seed demands. During FY 2019/2020, NARO produced over 2 metric tons of foundation seed for chloris gayana that was availed to farmers to rehabilitate over 300 acres of degraded pasture in the cattle corridor of Uganda notably in Nakasongola, Nakaseke, Masindi, Kiruhura, Kiboga, Kyankwanzi, Mbarara, Sembabule and Karamoja region.

Genetic improvement and conservation of indigenous cattle and goat breeds

i. Desirous to enhance the productivity of native livestock breeds coupled with the need to safeguard against genetic erosion, NARO has continued to improve and conserve indigenous cattle breeds notably Ankole cattle mainly at MbaZARDI, Small East African Zebu at Serere and Nganda cattle at Kamenyamigo.

ii. NARO has continued to facilitate community-led goat improvement schemes in Hoima, Nakapiripirit, Napak and Masindi Districts with the aim of selecting elite Mubende and Small East African indigenous goat breeds. The intervention focuses on systematically, identifying and selecting elite young male goats and use them for breeding within the goat farming communities in the above districts.

During the financial year 2019/2020, a total of 16 and 18 elite breeding bucks were selected and exchanged among members of breeding groups in Kyabigambire and Buseruka sub-counties respectively. The breeding objective is to improve body weight at six months from 10 kg to 18 kg, and twinning ability from 30 to 50%.

Photo: A multiplication / breeding farm of Elite goats in Masindi district.

During the financial 2019/2020, the intervention results in elite goats with 15kg at six months. Consequently, the participating farmers were able to sell 136 elite breeding animals at a cost of 300,000/= each compared to the 100,000- 150,000/= they used to sell at the local market before the intervention.

The intervention in elite goats helped participating farmers to sell

136

elite breeding animals at a cost of 300,000/= each compared to the 100,000 - 150,000/= they used to sell

Evaluation of exotic dairy breeds in Uganda conditions

Desirous to guide the country on the best dairy breed under Ugandan conditions, NARO introduced the Viking Jersey dairy breed. During the FY 2019/20, NARO has evaluated the performance of Viking Jersey calves under intensive production systems.

The results of the study revealed that the average daily weight gains of the calves during pre-weaning phase ranged from 392.9 g/day to 654.8 g/day with an average 532.6 g/day.

During post-weaning phase, the mean daily weight gain for all calves was 450 $gday^{-1}$. Because the Jersey is a small animal with mature live weight of about 320kg, results on growth performance revealed that the calves reached 60% of the mature live weight (210kg) in 16 months. Attaining 60% of mature live weight implies that that the animals has attained sexual maturity and has reached mating weight.

Therefore, as compared to other exotic dairy breeds like the Friesians and Ayrshire that attain mating weight in 24 months, the Jersey can be mated between 14 and 16 months. NARO will continue evaluating the performance of the breed in various parameters including feed utilisation efficiency, biogas production potential, adaptability, and disease tolerance among others.

Relocation and Operationalization of NaLIRRI at Nakyesasa and Maruzi

NARO has continued to transfer NaLIRRI to Nakyesasa and Maruzi campuses following the establishment of a phosphate fertilizer production complex at Tororo where NaLIRRI was housed. During the FY 2019/20, NARO has made significant progress towards acquiring a land title for 10 square miles of Maruzi ranch. The title has been processed and awaits transfer in to NARO's name.

In order to strengthen capacity for large scale mechanised feed and forage production to address to the feed scarcity challenge in the country particularly during drought, NARO has established

an implement and machinery workshop equipped among others with two tractors, hay baler, forage choppers, planter, boom sprayer and ploughing implements at Maruzi.

To sustain availability and supply of quality forage/pasture seed and conserved feed resources notably hay and haylage to livestock farmers in Uganda, NARO established and maintained over 500 acres of forage production fields for different forages including chloris gayana, fodder maize, lablab, Brachiaria and Alfalfa among others at Maruzi and Nakyesasa resulting in production of 315 tons of conserved feed resources and over 2 metric tons of forage foundation seed.

Stingless bee research

NARO is increasing the potential of stingless bees in Uganda towards improved pollination, medicinal, and ecology. So far, four (4) stingless bee species have been identified (Meliponula bocandei M. ferruginea, M. nebulata and Plebeina hilderbrandtii). M. bocandei and M. ferruginea so far exhibit potential for commercial value and are under evaluation.

Two stingless beehive prototypes (NAROSBH 1 & NAROSBH 7) have been developed and are being tested for the domestication of M. bocandei, M. ferruginea and P. hilderbrandtii. Three novel and high value stingless bee products (honey, pollen and propolis) for use in the in food and pharmaceutical industries have been developed and are being profiled physio-chemical properties.

Rangeland improvement

NARO has demonstrated that rangelands can be improved and enhanced to reduce drought related constraints, reduce livestock migration, and boost household dry season feeding in the Karamoja sub-region. In this effort, NARO rehabilitated 85 acres of degraded pasture and established 35 acres of improved drought tolerant dry fodder banks in Nakapiripirit, Nabilatuk and Moroto districts.

Rehabilitation of degraded pastures involved removal of unpalatable species, introduction of improved grass and legume species namely Chloris Guyana, Cenchrus Cilliaris, Centrosema pubescens and Glycine max. In addition, there was conservation of the improved pastures during the wet season and controlled rational grazing of the rehabilitated fields during the dry season that October – April with a peak between January to March.

Results obtained indicated that the biomass dry matter weight of rehabilitated sites was six (6) times that of non-rehabilitated sites. The total area under pastures rehabilitated (115 acres) could sustain 300 livestock units of 250 Kg for during the peak period of the dry spell of 95 days. Besides, fodder production from 47 acres could sustain 300 livestock units for 101 days without migrating.

This implies that by rehabilitating and implementing protective grazing on one (1) square mile, pastoral communities raising 3,000 to 8,000 livestock units per kraal are able to retain 1500 livestock units without migration. This would save kraals average loses due to mortality of 15 per cent of the herd during migration valued at not less than shillings 225,000,000 per annum per kraal.

Five (5) Beneficiary committees of nine (9) members each comprising of kraal

NARO is increasing the potential of stingless bees in Uganda towards improved pollination, medicinal, and ecology

leaders, local council leaders, elders, representatives of livestock owners, herdsmen leaders, land owner/host farmers, women and youth mobilisers, animal health workers, Village Health Teams (VHTs) and community demonstration site attendants have been established, skilled and tasked to ensure post-project sustainability in all project sites.

Fisheries research

Research undertakings in fisheries during the FY 2019/20 have achieved the following;

i. Adopted a POCKIT™ Nucleic Acid Analyzer diagnostic kit, and validated TILV detection protocols of Chang et al., 2012 and Tsai et al., 2012 using IQ Plus™ TiLV Reagent sets.

ii. Quality brood stocks/seed (faster growing) of Tilapia (seed - 108,688; brood stock - 1,340) and African Cat fish (seed - 30,415) has been provided to six seed multipliers and 136 farmers.

In addition, multiplication and maintenance of improved Nile tilapia and the African catfish at Kajansi ARDC has been strengthened. Two thousand Nile tilapia broodstock were collected from Lake Victoria and are currently under acclimatization on-station before use in selective breeding of the species,

iii. The abundance, diversity and type of plastics in sediment and water have been established to aid planning and mitigation measures for plastic pollution on Lake Victoria. In addition, distribution maps of hotspots of micro plastic occurrence and diversity in sediment and water of Lake Victoria have been produced,

iv. Annual fish production trends and economic value of fish catch production as of 2019 in lakes Albert (335,000 tonnes valued at 700 bn), Edward, George and the Kazinga Channel (6,630 tonnes valued at ~ 47 bn) have been generated. This will inform developing strategies for improving fisheries sub-sector,

v. Evaluation of ecological status of two pollution hotspots (Murchison bay and Napoleon Gulf) on Lake Victoria is on- going. This information will aid monitoring of pollution as a result of human activities,

vi. Production of value-added products (fish sausages). Received additional

Photo: A beneficiary of the quality brood stocks/seed of Catfish in Budaka Town Council, Budaka district.

support to upgrade production line from 0.5 tonnes to 10 tonnes per day at Wakiso district. Prior COVID 19, produced 3 tonnes per day for local and regional markets (Kenya, DRC & Rwanda), Live fish sales have increased from 100kg to about 500 kg per day in Wandegeya Market. The project received extra support from MSINGI to install a cold chain to increase sales to more than 5 tonnes per day. COVID 19 affected sales during lockdown: closed markets.

vii. Land with its title has been secured and structural designs approved for establishment of proposed satellite fisheries research station on Lake Albert.

Forestry Research

i. Under the forestry sub-sector, NARO directed research interventions on tree species and management options, medicinal tree database establishment and supporting households' soil and water management. These interventions registered the following achievements;

ii. Suitability maps were developed for tree species and management options across different sites in Eastern Uganda and farmer circumstances that depict erosion hotspots, runoff potential and appropriate land and water management options,

iii. Smallholder farmers in 14 villages of Manafwa and Kapchorwa districts have adopted calliandra fodder shrubs, resulting in a 2 fold increase in milk production of their cows. .

iv. Biological agents (4,650 C. nockae and 2,000 P. bliteus) released against bronze bug and Red Lerp Psyllid in the field. Field performance of C. nockae and P. bliteus bio-agents in the field rated at over 70 % effectiveness. Sampling for resistant Eucalyptus species/hybrids done in Eastern and Western AEZs.

Leaf samples from susceptible and resistant Eucalyptus trees collected for genetic identification. The biological control agents, particularly P. bliteus released much earlier are a success and have saved over 50,000 ha of Eucalyptus equivalent to 1.75 trillion Uganda Shillings from being wiped out.

v. A database of tree and shrub species used in diabetes treatment in Uganda was assembled, and will contribute to efforts towards development of an herbal cure for diabetes in Uganda.

vi. A total of 550 households were supported in use of water management technologies namely; contour grass strips, terraces, and unlined, run-off ponds for irrigation in Eastern Uganda. Significant improvement in soil health has been observed as indicated by improved crop yields

vii. Optimized a protocol for tissue culture mass micropropagation of bamboo seedlings that will eventually sustain the raw material base for development of various value-added bamboo products. Further, over 50,000 bamboo seedlings involving two species – Giant bamboo (Dendrocalamus giganteus) and common bamboo (Bambusa vulgaris) have so far been conventionally produced in Kifu green houses.

Agricultural engineering

During the FY 2019/2020, NARO developed a second prototype of ram pump (NARORAMP-2) with a higher discharge

Smallholder farmers in 14 villages of Manafwa and Kapchorwa districts have adopted calliandra fodder shrubs, resulting in a 2 fold increase in milk production of their cows

of 1,440 lts/hr at delivery head of 4m and two models of second generation of commercial food grade fish smoking kiln (NAROFIK-3-D4 and NAROFIK-3-D6) with capacity of 400 to 700 Kg/day. Use of the ram pump has increased vegetable cropping regime from 2 to 3 per year and farmers along rivers and streams can now grow vegetables and earn a living all year round. The fish kiln (Figure 1) processes high quality smoked fish and has reduced cancer-causing compounds in our smoked fish from 40,000 ppb to 0.88 ppb well below the maximum limit of 2 ppb set by EU markets.

This has enabled Ugandan smoked fish competitive in export market. The expected lifespan of the entire kiln assembly is 20 years without any major repairs. After 20 years a new heat insulation system will have to be built on the stainless steel part of dehydration chamber. In addition, new smoke generation and filter units are fabricated thus producing a new kiln using the same stainless-steel section of the dehydration chamber. When in operation, the kiln should be placed in a well-aerated housing structure.

In addition, NARO is promoting smallholder agricultural machinery hire service enterprises that increase access of farm machinery to farmers at same time creating jobs for the rural people and the youth. To this effort a total of 60 multicrop planters, 27 NARO lightweight rice threshers, 23 food grade cassava chippers, 75 Ox-weeders were distributed to 63 farmer entrepreneurs in 25 sub counties, in Acholi sub-region and Adjumani district. Furthermore, skills of 488 (40% women) farmer entrepreneurs and equipment operators in Kitgum, Lamo and Agago districts was enhanced in operating equipment hire service as business and processing high quality cassava chips and flour.

Photo: NARO PAH-Safe Fish Smoking Kiln – NAROFIK-3-D6

Value Addition

In a bid to promote agro-industrialisation and create niche markets, NARO has directed part of its efforts to value addition, and the following achievements were registered;

i. Milk fortification was undertaken to improve on micronutrient status and alleviate common health problems. Development of safe and stable milk-based nutraceutical products with anti-ulcer, diabetes and cancer properties are ongoing. In addition, plant-based pharmaceutical compounds: tannins, phenols, flavonoid, antioxidants, anthocyanin for evaluation of anti-cancer, anti-ulcer and anti-diabetic properties were extracted, bulked and

constituted in milk-based products. To date, 50 plant species were screened for availability of target biochemical compounds. 11 plants were pre-selected based on Frap values, availability in the community and ease of extraction. The 5 best plants based on the above criteria were chosen for fortification in yoghurt samples. In addition, a complete blood profiling protocol for testing in mice based on production of antibodies and other blood parameters against the target ailments has been completed for submission to the research and ethics committee for approval.

ii. Three Market oriented fish products were generated (Nile perch oil with respect to optimizing protocols for Nile perch oil production; Plant N (bio-control agent for fish pathogens); Waste water cleaning algae),

iii. A feed mill at Kajjansi ARDC has been repaired and production of 9 ton/ week fish feeds including powder and pellets for sale to farmers is on-going,

iv. Two snack prototypes of a nutrient dense (pro-vitamin A, protein, Iron and Zinc) Market-Smart AroNutro Instant Maize Snack were developed.

v. A total of four (4) starter culture formulae for processing milk products (1 for ghee; 2 for yogurt and 1 for probiotic yoghurt) were developed. This has improved the quality of traditionally produced products (yoghurt, butter and ghee) of at least 2 cottage industries in which about 500 women are involved in dairy product processing and marketing.

vi. The main cooking and beer brewing banana varieties with potential for high banana juice yield in southwestern Uganda have been identified and mapped. The 4 cooking banana varieties are Kibuzi, Mbwazulume, Ntalagaza and Nshasha; and the 6 beer brewing varieties are Mbidde, Musa, Kisubi, Kayinja, Mufunyakobe and Fhia 23.

vii. Most important is that one banana variety that is market-preferred and with the best juice and wine producing attributes and well adapted to the local agro-ecological conditions has been selected for use by the industries.

viii. One (1) enzymatic banana juice extraction method has been developed. This method, which uses Pectinase enzyme at 0.08% (by weight) can propel the banana juice processing cottage industries to a much higher level. Use of the method greatly reduces labour, reduces fuel energy, reduces extraction time and enhances the quantity and quality of banana juice and wine produced.

ix. Two (2) clay-based anti-aflatoxin formulae designed for pre-treatment of maize bran-based feeds. Treatment of maize bran with the aflatoxin binder (developed from the locally selected minerals) reduces the aflatoxin content in the animal feeds by 80-98%, that is, a percentage higher than any commerce available aflatoxin binder on the market. This significantly reduces the risks associated with the consumption of aflatoxins in fish and livestock products. , what have they improved?

x. Four (4) feed formulae for poultry (2 broilers; starter and grower; 2 layers; chick and growers), the rations produced by use of these formulae significantly increase growth rate/ weight gain and egg production. Expect application manual?

xi. Two feed formulae for cattle (1 dairy meal and calve starter). This has improved calf growth by 17% and increased milk production by 46% where these diets are in use.

A total of four (4) starter culture formulae for processing milk products (1 for ghee; 2 for yogurt and 1 for probiotic yoghurt) were developed.

The four (4) starter culture formulae for processing milk products has improved quality of traditionally produced products

Bio-technology

Biotechnology research focused on addressing the challenge of nutrition deficiency in banana and devastating diseases in cassava namely: Cassava Brown Streak Disease (CBSD) and Cassava Mosaic Disease (CMD). Under banana research, two biotechnology research products: Hybrid M9 [Kabana 5] and Nakitembe, enhanced with pro-vitaminA [pVA], were approved by National Biosafety Committee.

The two varieties have further been advanced to four multi-locational confined field evaluation trials representing banana agroecological zones in Buginyanya, Mbarara, Bulindi and Kawanda. In addition, evaluation of transgenic cassava plants with genes for enhanced ammonia and nitrogen dioxide uptake is also on-going and so far, at least five (5) cassava varieties have been evaluated.

Trials for validation of resistance to Cassava Brown Streak Virus established in Namulonge showcase promising results of GMO cassava plants are tolerant to CBSD and Serere. Advanced Yield Trials established in four (4) locations (Namulonge, Tororo, Serere, and Arua) with 32 clones (22 white and 10 yellow fleshed).

Also, advances were made on the GM potato against late blight resistance by using 3R genes extracted from wild relatives of potato. The transgenic potato lines have consistently shown field resistance to late blight. One line vic.172 has been tested under confinement in multi-locational trials at Kachwekano, Rwebitaba and Buginyanya and currently data collection for the regulatory phase is ongoing.

Socioeconomic and cross-cutting research

Gender mainstreaming in agricultural research for development

During the FY 2019/2020 NARO has continued to register considerable achievements in the implementation of its gender and diversity programs. In an effort to ensure that all gender categories (children, women, youth, the elderly and persons with disabilities) benefit from its technological development and dissemination initiatives at the grassroots the organization has endeavored to develop technologies and knowledge generated in various disciplines to cater for production challenges. Furthermore, stakeholder skills enhancement programmes have been designed and implemented to cater for the all gender categories.

Photo 1 & 2: GMO Cassava plants with no CBSD Symptoms, **Photo 3 & 4:** Non GMO cassava plants showing CBSD symptoms

The key achievements are:

i. 48 environmental social safe guard/ gender focal persons in PARIs were trained in gender analysis and strategy development,

ii. Gender assessment and monitoring tools developed for integrating of gender in research at all PARIs,

iii. institutes were consulted and guided on the implementation of gender actions in their projects especially ensuring that women's voices are included in decision-making, accessing and controlling production factors, engaged in research, extension and capacity building processes; and interests of youth in agriculture, food, income insecurity and poor nutrition.

iv. NARO has also been engaged in the management of social risks. This has involved building capacity of the local communities including institute workers, staff and community personnel to address social concerns including child-labour, HIV/AIDS, gender and sexual harassment.

Invasive Weed Species Management

Efforts in controlling aquatic invasive weeds was directed to Kariba weed (Salvinia molesta) management and the key achievements registered are as follows:

i. Lakes Kyoga, Kwania and Kibimba dam which were previously Kariba weed hotspots are now over 90% clear of the weed due to the deployment of an integrated management approach using bio-agents (Cyrtobagous salviniea weevils) and some mechanical removal,

ii. Information on Kariba weed occurrence and infestation level, and a map of Kariba weed occurrence produced for five water bodies in the country. Lake Nakuwa in Kaliro district and Lumbuye swamp in Buyende district are now the new Kariba weed hotspots,

iii. To accelerate the control of Kariba weed, a total of 23,000 adult weevils from the 2 lake shore rearing facilities and Namulonge rearing station were released in Lake Kyoga, Lake Nakuwa and Kibimba dam (Bugiri district),

iv. Skills of five weevil rearing facility managers identified from the local communities were enhanced on weevil rearing at Budipa Landing site on Lake Nakuwa.

v. One weevil rearing facility was set up and stocked with 560 weevils at Budipa Landing site on Lake Nakuwa,

vi. Kariba weed management information has been packaged for dissemination to control of the weed on Uganda's water bodies.

Biodiversity

The achievements in biodiversity are as follows:

i. A tracking and monitoring system for fall armyworms developed based on two pheromones (Chem Tica from USA and Russel IPM from the UK),

ii. NARO supported a community seed bank in Nakasongola, Uganda banana cooperative union and one food industry platform,

iii. Genetic population structure and information on 47 pearl millet accessions in place to support breeding.

Research Extension Interface Promoted and Strengthened

Partnerships, Technology Promotion and Dissemination

NARO in the FY 2019-2020 worked closely with a number of strategic partners to achieve various outputs along the technology generation and promotion chain. The partners are summarized in the following table.

Seed Production

NARO produced substantial quantities of breeder (pre-basic) seed, foundation (basic) seed, seedlings and vegetative planting materials of several commodities and provided to technology uptake pathways (farmers, farmer groups, NGOs, MSIPS, Local Governments).

Photo: NARO's Tomato Variety, Ten Ten.

Livestock and fish seed were produced and distributed to various farmers:

i. Five (5) technologies Assorted seeds of 5 improved pasture varieties including NARO Napier 1, 2, 3 and Kakamega and Brachiaria mulato were produced and distributed at Mbarara ZARDI

ii. Assorted research products including Chloris gayana, Cenchrus ciliaris; Napier stunt tolerant planting material, silage, Hay, Haylage, Jersey Semen, Fleckvick Semen, forage conservation technology was produced at NALIRRI,

iii. Four (4) improved livestock breeds (Sahiwal cross breed, Cambrough pigs, Toggenburg goats breed & Bovan Brown chicken produced and distributed to famers at Nabuib ZARDI,

iv. 250 bags of forages, 2000 Nile tilapia fish seed, and 32 piglets were distributed at Bulindi ZARD

20,000 high quality tilapia fingerlings were produced and distributed to farmers at Mukono ZARDI; on fish seed (1,000,000)/broodstock, live foods for juvenile fish (artemia, moina and rotifers), fish feed formulations (dry rations).

Outstanding challenges and actions being taken

The following are the key outstanding challenges of NARO:

1. **Effectively Conducting Research Under Budget Support**

Most of NARO's budget is under support to NARO (GoU Development) and mainly caters for capital items. The expenditures on core technology generation and dissemination and maintenance of infrastructure are categorized as consumptive expenditure and restricted to about 20% of the total budget. NARO has continued to request MoFPED to provide a code for the purpose.

2. **Meeting expectations with inadequate and unsustainable funding**

NARO operates with a very limited budget which has affected generation and dissemination of agricultural technologies and; adequate engagement to stakeholders. For the past 10 or so years Uganda's agricultural research intensity ratio – that is, agricultural research spending as a share of its GDP (Ag GDP) – has remained less than the minimum investment target of 1 percent set by the African Union and the United Nations. This calls for deliberate step up in increasing spending on agricultural research.

3. **Working with limited research infrastructure**

While there have been concerted efforts and funding from GoU and partners towards improvement of agricultural research infrastructure, the current infrastructure is still to undertake cutting edge research and respond to emerging issues. There are inadequate facilities such laboratories, scientific equipment, staff houses and transport to effectively conduct research. There is need to improve infrastructure to adequately contribute to agriculture transformation.

i. Operating under competing land use interests:

NARO operates under uncertain land ownership and distressing pressure from interested parties with immense development plans on land designated for agricultural research. This has slowed down investments in research infrastructure and interrupted effective implementation of land-use plans. This warrants investment in securing land for agricultural research.

ii. Relocation of NaLIRRI to Maruzi via Nakyesasa

NARO has remained committed to operationalizing NaLIRRI in Maruzi albeit now faces vivid challenges. While the project is posted on the Integrated Bank Projects (IBP), it has no direct budget allocation from MoFPED. In addition, it has received meager support by encumbering on Support for NARO P0382 for the last two consecutive fiscal years. Consequently, the relocation of NaLIRRI to Maruzi now faces a possible risk of being removed from the PIP by MoFPED thereby potentially delaying the project operationalization.

iii. Covid-19 Pandemic

NARO closed some of its operations for 12 weeks following the covid-19 outbreak from March 2020. Prior to closure of offices, NARO Management assessed the impact of COVID-19 related restrictions on the implementation of the scheduled work for the FY 2019/20 Work Plan in order to refocus efforts in areas that could still be delivered while working remotely.

NAADS; pushes for Agro-industrialization for improved livelihoods of farmers

The National Agricultural Advisory Services (NAADS) is an agency of MAAIF that was instituted by the Government of Uganda as a semi- autonomous public agency, responsible for public agricultural advisory/ extension services. The NAADS Programme was created in 2001 by an Act of Parliament and is currently committed to the delivery of quality agricultural inputs and making progress towards sustainable development in the agricultural sector of Uganda.

Since 2014, NAADS has continued to implement interventions aimed at transforming the livelihoods of Ugandans through agriculture. NAADS' interventions are geared towards increasing production and productivity through the provision of planting and livestock materials, water for production, storage facilities and other agricultural inputs for improved food security and household incomes.

The interventions have registered tremendous successes evidenced in the improvement in Uganda's food security and nutrition, the improvement in household

Photo: Inside Yumbe Mango processing factory in Yumbe district

incomes and ultimately the farmers' livelihoods across the country. In order to consolidate the gains so far achieved, NAADS is focused on value chain development with emphasis on the upper end of the chain among other interventions.

The interventions in this area are aimed at adopting improved and efficient production technologies, enhancement of timeliness and profitability of farm operations and intensified farm production systems; as well as provision water for production to address adverse effects of climate.

In line with National Development Plan (NDP) II and the Agriculture Sector Strategic Plan (ASSP), NAADS purchases specialized agro machinery & equipment for production and processing along the agricultural value chains for agro industrialization.

Under Purchase of specialized agro machinery & equipment, focus is on the following areas;

- Appropriate household irrigation systems for water for production
- Tractors and matching implements for agricultural mechanization
- Value addition- fruit processing equipment (small scale and medium scale) for Mango, Citrus and Pineapples
- Grain Milling equipment,
- Milk coolers & matching generators.

Value addition initiatives by government through NAADS

In the past 6 years, NAADS has contributed towards the industrialization agenda by supporting farmers/farmer associations with value addition equipment and facilities with the aim of improving farmer's livelihoods and incomes, providing market opportunities to farmers and contributing to import substitution.

In line with National Development Plan (NDP) II and the Agriculture Sector Strategic Plan (ASSP), NAADS purchases specialized agro machinery & equipment for production and processing along the agricultural value chains for agro industrialization. Under Purchase of specialized agro machinery & equipment, focus is on the following areas;

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- Grain Milling equipment,
- Milk coolers & matching generators.

Dr. Samuel Mugasi, Executive Director, NAADS

Photo: A 1,000 litre milk cooling facility provided to Umoja Women's Heifer project in Pallisa Town Council

FRUIT PROCESSING FACILITIES

1. Yumbe Mango Processing factory

Yumbe Mango Processing factory is a value addition initiative by the Government of Uganda through the NAADS Secretariat in partnership with Food and Nutrition Solutions Ltd (FONUS), Aringa Mango Farmers' Cooperative Society and Uganda Development Corporation (UDC).

The project is a fulfilment of the H.E the President's pledge to support Food and Nutrition Solutions Ltd (FONUS) (a company started by Makerere University Professors in Food Science) to complete the project. FONUS are the vision bearers of the value addition initiative.

The 6-metric ton per hour factory is designed based on the local mangoes grown in the West Nile region and a ready market for the farmers. The establishment of the factory is intended to put a stop to the exploitation of our farmers by the middlemen who buy the mangoes cheaply

Photo: Factory structure for Kayunga Pineapple processing factory in Kayunga district

The factory is established in partnership with UDC under the Ministry of Trade, Industry and Cooperatives which has built the capacity of the farmers under their umbrella association Aringa Mango Farmers' Cooperative Society.

Currently, 90 percent of the works have been completed with the processing equipment fully installed. The remaining works include construction of stores, the perimeter wall and the compound.

Government has so far injected UGX 8.9 billion in the project which is expected to be commissioned in early 2021.

2. Kayunga Pineapple Processing Factory

The Kayunga pineapple processing plant is medium scale with a capacity of 12MT per day. Construction is 80% complete. The key partners are Sem Agrotech and Entebbe Miracle Centre who are the proprietors. NAADS is providing the equipment while the proprietors are building the factory structure.

The initiative is a fulfilment of the pledge made by H.E the President to support Entebbe Miracle Centre to establish a value addition facility in Kayunga district to add value to the pineapples produced in the region.

Under the partnership, Government has fully installed processing equipment and a solar water pumping system for access to water.

The processing facility is expected to create more than 200 direct and more than 10,000 indirect jobs for local residents and spur growth among other business ventures.

3. Nwoya Fruit Factory

Government through the National Agricultural Advisory Services (NAADS) has set aside 19 billion shillings to construct a fruit processing factory in Nwoya district.

The feasibility study for the Nwoya fruit processing plant was completed and it points to immense potential. This plant will be implemented under a MoU between the Ministry of Agriculture, NAADS and Uganda Development Corporation (UDC) blanch as the technology provider while Delight (U) Ltd has been identified as the private partner.

Delight (U) Ltd already has 1,000 acres of land under mango production in Nwoya and more under citrus fruit production. NAADS has started on the procurement for the construction works and the equipment. The planned processing capacity for this factory is 8MT/hr for mango; 2MT/hr for citrus and 2MT/hr for guava.

The 12 metric ton per hour factory will add value to the mangoes, oranges and guavas grown in Nwoya and the neighbouring districts.

4. Kapeeka Fruit Processing Factory

In Kapeka, NAADS is partnering with CURAD to set up an incubation centre but also to process on a commercial basis. CURAD is currently establishing an agribusiness incubation hub in the Kapeka Industrial Park.

They already have the structure in place which just needs to be equipped; their proposal indicates a need for a 2MT/hr processing line and the procurement is already underway.

MILLING EQUIPMENT

NAADS distributes milling equipment to farmers as one of the initiatives to reduce post-harvest losses as well bring value addition facilities closer to the farming households for improvement of livelihoods and rural incomes. The milling equipment is provided to farmers organized in farmer groups/organizations or associations/ cooperative societies.

Why the Support?

- To bring value addition services closer to the people
- To provide an easy market for agricultural produce
- Create employment especially for the youth who work in these facilities as operators and administrators
- To improve group cohesion for the beneficiary organizations

Maize Mills

Production of maize has increased over the years with an increasing trend towards commercial production attributed partially to increased adoption

Photo: Fruit processing equipment installed at Kayunga Pineapple Factory in Kayunga district

of improved maize varieties by farmers provided by NAADS and other partners. Whereas maize is predominantly a staple food crop, it's also an important cash crop contributing to household incomes & national export earnings.

Maize production statistics based on district returns to UBOS show a steady increase overtime from 1.17 million MT in 2001 to about 2.55 million MT in 2011 and above 4 million MT in 2018. Following the significant increase in maize production, there was an outcry of lack of market from the farmers which prompted government through NAADS to provide simple milling facilities at rural level. NAADS has strategically considered supporting farmers with maize milling facilities to take care of the value addition needs at rural level.

Apart from offering a quick market to the farmers, the milling equipment provides value addition solutions to the farmers and ultimately increasing their incomes.

Currently, 36 maize mills have been distributed to farmer association in different parts of the country.

Rice Mills

A number of interventions by Government through its ministries and agencies, non-Government and Private Sector players have resulted into a significant increase in the production of rice in the different rice growing regions. Total production is currently estimated at over 165,000 metric tons per annum.

With the introduction of new varieties of rice including upland rice, rice growing has spread across different regions in the country. The demand for rice has also increased both locally and in the international market. Locally, rice has become a staple food for many Ugandans.

The increased production resulted into an increased demand for rice milling equipment. In response, Government through NAADS is providing mini rice mills to farmer groups. The mills are equipped with destoners that remove stones from the rice.

The intervention has improved the quality of the rice produced in Uganda and widened its marker. 5 rice mills have been distributed in Bugiri (2), Alebtong, Lira and Gulu districts.

Photo: (Left) maize mill given to Nkondo Multipurpose Co-operative Society in Nkondo Sub County in Buyende district

(Right) : Processed maize flour by Kigumba Produce Buyers and Millers association in Kigumba town council in Kiryandongo district.

Feed Mills

There has been a steady growth of the livestock sector in Uganda in the recent years. The sector constitutes 17 percent of the agricultural GDP and is a source of livelihood to more than 5 million people in the country. The sector is categorized into cattle, goats, pigs, sheep and poultry.

The growing local and regional demand for meat and milk products, and poultry products has escalated the number of livestock in the country over the years. As a result, there is an increased demand for animal and poultry feeds across the country.

Due to the increased demand for animal feeds coupled with the high cost of feeds, NAADS is supporting livestock farmers with modern feed mills to mitigate the ever increasing prices of feeds. The feed mills are given to organized farmer groups to assist them in milling their own animal feeds ultimately reducing on the cost of production.

The support is in line with the National Animal Feeds Policy which promoted the development of local capacity of stakeholders to optimally utilize the feed resources in order to increase the supply as well as improve the quality of animal products and by-products, and to maximize the economic and social benefits of the livestock sub sector.

NAADS has so far distributed 10 feed mills to farmer associations

Grain Storage Facilities

In order to increase national gains in agriculture especially for smallholder farmers, National Agricultural Advisory Services (NAADS) Secretariat and World Food Programme (WFP) came into partnership under a Memorandum of Understanding ("MOU") to jointly address identified gaps in food storage capacity, post-harvest losses eradication, value addition and collective marketing systems, besides improving access to agro-inputs in selected parts of the country.

Eleven (11) community grain stores have since been constructed in 10 districts across the country and are now complete and operational. Through this partnership, the NAADS Secretariat and WFP intend to continue the establishment of additional community stores and capacity building for the beneficiary farmers.

The support is in line the government initiative to reduce post-harvest losses and improve the quality of grain produced in Uganda. It is also in line with the WFP 2018 – 2022 Country Strategic Plan

Photo: Members of Noteber Farmers in Alebtong district with a Rice Mill they received from NAADS in 2018. The mill has helped the farmers to ensure food security and improve their incomes

The dairy sub-sector contributes 9% of the country's GDP.

for Uganda and in pursuit of an integral programming approach to address food gaps and strengthen the resilience of vulnerable, food insecure communities and populations.

Value addition to Dairy

Dairy is one of the twelve (12) priority commodities being promoted by the Government of Uganda. The dairy sub-sector contributes 9% of the country's GDP. This means that if sufficient investment is made in the dairy industry, it has the potential to contribute significantly to national economic growth and development.

The Government of Uganda through the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) and departments such as the National Agricultural Advisory Services (NAADS) and Dairy Development Authority (DDA) aims at stimulating the dairy sector potential areas. It is believed that development of milk marketing infrastructure will create the incentive to improve milk production in the cattle corridor districts of Uganda.

The NAADS Secretariat is promoting a value chain approach to the dairy sector (increased milk production, collection and formal marketing) through:

- Provision of improved dairy cattle breeds to farmers
- Provision of community Artificial Insemination kits for improving local breeds
- Improved cattle pastures/feeds promotion and development:
- Provision of milk coolers and ancillary equipment to dairy farming communities
- Agribusiness trainings and capacity building of dairy farmers and farmer groups/cooperatives in collaboration with DDA, UCSCU, UCA and Ministry of Local Government.

Milk coolers are a critical unit in the dairy value chain. They ensure bulking is done at all levels of production, it eases transportation as milk tankers find reasonable volumes in one place and they also stimulate development in the area as different service providers will converge at the cooler. The milk cooler concept stimulates production; builds a community around a common interest. This makes it possible for the community to access better markets, bargain for favourable prices and hence improved household income.

Since FY 2012/13 to date, NAADS has distributed 121 milk cooling and handling

Photo: A milk cooler given to Rwengaju model village in Kabarole district

equipment to deserving dairy farmer groups/cooperatives in various parts of the country in order to promote production and marketing of milk and milk products along the dairy value chain.

The identification and selection of the potential dairy farmer cooperatives/groups/associations has and is being carried out in collaboration with the Dairy Development Authority (DDA). The aim has been to identify and select dairy groups with the ability to own and manage milk cooling facilities on business principles.

INDUSTRIAL PARKS

Government through NAADS and other partners is establishing 2 industrial parks in Rwenzori Region specifically in Kabarole and Kasese districts.

The industrial parks are under the Presidential Initiative on Agro Industrialization for local economic development (AGRILED) in the Rwenzori Region. AGRILED is a transformative national initiative, with the overall strategic direction of transforming local government system to facilitate effective business oriented local development with a focus on poverty reduction and sustainable wealth creation.

Photo: Officials from NAADS, FONUS, UDC and Yumbe District Local Government touring the construction project of Yumbe Mango processing factory in Yumbe

The Agri-LED strategic interventions are being piloted in Rwenzori sub region and will facilitate projects towards Public Investment Management for Agro Industrialization for:

- Kabarole Industrial Park
- Kasese Industrial Park

The industrial parks are set to prioritize the following;

- Agro-processing
- ICT
- Mineral Beneficiation and
- Tourism.

Progress

Kasese Industrial Park – 50% of the works have been done. Roads have been opened, both water has been extended and allocation of space to potential investors has been finalized.

Remaining works included finalizing the works on the roads and extension of electricity.

Kabarole Industrial Park: Construction is set to begin this financial Year

Partners in establishing the Industrial Parks

NAADS, Kasese District LG, Kasese Municipality, Kabarole District, Fort portal Municipality, Operation Wealth Creation (Secretariat & Regional), Uganda Industrial Research Institute (UIRI), Ministry of Local Government (MoLG), Uganda National Roads Authority (UNRA), National Water and Sewerage Corporation (NW&SC), Rural Electrification Agency (REA), Uganda Investment Authority (UIA), Uganda Development Corporation (UDC), Ministry of Trade and Industry and Cooperatives (MTIC) Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), Ministry of Works and Transport (MoWT), Private Sector Foundation(PSFU)

Photo: Executive Director NAADS Dr. Samuel Mugasi (center) with officials from OWC and Kasese District Local Government touring the construction site of Kasese Industrial Park

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From the garden to the final product in a supermarket shelf...

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Madhvani Foundation Builing, Kampala Rd, Opp NEMA

UNRA; Creating Safe & Sustainable Road Network for Economic Development

Currently we have;

- National roads network totals to 20,544km
- Over 4,971km of tarmac National roads, excluding the urban tarmac roads as of June 30th, 2019.
- UNRA is currently implementing a total of 27 road projects (new construction and upgrading from gravel to paved bituminous standards) covering a total distance of over1,920Km and a total distance of 343Km of roads under Rehabilitation.
- 10 ferries and 10 weighbridges are also functioning with around more 5 ferry development programs and 5 upcoming weighbridges.

UNRA works: Ongoing Upgrading projects

S/n	Project name	STATUS
1	Kampala Northern Bypass (17.5km)-EU/EIB/GOU	60.9%
2	Mpigi- Kanoni Road (65km)- GOU	99.10%
3	Kanoni-Sembabule and Sembabule- Villa Maria (110kms)-GOU	98.7%
4	Mukono-Kyetume-Katosi/Nyenga (74km)-GOU	85.01%
5	Olwiyo-Gulu (70.3km)-GOU	99.91%
6	Gulu-Acholibur (77.7km)-GOU	100%
7	Acholibur- Kitgum- Musingo road (87.4km)-GOU	100%
8	Musita-Lumino/Busia-Majanji (104km)-GOU	97%
9	Bulima-Kabwoya (66km)- AfDB/DFID/GOU	89.39%
10	Kyenjojo- Kabwoya (100km)-IDA/GOU	65.51%
11	Mubende-Kakumiro- Kagadi road (107km)-GOU	68.53%
12	Masaka- Bukakata road (41km)-BADEA, OFID & GOU	Contractor has commenced clearing and grubbing between km 18 & 24.
13	Rukungiri-Kihihi-Ishasha/Kanungu (78.5 km)-ADB/GOU	Contractor is mobilizing Equipment and setting up the main camp.
14	Bumboli- Lwakhakha (44.5km) ADB/GOU	55.51%
15	Soroti- Katakwi- Akisim (100km) GOU	78.42%
16	Akisim- Moroto Road (50.3km) GOU	98.35%
17	Rushere- Nshwerenkye Road (11.1km) GOU	100%
18	Tirinyi- Pallisa- Kumi (67km) IDB/GOU	17.58%
19	Pallisa- Kamonkoli (44Km) IDB/ GOU	17.49%
20	Masindi Park Junction and Tangi Junction- Para- Bulisa Roads (159km)- (Critical Oil Road Package 1) Exim Bank/ GOU	11.36%
21	Hoima- Butiaba- Wanseko (111km) (Critical Oil Road Package 2) GOU/EXIM Bank of China	28.08%
22	Buhimba- Nalweyo- Bulamagi & Bulamagi- Igayaza- Kakumiro (93km) (Critical Oil Road Package 3) –Exim Bank/GOU	14.5%
23	Kitala- Gerenge (10km) GOU	
24	Kigumba Bulima (69km) ADF, DFID & GOU	24%
25	Kapchorwa- Suam (73km) ADB/ADF/GOU	4.87%

Ongoing construction works

UNRA is expanding its coverage of the road network by embarking on construction of major roads connecting Uganda. Ongoing works include road rehabilitations and maintenance of Gravel roads with the intention of keeping them in a motorable state.

Photo top: Mrs Allen Catherine Kagina Executive Director Uganda National Roads Authority

Photo bottom: Ntungamo - Mirama Hills road.

Completed Projects 2017/2018

Project Name	Length (km)	Funder
Mbarara-bypass	14	EU
Kampala-Entebbe Express way (41km section)	41	EXIM
Rushere-Nshwerenkye	11	GOU
Gulu-Acholibur	78	GOU
Acholibur-Musingo	86	GOU
Mpigi-Kanoni	64	GOU
Total	**294**	

Enforcement Interventions

Actions in In the advent of road infrastructure exploitation and misuse, UNRA has established an enforcement mechanism to combat this practice. UNRA is pursuing tougher regulations to help wipe out this menace given inadequate punitive the existing laws.

UNRA works-the future

Major Expressways & Capacity improvement projects coming up….

Kampala Flyover Construction and Road Upgrading Project

- Kampala -Jinja Expressway (77km) (KJE)
- Kampala-Mpigi Expressway (32km)-Section 1:
- Kibuye-Busega Expressway (10Km)-Section 2:
- Busega-Mpigi Expressway (27km)
- Kampala-Bombo Expressway (50km)
- Kampala Outer Beltway
- Nakasero-Northern Bypass Express Route
- Output Performance Based Road Contracts on Toro-ro-Kamudini Road Corridor (340km) Funder: WB & GOU.

Vision:

"Great Roads, Great User Experience; 20,000Km of First Class Roads by 2025."

Mission Statement:

"To Efficiently Develop and Maintain a Safe and Sustainable Road Network for the Economic Development of Uganda."

Shared Values:

Safety, Integrity, Team work, Excellence, Customer Centric.

Photo: Isimba Bridge connecting Kayunga

MINISTRY OF AGRICULTURE, ANIMAL INDUSTRY AND FISHERIES (MAAIF); PROJECTS

- The Agriculture Cluster Development Project (ACDP)
- The Uganda Multi-Sectoral Food Security and Nutrition Project (UMFSNP)
- Enhancing National Food Security through Increased Rice Production Project (ENRP)
- VODP/NOPP
- AVCD
- RPLRP
- BLDP

The Uganda Multi-Sectoral Food Security and Nutrition Project (UMFSNP); strengthening Uganda's nutrition through agricultural innovations.

Over the last two decades, Uganda has pursued polices aimed at economic and social development. Economic growth has averaged 4.9% since the year 2000, mainly in industry, agriculture, and services.

The country has 75.64 % rural population. Uganda's population of 45 million is rapidly growing at 3.32% annually; the total fertility rate is 6.2 births per woman of reproductive age, which is one of the highest in the world.

The total population is projected to reach 100 million by 2050. While the urban growth rate of 5.2% is among the highest in the world and is expected to grow from 6.4 million in 2014 – 22million by 2040.

With 78% of Uganda's population being under the age of 30 years, which combined with Uganda's rapid population growth poses a challenge to service delivery, infrastructure development, and employment.

Uganda's progress toward achieving its Vision 2040 goals and Millennium De-

Photo: The Hon Minister and the PS of Health monitoring UMFSNP activities in Kabale district, 2018

velopment Goals (MDGs) is mixed. The country has more than halved national poverty in less than 20 years (from 56% in 1992 to 24 % in 2009/10) and also improved access to safe water and HIV treatment.

However, these economic gains may not translate into progress in nutrition, health, and other development priorities.

Because many MDGs have not shown the desired progress, particularly those related to child, maternal health and mortality, because of poor coverage of maternal, neonatal, child health and nutrition services.

However, recognizing that nutrition interventions are essential investments in human infrastructure for long term development, the Government of Uganda (GoU) identified priority actions to strengthen nutrition within key social sectors, including health, agriculture, and education.

The Uganda Multi-Sectoral Food Security and Nutrition Project (UMFSNP) is an innovative effort to strengthen nutrition by building upon existing major programs within these sectors.

The approach is to improve technical capacity as well as coordinate sectoral implementation and administration capacity for nutrition, especially at sub-national levels.

Globally, child and maternal under nutrition underlie more than one-third (1/3) of all child deaths and result not only in failure to meet the first MDG - to halve poverty and hunger - but also to meet other goals in health, education, and gender equity.

Uganda is among the 20 countries worldwide with the highest prevalence of under nutrition.

In 2011, 33% of under – 5 years children were stunted, higher than in neighboring countries with lower per capita income. Stunting is nearly twice as high in rural communities compared to urban areas (36% compared to 19%), and there are great regional variations.

Micronutrient deficiencies (particularly vitamin A and iron) are also highly prevalent across all regions.

Experiences in Uganda and globally have shown that under nutrition may persist even as income improves. For example, poverty levels in Uganda declined by 2% points, years between 1995 and 2006 while stunting declined only by 0.6%; Uganda's "breadbasket", the South west Region, has relatively low poverty (18%) but very high prevalence of stunting (42%); and while chronic under nutrition has decreased in most regions, particularly Kampala, Northern and Eastern regions, in two regions with some of the greatest increases in commercialization of agriculture (Central 2 and Western), stunting rates actually worsened between 2006 and 2011, possibly due to increased focus on cash crops worsening household food security.

These trends are a concern given that Uganda is focusing on agriculture as a primary growth sector.

The UNICEF nutrition conceptual framework identifies the multifaceted elements of food, health, and care that contribute to continued undernutrition in Uganda:

Inadequate dietary intake – poor dietary quality and quantity: Food insecurity affects 23% of households and is common among smallholder farmers, who accounts for 96% of all farm production in Uganda?

Twinamatsiko Julius

Project Coordinator

The Uganda Multi-Sectoral Food Security and Nutrition Project (UMFSNP)

The UNICEF nutrition conceptual framework identifies the multifaceted elements of food, health, and care that contribute to continued undernutrition in Uganda

Smallholder farmers mainly engage in subsistence rain-fed agriculture, typically on less than five acres of land, and are vulnerable to seasonal fluctuations in production, food shortages and weather shocks.

The typical diet is monotonous (plantains, cereals, and starchy roots) and low in micronutrients, reflecting lack of awareness and low prioritization of nutrition. Limited crop varieties and low use of inputs and new technologies also contribute to insufficient production of micronutrient-rich foods.

Poor care and sub-optimal feeding practices contribute to inadequate dietary intakes in infants and young children in both food secure and insecure households.

Global experience has linked increased rates of stunting to lack of dietary diversity and poor feeding practices such as breastfeeding and feeding frequency.

Across Uganda, 63% of children less than 6 months are exclusively breastfed and 13% of children 6 - 23 months consume a minimum standard of dietary diversity (four or more food groups).

These are particularly important for the critical first 1000 days of life (pregnancy through birth and to 23 months), which is the period of greatest nutritional vulnerability when nutritional insults have the greatest effects on growth and development.

Poor practices among these vulnerable groups indicate a lack of community knowledge and awareness, and weak nutrition education systems.

High burden of disease, including acute respiratory infections, diarrhea, and malaria, is a significant determinant of stunting in infants and young children in the Ugandan context. This is linked to insufficient health services and unhealthy household environments (poor water and sanitation).

Given these multifaceted determinants of stunting, the recent Lancet Series on Maternal and Child Nutrition (www.thelancet.com) highlighted the importance of Multi-sectoral approaches.

Agricultural interventions alone, without incorporating behavior change communication to explicitly address the issues described above and others (e.g., dietary diversity, feeding practices, intra-household food distribution, sanitation, and hygiene), are not as effective at improving nutritional outcomes, as well as the reverse.

The Project implementation Model

Parent led school gardens program found that primary schools can be an effective platform for community engagement and social change (between 2011-2014, 716 government primary schools, 8 district local governments and local CBOs SNV/ Netherlands Development

Organization in partnership with the Embassy of the Kingdom of Netherlands and UNICEF). Operationalization was flexible to reflect different contexts, with some common strategies, including:

- Use of school gardens as demonstration centers to increase use of productivity enhancing practices and to facilitate linkages between extension service providers and communities;
- Increasing community engagement through parental participation in garden activities and village coordinating committees;

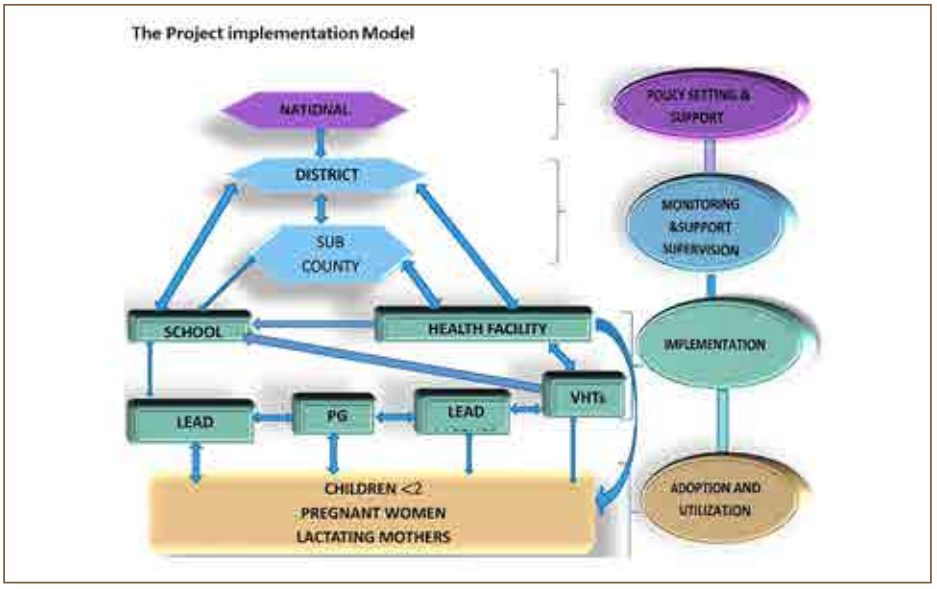


Diagram: The Project implementation Model

- Promoting vegetable study plots and water, sanitation and hygiene (WASH) for students; use of the School Nutrition Committee to coordinate and manage the school gardens.

The project supports GoU efforts to improve child nutrition through nutrition interventions across multiple sectors at national and district levels and implement selected interventions within each respective sector emphasizing existing systems, budgets, and accountability structures in eligible districts. It mainly supports interventions to improve the content and coverage of nutrition services at primary schools and surrounding communities.

These interventions are mainly focused on production and consumption of diversified micronutrient rich crops, nutrition care practices, and hygiene and sanitation demonstration. Simultaneously, the project supported demand-side approaches to enhance utilization of VHT delivered community-based nutrition services.

Primary schools are mandated to establish school gardens as "agriculture and nutrition classrooms" (e.g. for demonstration purposes and to deliver nutrition curricula) although these mandates are often neglected. Schools were used as an entry point to strengthen linkages between communities and line ministries, specifically Ministry Of Education Sector (primary school teachers), MAAIF (agriculture extension services), and Ministry Of Health (health workers and VHTs).

Project overview

The Government of Uganda received a grant of US$27.64M from the Global Agricultural and Food Security Programme (GAFSP) to implement a nutrition-agriculture linked project. This grant is supporting a five-year Multi-Sectoral Food Security and Nutrition Project (UMFSNP) and is being supervised by the World Bank.

The project is being implemented by Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), Ministry of Health (MoH), Ministry of Education and Sports (MoES) and Ministry of Local Government (MoLG) with Office of the Prime Minister as a coordinating entity.

Photo: The World Bank mission team meeting with the Hon Minister of Local Government, March 2019

Schools were used as an entry point to strengthen linkages between communities and line ministries, specifically Ministry Of Education Sector, MAAIF, and Ministry Of Health (health workers and VHTs)

The project is implemented in 15 district local governments of Namutumba, Iganga, Bugiri, Kabale, Ntungamo, Isingiro, Bushenyi, Kasese, Kabarole, Kyenjojo, Kiryandongo. Nebbi, Arua, Maracha, Yumbe.

Project Beneficiaries

The primary beneficiaries under the project are;

a. Pregnant and lactating women and under-2 children in all participating districts delivering enhanced community-based nutrition services.

b. All household members of Lead Farmers (LFs) and Parents Groups (PGs) participating in nutrition promoting activities with catchment areas of selected primary schools. In total, the project is targeting to directly benefit about 1.14 million primary beneficiaries, expected to be mainly from smallholder farming families.

Secondary beneficiaries include primary school teachers and school children; VHTs; agriculture, education, and health line ministry extension workers (at central, district, and sub county levels); and District Nutrition Coordinating Committees.

Project Components;

1. Delivery of nutrition services at primary school and community level
2. Strengthening capacity to deliver nutrition interventions.
3. Project monitoring, evaluation and knowledge generation.

Implementation Strategies

Phased approach of roll out to the 15 districts;

a. Phase I (Maracha, Nebbi, Namutumba, Ntungamo and Bushenyi districts,

b. Phase II first five districts- Kabarole, Kasese, Kyenjojo, Kabale and Isingiro Districts, and

c. Phase II last five districts- Iganga, Bugiri, Kiryandongo, Arua and Yumbe districts).

d. Utilization of 100 government aided primary schools in each of the 15 participating districts as entry points for the project.

Utilization of expertise in the agriculture sector to establish school demonstration gardens for micro-nutrient rich crop varieties (high protein maize, iron rich beans and vitamin A rich Orange Fleshed Sweet Potatoes (OFSP) both for pupil based learning and surrounding target communities.

e. Utilization of expertise in the agriculture sector to promote other nutrition sensitive agriculture technologies such as post-harvest handling, household level value addition, environmentally friendly food preparation practices, water harvesting and sustainable land management both at school levels and in the community

f. Linkage with Ministry of Health (MOH) and utilization of the primary schools for increasing access to health based nutrition services for the pupils such as de worming, micronutrient supplementation interventions and activities under WASH.

g. Supporting Ministry of Education and Sports (MOES) to implement the nutrition curriculum in the target schools

h. Establishing community-based multiplication centers for micronutrient rich crop varieties and demonstrations for good nutrition practices under the Lead Farmers (LFs).

i. Supporting and linking up with the available health sector institutions

in the target areas to implement the health sector-based nutrition interventions that are already being affected at school level in the target farm communities

Development of the Primary School Nutrition Action Plan (PSNAP);

The PSNAP is the main working document for nutrition services provision in the primary school participating in the UMFSNP. The main responsibility for its preparation is with SNC which is established as a sub-committee of the SMC for the sole purpose of focusing on the nutrition agenda in the primary schools participating in the Project districts.

During its preparation, technical support is obtained mainly from three sources:

1. Technical support, supervision and guidance, form staff from MoES at the national level, who are familiar with the preparation of such documents that guide education at the primary school level;
2. Staff and experts from the Departments of agriculture, health and education at the district level, who are responsible for incorporating the proposals in the primary school nutrition action plans (PSNAPs) into the District nutrition action plans (DNAPs) and subsequently the five-year rolling District Development Plans;
3. Staff from the agriculture, health and education sectors or community facilitators serve as members of the school nutrition committee (SNC) during the preparation of the PSNAP.

The main idea behind this is to inculcate the idea that good nutrition within the primary schools and communities can easily be realized through the interplay and balance between education, health and agriculture related activities.

The PSNAP document contains all details and activities pertaining to the nutrition agenda of the primary school. Specifically, it contains information on:

a. Methodology and activities needed for the establishment of the school demonstration gardens. This itemizes the inputs, the time frame, the labor requirements and the associated budgets.
b. It defines and cost the various activities to be undertaken from planting to harvesting including, procurement of micro-nutrient rich crops and other inputs, planting, thinning, weeding, spraying, application of fertilizers, and post handling processes
c. It also defines the critical points during the entire process when it is critical to stage demonstration both for the pupils and the farmers so that maximum benefits can be derived from the gardens.
d. It contains information on various activities related to:
e. Practical nutrition education where both parents and pupils attend monthly demonstration sessions in food preparation, and processing in order to derive maximum nutritional benefits from the various food ingredients including those derived from the school demonstration gardens. The activities and the associated costs are in the PSNAP;
f. Information on the formal primary school nutrition education of children in classrooms.

PSNAP contains information on: Methodology and activities needed for the establishment of the school demonstration gardens

Photo: Total of 4500 demonstration gardens have been set up at both school and lead farmer levels.

Demonstration Gardens;

Each of the 1500 primary schools has received a package to establish/strengthen their school demonstration gardens to produce year-round micronutrient-rich crops, and to support nutrition education activities.

Total of 4500 demonstration gardens have been set up at both school and lead farmer levels.

The Primary School Demonstration Gardens are primarily managed by the Parent Groups (PGs) and pupils. Demand for nutritious foods is mainly generated through communications and promotion strategies. The primary incentive for PG participation is to gain skills to increase availability and yields of nutritious foods for home consumption, particularly during hungry seasons, arising from improved soil management and cultivation practices, diversified crops, laborsaving technologies, and improve post-harvesting processes.

The World Bank mission team meeting with the Hon Minister of State for Agriculture, Hon. Kibanzanga Christopher in March 2019.

The Director Education Standards monitoring project activities in Bushenyi District, May 2019

Hon Minister of State for Agriculture, Hon. Bagiire Aggrey Henry monitoring UMFSNP activities in Kasese District, December 2020

The Permanent Secretary MAAIF Mr. Pius Kasajja Wakabi monitoring UMFSNP activities in Kabale district, May 2019

Eligible expenses for schools include rainwater harvesting; cooking pots/ saucepans, and utensils; gardening tools (e.g. Sprayer Pump, Hoe, Rake, Watering can, Pangas, Slasher, Wheelbarrow); locally available and non-locally available micronutrient-rich crop seeds and planting materials; fencing materials; fertilizer; and herbicide/pesticides.

Component 3.2: Project monitoring, evaluation, and knowledge generation

Project Progress and Key Achievements:

Project Development Objectives indicators.

Percentage of households reporting year-round production of at least three micronutrient rich crops in project areas.

This indicator is intended to measure the Number of households that are having year-round production of at least three micro nutrient rich crops in project areas.

The project is Promoting 2 Main micro nutrient rich foods across all the project areas these are:

1. **Orange Flesh Sweet Potatoes (OFSP).**

These are particularly rich in Vitamin A. Varieties being promoted include; Naspot 10, 12, 13, and 15. Vitamin A is particularly responsible for boosting the immunity and improved eye sight.

2. **High Iron Rich Beans (HIRB).**

These are particularly rich in Iron. Varieties being promoted include; NARO bean 1,2,3 4C and 5C. Iron is an essential element for blood production.

The end target for this Project Development objectives (PDO) indicator is to have a 20 % increase from the Baseline

PDO 2. Percentage of children aged 6-23 months in households with minimum dietary diversity

Dietary diversity refers to the number of different foods or food groups frequently consumed over a given period of 24 hours (mainly focusing on Nutrient adequacy). This indicator intends to measure the "adequacy" and dietary "quality intake of children between 6 - 23 months in project areas. Adequacy in this context means a diet that meets dietary requirements for energy and all essential nutrients.

The target is measured on a 10% Increase from the baseline.

PDO 3 percent of women participating in community-based nutrition activities in project areas.

Photos: (Top) Orange Flesh Sweet Potatoes (OFSP).

(Below) The High Iron Rich Beans (HIRB) varieties being promoted by NARO.

Photo: Women participation in community-based nutrition activities such as cookery demos and growth monitoring & promotion.

As a strategy the project is focusing on "1000-day window of opportunity" directed at women of reproductive age, newborn and young children under the under the age of two years.

The project is contributing to addressing gender issues in the agriculture sector, the project activities are focused on improving and diversifying household food production of smallholder farms which are traditionally controlled by women, through increasing access to agricultural inputs and extension services and promoting use of labor-saving technologies.

The target is measured at a 50% increase from Baseline. Activities captured under the community-based nutrition activities include; cooking demonstrations nutrition education sessions e.g. on child feeding practices, participating in GMP among others.

Progress as per Intermediate indicators

Number of cooking demonstrations carried out at community level

The project conducts cooking demonstrations at school and community level routinely purposely to demonstrate essential nutrition actions related to preparation and consumption of micronutrient rich foods.

Total of 10,286 cooking demonstrations have been conducted at community level as of May 2020. The is substantive increase in the number of cooking demonstrations is mainly attributed to increased levels of adoption and active participation in the community forum.

There has been a reduction in number of cooking demonstration conducted from January to April

2019 as these have been revised to Nutrition Forums which go beyond just the cooking demonstrations. The nutrition forms include Nutrition education sessions, Monthly Growth Monitoring and Promotion (GMP) by the village health team (VHT) and Health worker, conducted at community level.

Isingiro district has continuously registered the highest number of cooking demonstrations at both school and Community level for the months of March, April, May and June 2019.

The number of cooking demonstration is expected to increase with the continued sanitization and adoption at community level.

There has been a reduction in number of cooking demonstration conducted in June and July 2019, however more sanitization is continuously being carried out along with the dissemination of Ministry of Health (MoH) guideline and more Nutrition forums are being conducted as seen in the upward trend in the month of August.

Total of 1,146 cooking demonstration were conducted in September, October, November and December 2019, with the highest of 443 in the month of November and lowest in the month September 2019. The low numbers in cooking demonstration was attributed mainly to the lack of the non - locally available foods such as meat, fish etc.

The project has set aside funds sent to school to procure these foods to ensure increase in the number of cooking demonstrations conducted.

Isingiro district had the total number of cooking demonstrations across the months and Nebbi district had the lowest number recorded.

Total of 1,566 Cooking demonstrations were conducted for months of January, February, March, and April 2020 which shows an improvement from the previous 4 months. The highest being reported in the months of February 2020 and the lowest in April 2020. This activity was greatly affected by the COVID-19 pandemic as the community forums could not be conducted.

Photos 1 & 2: Health workers taking weight & height measurements of children under 2.

Number of under-2 children reached for GMP in project areas

Growth Monitoring and Promotion (GMP) is a prevention and promotion activity. It comprises of periodic, frequent body measurements of a child in comparison to the WHO standard in order to assess growth adequacy and enable timely identification of growth faltering. Basic growth assessment involves measuring a child's weight, length or height, age, sex and comparing these measurements to the WHO growth standards.

By July 2019, the project had reached a total of 238,542 which is over and above the set end target of 187,500. A total of 295,126 children under 2 have been reached for GMP.

There is a continuous increase in the number of children under 2 reached for GMP and this number is expected to increase even further with continuous uptake and adoption of nutrition forums

Total of 14,274 children under 2 were reached for GMP in the months of September, October, November and December 2019. With the highest numbers recorded in October and November because this activity is intensified during the child health days. The highest number of GMP was recorded in Isingiro and Namutumba districts.

Total of **14,274** children under 2 were reached for GMP in the months of September, October, November and December 2019.

The Agriculture Cluster Development Project (ACDP); Building transformation interventions in agriculture across Uganda

The Agriculture Cluster Development Project (ACDP) is a 6-year project implemented by the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) that took effect on 23rd January 2017.

Photo: President Museveni flags off Primary Processing equipment for farmer organisations at Namalere Mechanisation Centre.

The ACDP is a development project implemented with support from the World Bank, financed by the International Development Assistance (IDA) to a tune of US$ 150 million. The Project Development Objective (PDO) is to raise on-farm productivity, production, and marketable volumes of selected agricultural commodities (maize, beans, rice, cassava and coffee), in specified (12) geographic clusters in 42 districts (now 57 districts as a result of splitting of districts). The Project is in its 44th Month of implementation since it was declared effective on January 23, 2017.

The project planned to undertake a range of activities to achieve its objectives, which contribute to the overall Project Development Objective.

The project has 4 components as aligned in the Agriculture Sector Strategic Plan (ASSP) and the National Development Plan II (NDP II) as displayed in the table below:

The project is implemented through the Ministry departments with support from the Project Coordination Unit (PCU). The departments responsible for the different project Sub components are:

1. Department of Crop Resources
2. Department of Agricultural Extension and Skills Management
3. Department of Agricultural Investment and Enterprise Development
4. Department of Agricultural Infrastructure, Mechanization and Water for Agricultural Production
5. Department of Crop Inspection and Certification
6. Department of Crop Protection
7. Department of Agricultural Planning

Photo: **Dr Henry Nakelet Opolot Project Coordinator ACDP**

Table 1: Aligned project objectives to sector objectives

SN	*Sector Objective*	*Project Components*
a.	To increase production and productivity of agricultural commodities and enterprises;	**Component 1** Support for intensification of on-farm production 98.7%
b.	To increase access to critical farm inputs;	
c	To improve access to markets and value addition and strengthen the quality of agricultural commodities, and;	**Component 2** Value addition and Market Access
d.	To strengthen the agricultural services institutions and enabling environment.	**Component 3** Policy Regulatory & Institutional Support **Component 4** Management support & ICT platforms

Photo: **Table 1: Aligned project objectives to sector objectives**

Out of the USD 79.38 million disbursed to date, USD 36.97 million which is (48%) has been spent and USD 42.41 million is unspent.

Organization and Management

The project coordination is overseen by the project coordination unit, led by the Project Coordinator and deputized by the Deputy Project Coordinator.

The project contract staff comprise of specialists and assistants in procurement, finance, monitoring and evaluation, environment, social science, road and water engineering, ICT, farmer organizations, agronomy and knowledge management and communications. the project is also overseen by a Technical and a National Steering Committee. The Project Coordinator reports directly to the Permanent Secretary.

Financial Performance of the Project

As at the end of August, 2020, the Project had a cumulative disbursement of USD 79.38 million (53% of the Loan) out of which USD 36.97 million (46% of disbursed) had been utilized .

The project financial performance has kept improving steadily since when it started spending on big ticket items like matching grants and rehabilitation of road chokes from 21.7% to 48% at the end of June 2020. As of end of June 2020, disbursement has risen to 47.7% and absorption to 52.9% of the disbursed amount mainly as a result of disbursement of initial matching grants to farmer organizations, from among 123 FOs who participated in the November 2019 match-making expo and out of which 111 grantees have received a total of 21.7bn.

The overall project expenditure increased by 41% from USD 26.26 million in March 2020 to USD 36.97 million as at end of June 2020. The major drivers for expenditure were UGX 21.7bn disbursed to matching grants beneficiaries, UGX 5.2bn paid to e-voucher beneficiaries, and UGX 7.9bn for disbursements to project districts to facilitate project activities.

Physical Performance of the project;

Physical progress of implementation since effectiveness in January 2017 to August 2020 by component and sub component

Support intensification of on-farm production

The objective of hear is to support intensification of on-farm production of five priority commodities namely, maize, cassava, beans, rice and coffee. For eligible farm households, support focuses on:

Table: Overall Project Financial Performance, August 30, 2020

Funding source	Loan (USD)	Cumulative Disbursed (USD '000)	Cumulative Expenditure (USD '000)	Balance unspent on Disbursed (USD '000)	Balance Undisbursed (USD '000)	Balance Unspent (USD '000)
International Development Association (IDA)	150,000,000	79,376 (52.9%)	36,966 (46.6%)	42,410 (53.4%)	71,541 (47.7%)	113,951 (76%)

1. e-Voucher Program;
2. Capacity Building for Target Beneficiaries and Farmer Organizations;
3. Development of Agricultural Input Markets.

To achieve the above objectives, the component is structured into three sub components as detailed below.

e-voucher (input subsidy) program

The objective of this sub component is to provide a time-bound, partial and diminishing subsidy to finance the purchase of key inputs and on-farm storage.

Financial Performance

The overall budget allocation of the subcomponent is USD 79m and to date the total amount spent is USD 8m as of June 2020, putting overall expenditure at 10%.

Key Performance Indicators

The subcomponent contributes to the following key performance indicators in the project results framework;

1. Yields (MT/ha) of selected commodities (maize, rice, beans, cassava, and coffee) for the participating households
2. Increase (%) in maize, rice, beans, cassava, and coffee production by participating farms in the project areas
3. Increase (%) in maize, rice, beans, cassava, and coffee production in the project area (percentage)
4. Direct Project Beneficiaries
5. Percentage of Female Beneficiaries

6. Area under improved technology (Seed, Fertilizers, Pesticides) as a result of project interventions – Hectares
7. Percentage of Farmers using improved agricultural technology (seed, fertilizer, pest protection, small scale irrigation equipment, etc.) among the targeted beneficiaries
8. Number of participating farm households using post-harvest technology inputs as a result of the project intervention

Physical Progress

In an effort to increase access to the time-bound, partial and diminishing subsidy to finance the purchase of key inputs and on-farm storage, implementation was focused on;

1. Development and maintenance of an e-voucher management system
2. Registration and profiling of farmers
3. Enrollment of beneficiary farmers
4. Provision of subsidized inputs to beneficiary farmers

Photo: Training on the use of the e-voucher system in Kitagwenda district

Electronic Voucher Management System (e-VMS)

The agro-input dealer delivers inputs to the farmer and then initiates the process of inputs redemption

The achievements made under the e-voucher Development and maintenance of an e-voucher management system

The project contracted an e-Voucher Management Agency (e-VMA) to Supply, Install, Commission and Maintain an Electronic Voucher Management System (e-VMS).

The system was designed and launched in November 2018. The critical users of this system are farmers and agro-input dealers. Eligible farmers are enrolled into the system where they place orders to accredited agro-input suppliers for subsidized inputs for the 5 project commodities. Once accredited, the agro-input dealer is enrolled into the system and receives orders from farmers.

The agro-input dealer delivers inputs to the farmer and then initiates the process of inputs redemption. The system is able to deliver on its basic functions and the following have been achieved;

1. Integration of the e-Voucher system with National Identification and Registration Authority (NIRA) database which enables verification, traceability and prevents beneficiary farmers from repeating a cycle,
2. Pre-loading of administrative units (districts and sub counties) in the system to eliminate typing errors,
3. Payment of e-Voucher management agency costs for Roll-out 1 and 2,
4. Government SMS payment gateway has been integrated to enable farmers receive free Short Message Services (SMS).
5. Payment options including over the counter, internet and agent banking.

However, the system faces some challenges such as; inability to pay using mobile money, non-functional system dashboard, low uptime and slow processing which affects timely access to inputs. To counter this problem, MAAIF together with the World Bank adopted the DATs challenge to identify an alternative service provider to supply, install, commission and manage a parallel EVMS.

Through DATs challenge MCash (Financial Technology Solution) emerged the winner. As part of knowledge transfer and sustainability of EVMS, the contracted vendor UBA has trained over 500 Agricultural Extension Officers and granted system access rights to 350 officers. This among other reasons has contributed to the increase in the number of farmers enrolled.

Registration and Profiling of Farmers

Registration and profiling of farmers involves capturing personal details of the farmer (names, age, gender, household size and identification number) and basic farm data (commodity grown, total land size and group membership). It is from this database that farmers are selected and enrolled onto the e-VMS.

Since the project started, farmer registration and profiling has increased from 37,719 farmers (5 pilot districts in Season 2018B) to 349,409 as of 15th August of Season 2020B. The graph shows progressive increase over the seasons.

Low registration has been attributed to poor mindset of farmers due to; (i) uncertainty of the likely use of their data,

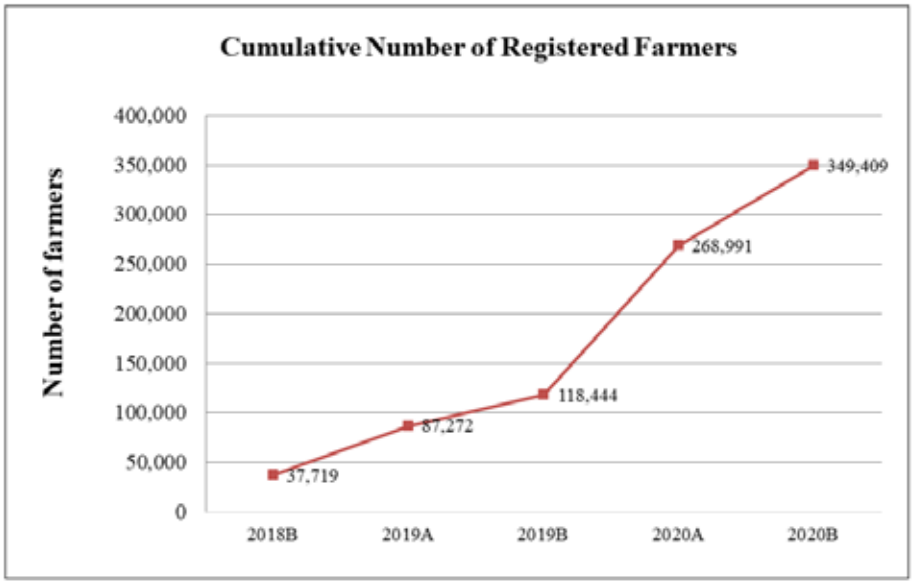
(ii)fear of taxation, (iii) programs with related names that fleeced farmers, (iv) inadequate human resource to undertake registration and (v) political interference in terms of discouraging contribution for inputs.

Enrollment of beneficiary farmers

The total number of farmers enrolled as of 15th August 2020 was 201,556 (41% are female) which is 45% of the targeted 450,000 farmers. Enrolment has generally increased from 51,674 farmers in Season 2019B to 201,556 as of August 2020 (Season 2020B), an increment of 290%.

Cluster 1 has enrolled the highest number of farmers among the pilot clusters surpassing its target beneficiaries (30,000) by 93% while Cluster 12 has the lowest number of beneficiaries at 23% of its targeted beneficiaries (19,500). On the other hand, the roll out clusters have realized a greater number of farmers enrolled within a short time, with Kyenjojo Cluster leading with 41% of its target beneficiaries (72,000) and Kabarole Cluster registered the lowest enrollment at 14% of its target beneficiaries (52,000). It should be noted that the pilot clusters have participated in the e-voucher program for over 4 seasons whereas the rollout clusters have participated for two seasons running so far.

The high enrollment in Cluster 1 is attributed to; (i) the longevity of project implementation in that cluster, (ii) farmers having a higher level of awareness of the benefits of input use, (iii) good political will to the project (iv) proximity to the city making access to the inputs much easier (v) highly commercialized crop (coffee) grown in the area (vi) existing coffee plantations supported by the project and (vii) existence of organized farmer groups.



The low enrollment registered in Cluster 12 is attributed to;

1. Low commercialization of the cassava commodity
2. Delayed inclusion of tractor hire services in the input package
3. Low political support,
4. The cassava commodity being grown for over 12 months,
5. Slow mindset change.

Enrollment of farmers has been enhanced through the following strategies:

1. Deployment of teams from Project Implementation Team (PIT) at the Ministry as Cluster Coordinators to support project implementation activities
2. Issuance of eVMS user rights to Agricultural Extension Officers at sub-county level,

Graph above: Profiling and Registration of farmers and farmer organization per season

Cluster	Number of farmers enrolled	Target Benefi-cia-ries	Percent-age at-tainment
Cluster 1 (Kalungu et al)	58,049	30,000	193
Cluster 11 (Ntungamo et al)	34,237	57,000	60
Cluster 6 (Amuru et al)	10,346	23,000	45
Cluster 2 (Iganga et al)	18,516	42,000	44
Cluster 12 (Nebbi et al)	4,570	19,500	23
Roll out Cluster			
Cluster 9 (Kyenjojo et al)	29,617	72,000	41
Cluster 3 (Tororo et al)	5,673	18,500	30
Cluster 5 (Soroti et al)	1,817	6,000	30
Cluster 10 (Hoima et al)	11,549	44,500	26
Cluster 7 (Apac et al)	6,511	27,500	24
Cluster 4 (Kapchorwa et al)	13,203	58,000	23
Cluster 8 (Kabarole et al)	7,227	52,000	14
Total	201,556[1]	450,000	45

Table below: Number of farmers enrolled vs target beneficiaries in the 12 clusters

3. Targeted mobilization and sensitization of prospective farmers, farmer groups, partners and opinion leaders in the communities and
4. Timely delivery of quality inputs.

Provision of subsidized inputs to beneficiary farmers

Out of the total enrolment of 201,556 farmers, 143,074 farmers (71%) have so far made orders as at 15th August 2020. Whereas, the number of farmers making orders has grown from 31,762 to 143,074, an increment of 450% between season 2019B to 2020B (August). There is improvement with the number of farmers who progress from enrollment to ordering.

This is attributed to;

1. Increased awareness and knowledge of the project among the beneficiaries,
2. Increase in the number of agro input suppliers across clusters and
3. Close supervision and monitoring of the clusters by PCT at the Ministry.

The project has provided subsidized inputs to 108,423 farmers (41% women) which is 25% of the targeted 450,000 beneficiaries. Most of the farmers are in cycle 1 and a few in cycle 2 and 3. The total number of project beneficiaries in all cycles were 231 farmers in 2018B, 6,402 farmers in 2019A, 16,544 in 2019B, 49,962 farmers in 2020A and 38,356 in 2020B (August). There has been a 574% increase in redemption of inputs between November 2019 and August 2020. The increment is attributed to:

1. increased knowledge of the project by the agro-input suppliers
2. Increase in number of agro-input dealers
3. improvement in the agro-input dealer networks with 09 national dealers having set up networks in 20 towns/districts in the project area and
4. deployment of cluster coordinators who closed the gap created by COVID 19 at a critical time of the season, by vigorously supporting input distribution.

The rate of redemption of orders was 96% in Season 2018B, 69% in season 2019A, 78% in Season 2019B, 78% in Season 2020A. Twenty-two percent (7,893 farmers) of the farmers that ordered failed to redeem and this is attributed to;

1. Failure by farmers to top-up their contribution in time,
2. Delayed and failed delivery of inputs by agro input dealers
3. Stock outs among dealers due to unexpected demand and
4. Unstable system and
5. Limited farmer capacity to use the system.

The project has put in place the following measures to address the above challenges; (i) continuous mobilization of farmers through-out the season, (ii) building the capacity of farmers on system use, (iii) assignment of user rights to sub county extension workers (iv) early ordering enabling aggregation of demand early on in the season, (v) continuous accreditation of agro-input dealers as and when demand arises (vi) improving the agro input network and (vii) timely reporting of system errors by cluster coordinators enabling quick solutions.

Value of Inputs

One of the project intentions was to cause farmers to appreciate use of inputs thus growing from investing in inputs UGx. 50,000 per season to UGx. 300,000 per season. This has been partially realized as most farmers currently contributed more about UGx. 148,000 in cycle 1 of picking inputs. Currently farmers have invested a total of UGx. Fourteen Billion in inputs while Government has matched this contribution with UGx. Twenty-eight (28) Billion.

The poor transition is attributed to the following reasons;

1. Farmers recycle seed on all ACDP commodities except hybrid maize seed and get fairly good yield
2. Higher contribution requirement by farmers at cycle 2 and 3,
3. low access to credit for agricultural purposes coupled with limited time for farmers to sale and raise capital for the next season,
4. Delayed delivery of inputs which discourages farmers from continuing in the project,
5. Existence of programs distributing free seed/ planting materials and fertilizers,
6. Ability of farmers to use other family members for subsequent seasons at the same level of contribution on piece of land.

To address these challenges, the project is strengthening farmer groups, intensified sensitization of farmers, cleaning of the e-voucher system database, recruitment and deployment of community-based facilitators, strengthening agro-input dealer distribution networks by accrediting local service providers, capturing farmer household data.

In addition, the project proposes staying farmers at 33% for at least 2 cycle and introducing a revolving funds for farmer organizations.

ACDP project has provided subsidized inputs to **108,423** farmers (41% women) which is 25% of the targeted 450,000 beneficiaries.

Effect of the Subsidy Interventions

Low use of improved agro inputs (seeds, fertilizers, chemicals, tarpaulins, hematic bags, etc) in Uganda has been attributed to unaffordability and thus limiting access to such inputs. To improve access to agro inputs, the ACDP project provides a subsidy program to beneficiary farmers. The project has attracted household level investment (through co-funding) for agro inputs to the tune of Uganda Shillings fourteen billion (UGX 14.2bn) within a period of 2 years as of 15th August, 2020. This together with government contribution has made a total investment in agro inputs of Uganda Shillings twenty-eight billion (UGX 28.6bn).

The ACDP project targets to reach 450,000 farming households (450,000 acres). 108,243 farmers have used inputs implying that ACDP inputs have been applied on approximately 108,243 acres. Of these 38,000 acres were under improved seed and planting material, 60,900 acres were under fertilizers, 700 acres were preparation using tractors, and 65,300 household used postharvest handling materials. The technologies were used complementarily especially for seed/ planting materials, fertilizers and tarpaulins.

The project has enabled 201,556 households to use Information Technology (IT) in agriculture (use of phones to order and redeem inputs).

The application of the above-mentioned technologies has resulted into increased production and productivity of maize, beans, rice, cassava and coffee among smallholder farmers. Hence, the project is making significant strides towards the objective of increasing production and productivity of marketable volumes of rice, maize, beans, cassava and coffee in specified geographical clusters.

The mid-term review study conducted in 24 pilot cluster districts, shows that the yields increased by 30% for maize, 19% for beans, 26.8% for rice and 9.4% for coffee and a decrease in cassava yield by 5% among beneficiary farmers.

The same study noted that there were improvements of about 30% in marketable volumes of the commodities in the 24 pilot cluster districts. Further, there were small improvements in profitability ratios but higher profitability for rice at 30% profit ratio. Profitability highy depends on market price implying that the project needs to take big strides in the market otherwise the income will not be sufficient to pay for the fertilizers.

Photo: An ACDP farmer in Mbale district standing between his ACDP garden and the control garden in the fore ground. The crops where ACDP inputs were applied grew vigorously.

In order to increase efficient use of inputs, integration of Sustainable Land Management (SLM) is being pursued by the project. To date, 40 Agricultural Officers (AOs) drawn from 12 coffee districts were trained on integration of SLM into the coffee farmers' fields. The trained TOTs cascaded the training to 40 Agricultural Officers (AOs) and 294 farmers (180 females & 114 males) on SLM technologies at sub-county and farmer field level in the districts of Kalungu, Mpigi, Masaka, Arua, Nebbi and Yumbe districts.

Challenges

COVID restrictions;

1. In addition, the restrictions on movement and gatherings affected planned farmer trainings in the sub counties.
2. Coincided with the time of demonstration gardens establishment at sub county and farmer group levels
3. Low staffing levels of extension staff in some districts (new districts) affected mobilization of farmers for trainings and other line project activities.
4. Negative publicity on the use of inorganic fertilizers by some organic based fertilizer movements/organizations in some project districts.
5. Some commodities promoted in some project districts are less popular hence affecting enrolment. In some of these districts there has been a demand for a third commodity e.g. Cluster 4 is requesting for Beans.
6. Limited capacity of the EVMA to train farmers on input use.
7. Weak farmer organizations that are unable to mobilize their members to participate in the project.
8. Inadequate capacity of DLGs to integrate SLM technologies in the production of ACDP commodities.
9. Limited capacity to monitor and mitigate aflatoxin contamination of produce by DLGs.

Recommendations

1. Consideration of another preferred ACDP commodity in affected districts/ clusters for support
2. Continued sensitization of farmers on benefits of organic and inorganic fertilizers in affected clusters.
3. Inclusion of organic fertilizers in the input subsidy package.
4. Scaling up of technology demonstrations and farmer field days.
5. Separate farmer trainings on input use from EVMA's roles and responsibilities.

Lessons Learnt

1. Closer supervision of district implementing teams through deployment of cluster coordinators created a close linkage and helped focus the DCTs to their specific roles in project.
2. The project planned 2-3 days training on e-VMS system use, financial literacy and input use, is grossly insufficient to build appropriate capacities required to effectively use the system and apply inputs received. The target beneficiaries require close and continuous support and training.

Low staffing levels of extension staff in some districts (new districts) affected mobilization of farmers for trainings and other line project activities


1


4


5

A pictorial of field performance of some ACDP project commodities:

Photo 1. Mr. Yayeri Ntegyeriize from mugono village, Itojo, Ntungamo District with a sample of his beans (Nabe 2) harvested after Season 2020A. A good harvest.

Photo 2. Lubaale Ben in his cassava garden in Kakooro sub-county, Butebo district.

Photo 3. Mr. Olebo's maize produced and dried using ACDP seed, fertilizers and tarpaulins in Kameke Sub-county, Pallisa district

Photo 4. A farmer receiving 8 bags of NAROCAS1 in Otipe Ward, South Division, Kumi Municipal Town Council in March 2020.

Photo 5. A farmer in Nyamunuka Town Council, Ntungamo district showing off his beans garden. The farmer used ACDP bean seed and fertilizers (2020A)

Photo 6. Rice at grain filling stage in Mazimasa sub-county, Butaleja district. The uniformity of the rice garden shows good quality seed

Photo 7. Mr. Bbale's in Bulwaga village, Kanywa Parish, Buwunga subcounty Masaka district shows off his coffee to an ACDP Project team.

Photos by ACDP

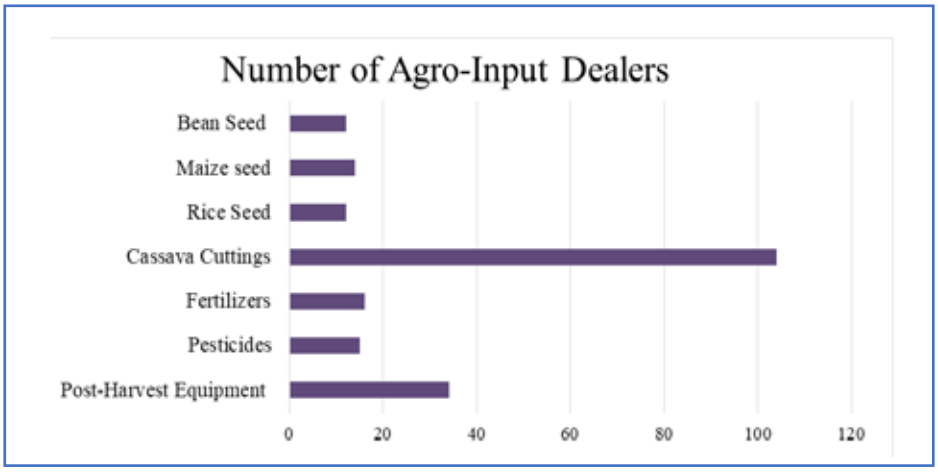
Under ACDP project, the number of accredited agro-input suppliers has increased from 03 in the first Season 2018 B to 165 in season 2020 B.

Establishment of local agro-input dealers' network

The number of accredited agro-input suppliers under the project has increased from 03 in the first Season 2018 B to 165 in season 2020B. This has led to increased accessibility of inputs to farmers; with 09 national dealers have established networks with local dealers or establishing their own outlets in about 20 major towns in the project area. The quality is generally good and quantities have improved.

In order to incentivize the establishment of distribution networks, the project organized two regional match making workshops involving 72 agro-input dealers at both national and local level. During these workshops, participants were exposed to the different business opportunities existing in the project which include a large assured market for their products.

The process of establishment of agro-input dealer distribution networks face the challenge of lack of capital among local dealers to stock required quantities of inputs from the national dealers. In order to solve the challenge of agro-input distribution networks, the project conducted an assessment of the capacity of local dealers who can be included in the e-voucher system. A total of 128 dealers have been identified. Below is a breakdown of the number of dealers.



Value Addition and Market Access

The project supports activities and investments to improve marketing and post-harvest handling of farm produce and measures to eliminate bottlenecks and trouble spots in rural access roads critical for the movement of farm produce to markets. The component builds the capacity of the Area-based Commodity Cooperative Enterprises (ACCEs) and RPOs to effectively perform value addition and become marketing agents (aggregators) of farm produce from their affiliate farmer organizations.

The objective is to:

a. Improve the operating capacities ACCEs/RPOs;

b. Increase volume (MT) of selected commodities marketed by ACCEs/RPOs;

c. Provide additional volume of storage capacity;

d. Increase the percentage of ACCEs/RPOs investing in post-harvest and/or marketing; and

e. Rehabilitate road chokes/bottlenecks on community farm access roads.

Manuals were prepared and used to guide these trainings, and have since been standardized for use by Trainers of Trainers (ToTs) at the District and Lower Level Local Government for subsequent trainings.

In May 2020, MAAIF commissioned and launched construction of post-harvest facilities in the five pilot clusters. The events were aimed at informing the general public of these investments in the project sites and encouraging them to take advantage of the facilities to improve marketable volumes of the project commodities.

(Photo 1) Hon. Bright Rwamirama Minister of State for Animal Industry presided over the launches in Cluster 1

(Photo 2) Hon. Bagiire Henry Minister of State for Agriculture launched road chokes and Matching Grants facilities in cluster 2.

Since the launch of the sites, different teams including Top policy management of MAAIF, MAAIF technical teams, District Technical and Political teams have provided guidance during the implementation of these construction works. Over 70% of the Construction sites have been roofed and in finishing phase before value addition equipment installation.

During these visits, the Ministers encouraged local leaders to mobilize more farmers enroll under the project to be able to fully benefit from the project investment. The involvement of supervision of works by District Engineers, has ensured that the quality of works is commendable in most of the sites. However, in Kabale district, one of the grantees (Karweru Bahingi Kweterana Group) altered the building plan to create more office rooms which reduced storage space.

The Ministry has directed District team to do modifications and ensure that the original plan is implemented.

Six grantees have completed construction and installed value addition equipment and about 50 grantees have placed orders for equipment from service providers.

Photo below: Hon. Vincent Bamulangaki Ssempijja, Minister for Agriculture launching the construction of a storage facility for Balandiza Kimeze Bukulula Farmers' Cooperative society at Bukulula Sub County, Kalungu district.

Photo: A Multipurpose seed cleaner and grader machine at Bugiri District Integrated Farmers and Agribusiness Association

In Kamengo subcounty Mpigi district, KOFA Cooperative Society Ltd which has a membership of 160 coffee farmers received UGX 175m from ACDP and installed a coffee huller in June 2020. In addition, the members bulked 8.4 tons of un-hulled coffee (kiboko) producing 5.1 tons of hulled coffee (Kase).

The bulked coffee came from 89 members of KOFA cooperative of whom 33 were males and 56 were females. KOFA has built partnership (contracts) with exporters where it sells its processed coffee to NUCAFE. This will guarantee the market and price stability.

In total, the cooperative has processed 99 tons of un-hulled coffee (Kiboko) which resulted into 55 tons of hulled coffee (Kase). The installment of the equipment in the area attracted more mobile micro coffee traders to process their coffee at the plant. One hundred thirty-one (131) traders have processed their coffee from the facility and of these 83 males while 48 are females.

Farm Access Roads and Choke Points at Community Level

The objective is to provide support to each cluster to make improvements in existing farm access roads, while focusing on eliminating key choke points that impede the inflow and outflow of agricultural inputs and commodities, respectively.

The overall budget allocation is USD 16m and to date the total amount spent is USD 1.2m as of June 2020, putting overall expenditure at 8%. And USD 3.2 million has been committed (signed contracts) for payment to contractors in the 5 pilot districts, this is expected to bring total expenditure to USD 4.4m, 27.5% of the total subcomponent budget.

Mapping of high production areas

The purpose of mapping high production areas was to profile and determine the production levels of ACDP commodities. Mapping of high production and marketing areas was concluded in all the 57 project districts. Sub counties that are highly productive in the project commodities were identified. Then roads linking these areas to the value chain facilities and markets, to enable elimination of road bottlenecks critical for movement of farm produce to bulking centres and storage facilities mapped.

Lessons Learnt

1. Adoption of Community-based animator model has been successful in other projects and is a good strategy for ACDP
2. Building the capacity of FOs should be prioritized in the next period of implementation.
3. Generally, the project set relatively low-end target yield levels despite high level of investment in commodity production.
4. Going forward soil tests should guide/inform inputs use
5. Accelerating screening and pre-qualifying of local agro-input dealers.

Photo 1: Rock excavation & ETL works on Katokye - Kyenjubu Road in Ntungamo District

Photo 2: Filling up of swamp section on Butende - Idudi Road in Bugweri District.

Photo 3: Improvised Bridge on Kyenjjubu-Kakanena Road in Ntungamo District Washed out of Position During Floods in November 2019. Site proposed for bridge works

Enhancing National Food Security through Increased Rice Production Project (ENRP); targets over 9,000 farm families to benefit from the New Bugweri - Bugiri Rice project

"Farmers produce rice in the farms but they are facing challenges - the ENRP Project is ready to respond to the challenges".

In 2008, there was drought that resulted in famine in many developing countries. The Islamic Development Bank (ISDB) in the Jeddah Declaration announced allocating USD 1.5 billion to support efforts to meet immediate, medium and long-term food crisis in its least developed member countries (of which Uganda is a member country)

Government of Uganda applied for the loan in 2009 and two missions were sent to appraise the project in 2010 - 2012. The government of Uganda signed a loan agreement with ISDB in May 2013 and for USD 34.05 million which parliament approved for ENRP in November, 2013.

All conditions were met and the project was declared effective on the 20th October, 2016. But it was discovered that the project needed re-scoping because Busowa needs a dam and levelled farmland unlike Tilda that already had a dam and farmland but they Tilda, pulled out of the project because of disagreement with government on the terms of the engagement.

The four-year project is to contribute to increased production, Marketing and consumption of rice for improved nutrition and food security and incomes to Ugandans and as well support, build and strengthen institutional and technical capacities for sustained agricultural growth that contributes to the poverty alleviations and food security.

The project is a production alliance partnership model where government comes into partnership with private development partners for promotion, production, processing and marketing of agriculture products.

The project aims at enabling all farmers to produce rice throughout the year through controlled irrigation.

Photo: Dr. Adan Bashir the Regional Manager from IsDB smiles at a colleague who is preparing to harvest rice using a sickle at Pearl Rice Limited Demonstration Plot in Bugweri District.

Project Profile

Project Name: Enhancing National Food Security through increased Rice Production (ENRP)

Project Duration: 4 years

Start Date: 2018

Project Financiers:

- ISDB
- GOU
- Pearl Rice Company Ltd
- Busowa Coop. Ltd

Coverage: Bugiri and Bugweri districts

Gk Media spoke to the project coordinator ENRP, Simon Peter Abong, who says a total of 5,500 hectares will be developed in the two districts with 4,500 hectares targeting small holder farmers while 1,000 hectares is a nucleus estate under Pearl Rice Limited.

The project according to Mr. Abong, aims at increasing the area under protective irrigation of lowland rice production by at least 5,500 hectares doubling the productivity of small-scale producers from a national average of 2.5 tons per hectare to 5 tons per hectare.

We are going to support farmers to add value and market their produce while 9,000 small holder rice producers will have access to improved inputs, high yielding rice variety seeds, fertilizers and herbicides said Abong.

Status of Rice Production

Although the Eastern region of the country produces approximately 70% of Uganda's rice, atleast USD 50 million is spent on importing about 65,000 metric tons of rice in Uganda.

Upon implementation of the project, it is envisaged that an additional 65,000 metric tons of rice will be produced to add to the current production of 260,000 metric tons of rice in an attempt to meet demand of 450,000 MT annually. This will reduce rice importation which currently stand at 150,000 to 200,000 MT annually by a third.

Last financial year, NARO submitted seven (7) rice varieties to the National Variety Release Committee (NVRC). The varieties established have potential to increase per

Photo: David Lukone, Chairman Busowa Traders and Farmer's Cooperative Society Ltd admires a rice demonstration plot by the project agronomist.

Photos: **Rice varities with their special attributes**

capita income. All these varieties are resistant to Rice Yellow Mottle Virus, Rice Blast and Bacterial Leaf Streak. These varieties will be most beneficial to farmers within the low land areas in Uganda.

The varieties include; NARO Rice 1 also known as Kafu (Code PR 107), NARO Rice 2 also known as TOCI (Code MET 12), NARO Rice 3 also known as Ayago (Code AGRA 55), and NARO Rice 4, also known as Oraa (Code ARU 1189), NARO Rice 5 also known as Achomai (Code IR 1052). The following varieties were released: Arize Gold 644, and Chiga-1.

A few highlights of the Project Progress:

Detailed Engineering Design and Construction Supervision Consultant:

Government through MAAIF signed contract with M/s Studio Galli Ingenierie Afrique SUARL in joint venture with M/s SGI Studio Galli Ingegneria SRL in September 2020 to carry out detailed Studies, detailed engineering design and then supervise construction. These are international consultants procured through international competitive bidding with nationalities based in Senegal and Italy respectively.

So far they have started work vigorously and expect the design of the dam and farmland to be ready by July 2021.

Project Site Office

A project site office has been established at Bugiri District Local Government Headquarters to ease coordination with stakeholders on ground. The district allocated one room to the project as a site office to ease coordination with stakeholders on the ground. The Project Site Engineer is the one running the office.

Participatory training of farmers on rice agronomy

The project is carrying out participatory training of farmers on rice agronomy. 11 demonstrations sites were established in the project area (Bugweri and Bugiri) and farmers attended onsite training. A few of the demo sites produced an average of 6-8 tons per hectare. The farmers were also enlightened on use of small scale equipment like hydropower tillers for land preparation and proper use of fertilizers and hybrid seeds. All this is aimed at preparing them to manage the scheme effectively once construction is done.

Capacity building of farmer group organizations

A Memorandum of Understanding was signed between MAAIF and Ministry of Trade, Industry and Cooperatives (MTIC) to train farmers on business development and management in May 2020. The project is working together with MTIC to organize farmers into groups which is later expected to transform into cooperative societies.

Engagement with NEMA and MWE-DWRM

The project is working hand in hand with NEMA and MWE (Department of Water Resources Management) to see that the consultants do a very good job so that approval of ESIA, ESMP and RAP reports are done by MWE and NEMA including processing of the prerequisite permits and certificates.

Project Steering Committee (PSC) and District Implementation Committee (DIC).

These committees meet regularly to steer the project at national and district level respectively. Much as the PSC meet twice a year, the DIC meet quarterly to steer the project keenly.

It is envisaged that despite project delays, this time round the project is set to meet the project objectives despite challenges of rice production in a challenging climatic changing environment.

Photo: Staff from MAAIF, IsDB, Pearl Rice Limited, Busowa partners and District leaders and farmers from Bugiri and Bugweri Districts at the Source of the Nile Hotel in Jinja.

NATIONAL OIL PALM PROJECT (NOPP); the pillar to successful Public Private Partnership(PPP) in vegetable oil development in Uganda

Approximately 20 years ago, Vegetable Oil Development Project (VODP) was implemented in Uganda which has know transformed into the National oil Palm Project (NOPP), A leading project in developing the growing of Palm Oil in Kalangala and other parts of the country.

Uganda imports about 65% of its edible oil and soap needs, but with population growth and rising incomes continuing to fuel an annual growth rate of 9% in domestic and regional demand for vegetable oil and its by- products. Uganda's annual demand for edible oil is currently 120,000 tonnes, against a production capacity of 40,000 tonnes leaving a deficit of 80,000 tonnes (Uganda Investment Authority, 2020). As such, there is growing interest by the Government of Uganda in developing palm oil for import substitution, and the fact that production from even poor yielding oil palm substantially exceeds that from a similar area of annual oilseed crops.

Since 1998, the Government of Uganda has invested in domestic production and processing of vegetable oils to meet the increasing national demand. The VODP, implemented by the MAAIF, is the government's selected strategic effort to increase domestic vegetable oil production, while also addressing rural poverty by involving farmers, and improving the health of the population through increased vegetable oil intake.

The broader project was implemented in Kalangala, Buvuma, and 51 other districts across eastern, northern and north-western Uganda. However, regarding the palm oil component, the VODP implementation strategy was to be delivered

Photo: **Fresh Fruit Bunches in the Small Holder Plantation**

through a public-private partnership arrangement where the government took sole responsibility for acquiring land for oil palm development, and the private sector partner, M/S BIDCO Uganda Ltd, committed to providing investment, resources and technology for oil palm development and value addition.

Phase I (VODP I)

The first phase of VODP started in 2002, completed on 31 December 2011 and closed on 30 June 2012. VODP negotiated a tripartite collaboration between the government, BIDCO (and its joint venture partners), and smallholder farmers, to establish plantations and processing units for production of palm oil on Bugala Island in Kalangala district. The BIDCO conglomerate set up the nucleus estate, the palm oil mill and refinery, and established Oil Palm Uganda Limited (OPUL) to manage the plantations and processing units. The first 10,000 ha were developed on Bugala Island, with a nucleus estate of 6500 ha, plus 3500 ha of smallholder production, and the building of a mill to process 30-60 tonnes of fresh fruit bunches per day.

Phase II (VODP II)

The second phase of the Vegetable Oil Development Project (VODP II) was approved by IFAD and the Uganda Parliament. It was funded by IFAD on the 21 October 2010, with a total project cost of US$146,175 million, of this, US$70.38 million was from Oil Palm Uganda Limited (OPUL), US$52 million was a loan from IFAD, a GoU contribution of US$14.14 million, US$5.48 million from Kalangala Oil Palm Growers Trust (KOPGT), farmers' contribution estimated at US$3.89 million, and US$0.285 million from SNV (the Netherlands Development Organization). Following the closure of VODP II, the National Oil Palm Project (NOPP) was to take over under a revised arrangement.

Benefits of the Oil Palm Project in partnership with BIDCO;

1. *Oil Palm establishment (Hectares)*
   a. *In Kalangala, a total of 11,348 hectares of oil palm, of which 6,500 hectares is under Nucleus Estate, and 4,848 hectares under outgrower/ smallholders' scheme.*
   b. *In Buvuma, 7,500 hectares is to be planted of which 5,000 hectares will be nucleus estate and 2,500 hectares under smallholders/out growers. Planting has started.*
2. *Beneficiaries and employment creation*
   a. *In Kalangala, a total of 2,063 out growers, with 803 being female are participating in the project.*
   b. *A total of 2,760 workers are employed both on the nucleus estate in Kalangala and the oil refinery in Jinja.*
   c. *The out growers/smallholders are employing a total of 8,000 labourers are employed among the out-grower community, doing various tasks to do maintenance, harvest and transportation.*
3. *Production of Oil Palm fresh fruit bunches by smallholders and crude palm oil produced.*
   a. *Production of Fresh Fruit Bunches (ffbs) by the out growers since start of harvest in 2010 has reached 254.6 million metric tonnes, as of March 2021.*
   b. *The annual crude palm produced from Kalangala currently stands at 44,000 metric tonnes worth 52.8 million, landed in Uganda, from zero.*
   c. *Total Crude Palm Oil produced since 2010 is 249,000 metric tonnes, worth about USD 249million*

Connie Masaba, Project Manager, NOPP

The annual crude palm produced from Kalangala currently stands at 44,000 metric tonnes worth

52.8 million, landed in Uganda, from zero.

4. *Incomes for smallholders from sale of ffbs*
   a. *The cumulative income from FFB sales to Oil Palm Uganda Limited (OPUL) Kalangala, by the out growers, is UGX 131.3 billion.*
   b. *In March 2021, farmers received UGX 4.6 billion for sale of their ffbs.*
   c. *On reaching maturity at age 3to 4 years, the farmers harvest at least 2 times a month for a period of 25 years, hence regular income for the farmers.*
5. *Dividends from the 10% Shareholding the farmers hold in Oil Palm Uganda Limited (OPUL)*
   a. *The out growers earn dividends from their 10% shareholding in OPUL. The dividends received so far have accumulated to UGX 17.8 billion.*
   b. *The land provided by Government to the Company for set up of the nucleus estate earns the farmers 10% shareholding in the company.*
6. *Taxes paid by OPUL and Bidco Uganda Limited*
   a. *BIDCO Uganda Ltd, have so far paid UGX. 1,298 billion in form of taxes.*
   b. *Oil Palm Uganda Limited has paid UGX 122 billion.*
   c. *Oil palm farmers have paid UGX 2.66 billion from their dividend.*
7. *Farmer's Development Loan Performance*
   a. *During VODP I and II, out growers received an IFAD loan worth UGX 53 billion.*
   b. *The loan funds were for purposes of establishing and maintenance of the oil palm gardens, up to the point of commencement of the harvest.*
   c. *So far, the farmers have repaid UGX. 40.7 billion, through deductions on their monthly FFB sales. Of this reimbursement, UGX 29.9 billion has been remitted to the Consolidated Fund.*
   d. *The repayments are to be used to support other oil palm farmers in Buvuma and other hubs.*
8. *Corporate Social Responsibility (CSR)*
   a. *Bidco has been involved in corporate social responsibility and have so far spent UGX 2.015 billion in CSR.*
   b. *In Kalangala, they have improved schools, constructed school teachers' houses and classroom blocks. The have also set water harvesting facilities for the communities*

The Local Economy Wide Impact Evaluation of the Oil Palm Development activities in Kalangala

The Kalangala Local Economy Wide Impact Evaluation (LEWIE) was designed to evaluate the impact of oil palm production on incomes, welfare, production activities of project beneficiaries (oil palm farmer households) as well as non-beneficiaries in Kalangala district. The LEWIE was led by Prof. Edward Taylor of University of California, Davis, who worked with a team from the MAAIF and was completed in October 2017. Find below the findings:

1. **Per capita income:** The per-capita expenditures of both permanent residents (both oil palm farmers and non-oil palm farmers) and workers in the estates (both nucleus and smallholder) exceed the average per capita income of Uganda. Kalangala residents were found to earn approximately UGX 3.3 million (USD 908), the worker households' expenditure was UGX 2.8 million (USD 778) while the average per capita GDP for Uganda was USD 615.3 in 2016.
2. **Business formation:** There has been an evident increase in the establishment of businesses in Kalangala. The study found that 20% of all oil palm households operate at least one small business in Kalangala while 50% of non-oil palm farmers operate at least one business in Kalangala. The average age of the businesses was 5.2 years and business formation increased after 2007 and especially after 2010, when oil palm harvesting started in Kalangala.

Photo: Vegetable Oil Development Project Phase 2: First Oil Mill 40tons per hour, Bwendero, Kalangala district

3. **Impact of additional acreage of oil palm:** A 1-acre expansion of oil palm increases the total real income earned in Kalangala to UGX 1.93 million annually. The additional acre also increases employment in oil palm by approximately 31 additional worker days The largest income gain is to the oil palm producing households whose real income raises by UGX 1.02 million per additional acre of oil palm. The findings showed that the real income in households that do not cultivate oil palm increases by UGX 800,000 and oil palm worker households by UGX 110,000. The additional acre also increases retail sales in Kalangala by UGX 660,000 and expands non-agricultural production by UGX 490,000.

   The study also showed that a 1% increase in mature oil palm acreage (equivalent to 108.7 additional acres of mature oil palm) increased the real income in Kalangala by UGX 210 million.

4. **Impact of the change in price for oil palm fresh fruit bunches:** The findings showed that a 1% price increase raises the value of oil palm fruit production by UGX 187.5 million. This results in a UGX 410 million real income increase in Kalangala. The study showed that the price increase stimulates production in all sectors except fish. The retail sales rise by UGX 141 million while crop and livestock production increase by UGX 15 million and 14 million respectively, and other production in Kalangala increases by UGX 105 million.

5. **Impact of increased productivity on oil palm plantations:** The study found that a 10% increase in oil palm productivity for smallholder farmers raises real income in Kalangala by UGX 4.3 billion shillings with UGX 1.8 billion being gained by non-oil palm producing households and UGX 2.2 billion shillings being gained by oil palm farming households. Households of the oil palm laborers also benefit from higher productivity on the oil palm plantations with a real income of UGX 225 million.

6. **Fertilizer application:** 73% of the oil palm households applied fertilizers while only 16% of the other farming households (non-oil palm) applied fertilizers.

NOPP Geographical hub approach.

The project will be implemented in the mainland areas located in a narrow belt (25-30 km) along Lake Victoria and surrounding the two island districts of Kalangala and Buvuma, but also areas in the western (Bundibugyo, Masindi) and north-western (Arua) parts of the country.

The Project will work in geographical hubs, where a hub is defined as "an agro - climatically suitable area (not an administrative district), within a radius of 30 km around a planned or actual crude palm oil (CPO) mill, and in which a minimum of 3,000 ha of oil palm production can be assured."

Given this background, NOPP will concentrate its activities on smallholder oil palm development on the following hubs:

Project investment in any of these, or other hubs, will be dependent on confirmation of the agro-ecological suitability of the area, the identification of smallholder producers with 3,000 ha to dedicate to oil palm production within the 30km radius; and a firm commitment by the private sector to invest in the CPO mill to serve the local supply.

Photo: Vegetable Oil Development Project Phase 2: KOPGT truck delivering fresh fruit brunches at the 2nd Oil Mill in Bukuzindu village Betta parish Kalangala district

The National Oil Palm Project (NOPP)

The National Oil Palm Project (NOPP) under the Ministry of Agriculture, Animal Industries and Fisheries (MAAIF), is designed to consolidate investments undertaken under VODP I and II to support communities producing oil palm. It is a 10-year project with the goal of 'inclusive rural transformation through oil palm investment'. Now in transition, NOPP is to invest in a number of oil palm investment hubs, defined as agroclimatically suitable areas within a radius of approximately 30 km around a crude palm oil mill where at least 3,000 ha of oil palm production can be assured.

Three hubs have been identified, Buvuma island, Mayuge, and Masaka/Rakai, with a fourth hub to be identified during project implementation, in agreement with IFAD. The development objective of NOPP is to 'Sustainably increase rural incomes through opportunities generated by the establishment of an efficient oil palm industry, that complies with modern environmental and social standards' (IFAD, 2017). NOPP proposes to empower communities to seize the emerging economic opportunities by developing both non-oil palm farming and non-farming livelihood activities, and to further mitigate potentially negative effects of oil palm investments in areas such as land tenure security, food security, environment and management of natural resources, and HIV/AIDS.

Target Beneficiaries

The first target group are the prospective smallholder oil palm producers in the four new hubs, who may currently be practicing subsistence cropping and/or fishing, having up to 2ha of land suitable for oil palm development. These households will benefit from Project support with development financing to enable them to establish up to 2 ha of oil palm while keeping some land for food crops.

In Mayuge, Masaka/Rakai and Hub 4, a minority of these households will have more than 2 ha to dedicate to oil palm production (an assumed 20% of households, with an average of 4 ha additional land, beyond the 2 ha): this group will be supported with NOPP financing up to the 2 ha threshold; beyond this area, they will be expected to either access commercial financing or draw on their own resources to meet the establishment costs.

- Buvuma Island
- Mayuge
- Masaka/Rakai
- Kalangala (Bugala and outlying islands, where it will consolidate the investments to date, but will not support an expansion in the area under oil palm production)
- Around Kiryandongo or in Buikwe

The Project will link producers to financial institutions and provide them with technical support services. In Kalangala, the Project will support those smallholders already growing oil palm, to increase the productivity of their existing plantations; but it will not support an expansion in the area under production.

A second target group will be poor families in targeted communities where oil palm investment will take place, who will be assisted to respond to the increased economic opportunities in a dynamic local economy. Smallholder oil palm growers will also be targeted by this intervention to diversify their incomes and strengthen their food security.

Photo: Vegetable Oil Development Project Phase 2: Small Holder in the project area have been connected to Electricity grid, Kalangala district

Specific targets will be set to reach out to women and youth (at least 50%), and gender sensitive approaches will be used in all stages of the Project. Overall, the alternative socio-economic activities will allow to more than double the number of beneficiaries and to deepen sustainable livelihood development in the oil palm growing communities.

Poor and vulnerable households will be directly targeted by NOPP investments in oil palm production (Component 1) and in alternative economic opportunities and mitigation of social risks (Component 2). Overall, an estimated 30,800 households will directly benefit from these NOPP activities, without considering the sensitization activities aimed at whole communities.

On the basis of an average household size of 5, these figures translate to 154,000 individuals of these, over 11,000 households will benefit as smallholder oil palm growers; and a total of 23,700 households are expected to benefit from the Alternative Economic Livelihoods activities, out of which 19,300 will be additional, non-oil Palm growing households.

A total of almost 8,100 households will benefit from the mitigation of social risk (household mentoring) activities: these will include not only oil palm growers and non-oil Palm growers, but also an estimated 475 workers in the nucleus estates of Kalangala and Buvuma.

Beyond the direct target group many more people are expected to benefit indirectly as a result of the employment opportunities created by the smallholder oil Palm growers and the nucleus estate in Buvuma.

Finally, the communities within the targeted area for smallholder oil palm development will indirectly benefit from the broader spill-over economic and social benefits resulting from Project interventions targeting the communities in which oil palm growers live, together with the improvements in infrastructure and social services that will accompany the core oil palm investment. As the spillover effect of oil palm increases, socio-economic activities and services will further develop.

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Photo: (Above) Fertilizers ready for distribution at KOPGT offices in Bukuzindu village Betta parish Kalangala district

(Below) Small Holder Farmer Pruning Her Oil Palm Plantation

DEEPENING ACCESS TO FINANCIAL SERVICES

The Government of Uganda has made it possible for commercial banks to participate widely in financing of the agriculture sector which is one of the main drivers of the economy, employing over 80% of the country's population and contributing 20.9% to national GDP.

Different financial institutions are now offering services alomg the value chain of key enterprises especially coffee,maize,oil seeds, pulses, fruits and vegetables

BANK OF UGANDA; Extending affordable credit to boost social - economic transformation

With increased modernization of agriculture in Uganda, commercial agro – enterprises are growing fast across the country. This commercialization not only requires awareness about financial management but also affordability of financial services including credit.

Background

The Agricultural Credit Facility (ACF) was set up by the Government of Uganda (GoU) in partnership with Commercial Banks, Uganda Development Bank Ltd (UDBL), Micro Deposit Taking Institutions (MDIs) and Credit Institutions all referred to as Participating Financial Institutions (PFIs). The Scheme's operations started in October 2009, with the aim of facilitating

Photo: H.E. Yoweri Museveni launches the CMC - DFCU partnership to offer agriculture financing

the provision of medium and long term financing to projects engaged in Agriculture and Agro processing, focusing mainly on commercialization and value addition.

Loans under the ACF are disbursed to farmers and agro-processors through the PFIs at more favorable terms than are usually available under conventional loans. The scheme is administered by the Bank of Uganda (BoU) and its operations are guided by the Memorandum of Understanding (MoU) signed by all the stakeholders. The GoU is represented by the Ministry of Finance, Planning and Economic Development (MFPED). The scheme operates on a refinance basis in that the PFIs disburse all the loan amount required by a client and seek for a re-imbursement from BOU.

Objectives of the Loan

The main objective of the ACF is to promote commercialization of Agriculture through provision of medium and long term financing to projects engaged in agriculture, agro processing, modernization and mechanization.

Collateral Requirements

The primary security for the credit facilities is the machinery and equipment financed, where applicable, and any other marketable securities provided by the borrower/final beneficiary. PFIs may seek additional security based on their evaluation of the risk profile of the project being financed.

The PFIs shall ensure that the loan is adequately secured as per their credit policy to protect their interest and that of the BoU and the GoU.

Eligibility for Refinance/Sub Loans

Eligible Projects

Eligible projects include acquisition of agricultural machinery, post-harvest handling equipment, storage facilities, agro processing, mechanization and any other related agricultural and agro-processing machinery and equipment. Agricultural inputs required for primary production and working capital requirements are considered provided this component does not exceed 20% of the total project cost for each eligible borrower. The scheme also provides financing for Working capital and infrastructure for projects engaged in grain trading.

Sub-loan amounts are determined on the basis of assessment and appraisal of project costs and genuine credit needs in accordance with the lending policy of the PFI and the ACF Memorandum of Understanding. The loans are designated in Uganda shillings. The PFIs disburse the total loan amount (100%) to the final borrower (Sub-borrower) on the following terms:

Photo: DFCU Bank Head office

Photo: ACF promotes commercialization of Agriculture through provision of medium and long term financing of agro processing, modernization and mechanization.

Financing the Grain Trade

The scheme shall also provide financing for Working capital and infrastructure for projects engaged in grain trading. The terms will be as follows:

i. The maximum financeable amount to a single borrower will be UGX 10 billion and the GoU contribution shall be 50 percent of the eligible amount.

ii. The maximum tenure of a loan for working capital for an eligible project under the grain facility shall be 24 months from the date of disbursement to the borrower.

iii. The maximum tenure of a loan for capital expenditure for an eligible project under the grain facility shall be 8 years from the date of disbursement to the borrower with a maximum grace period of 3 years.

iv. The applicable interest rate for loans advanced to finance grain trading under the scheme shall be a maximum of 15% per annum.

LOAN AMOUNT

The maximum loan amount to a single borrower is up to Shs.2.1billion. However, this amount can be increased up to Shs.5billion on a case by case basis (for eligible projects that add significant value to the Agriculture sector and the economy as a whole). There is no designated minimum loan amount to the final beneficiary (farmer/ agro-processor) but BoU can only reimburse a minimum of Shs 10million to the PFIs.

LOAN TENURE

The maximum loan period should not exceed 8 years and the minimum should be 6 months.

Grace Period:

The Grace Period is up to a maximum of 3 years.

INTEREST RATE

The interest rate to the final borrower is up to a maximum of 12% per annum. The 50% GoU contribution is disbursed to the PFIs at zero

Interest (interest free).

FACILITY FEES

Loan processing fees charged by PFIs to eligible borrowers should not exceed 0.5% of the total loan amount. Legal documentation and registration costs are borne by the borrower.

v. The applicable interest rate for loans advanced to finance capital expenditure under the scheme shall be a maximum of 12% per annum.

Eligible Purposes for Sub Loans

Eligible purposes

1. The acquisition of agriculture machinery and post-harvest handling equipment, storage facilities agricultural inputs that include; pesticides and fertilizers, land opening, paddocking, biological assets that include; Banana suckers, fruit seedlings, chicks, piglets, cows and goats for restocking the farm, agro processing facilities, purchase of Grain and any other agricultural and agro-processing related activities.

2. Working capital required for operating expenses will be considered provided this component does not exceed 20% of the total project cost for each eligible borrower. These will include among others wages for hired farm labour, overhead costs like utilities and installation costs, and hiring of specialized machinery for farming activities. The maximum loan amount to an eligible borrower for biological assets shall not exceed UGX 80 million.

The Scheme shall not be used for financing working capital for purchase of land, forestry, refinancing existing loan facilities and trading in agricultural commodities with the exception of grain.

Procedure of Accessing the Loan

STEP ONE

The client forwards his/her loan application to any PFI of his/her choice.

STEP TWO

The PFI will then advise him/her on the terms under the ACF.

STEP THREE

A detailed bankable project proposal/feasibility report may be required by the PFI (depending on the loan amount applied for).

Photo: JOHN DEERE displaying during the PAKASA exhibition at Nambole, Kampala.

How to Strengthen Uganda`s Agricultural Transformation

One of the major handicaps to Uganda`s agricultural transformation and modernization is weak budget support. Uganda's agriculture budget allocation has been below 5% and below for the last 25 years.

This is contrary to the Maputo Declaration of the Member states to commit 10% of their annual government budgets to agriculture. But looking deeper, the problem stretches beyond the lean budget support to how the money is utilized.

How much money released by the government actually reaches the farmers? It`s prudent to increase sector funding, but the most critical thing is to make the small available budget work. If we can`t work with a small budget, how will we work with a big one?

Stories, analyses and narratives in the past 25 years have already been articulated sufficiently. Now we must begin concrete actions on changing the agricultural sector in Uganda from subsistence and raw-product system to modern and commercial and value addition-based production. There are pointers which will transform agriculture.

Photo: Executive Director KCCA, Dorothy Kisaka at Kyanja Agricultural Resource Center (Demonstration Farm)

Tapping into opportunities to drive production and markets

Coffee is a good benchmark. The world's top ten (10) leading exporters of coffee between 2019 and 2020 are:

1. **Brazil** - 2,590,000 metric tons
2. **Vietnam** – 1,650,000 metric tons
3. **Colombia** – 810,000 metric tons
4. **Indonesia** – 660,000 metric tons
5. **Ethiopia** – 384,000 metric tons
6. **Honduras** – 348,000 metric tons
7. **India** – 348,000 metric tons
8. **Uganda** – 288,000 metric tons
9. **Mexico** – 234,000 metric tons
10. **Guatemala** – 204,000 metric tons

The list is dominated by European countries which do not produce coffee; rather they are re-exporters of the products. The key lesson from the above illustration is that by investing to raise value-addition and standards capability for coffee exports, Uganda can level with leading coffee exporters like Germany, Belgium and Switzerland - European Union member countries that do not produce coffee yet remain premier exporters because of their advanced value addition and standards regime.

By upgrading exports to Sudan, Poland and China, and exploring other markets, Uganda's coffee export will swell. This strategy focuses on domestic value addition, include compliance with standards for coffee exports as a necessary critical path for Uganda's competitive advantage.

The motivating fact is that the consumption of coffee is expected to constantly be greater than production, at least until 2026. Therefore, the wise choice is to increase the production and quality of Ugandan coffee.

Promulgate a National Agriculture Policy.

In order to ensure policy coherence and avoidance of potential policy distortions, the relationship between NAADS,OWC,UNFFE and other agricultural modernization initiatives and the roles played by each should be clearly defined, differentiated and synergized.

Currently the planning had implementation of the agricultural projects scattered over various Ministries Agencies and Political offices. The small holder farmers do not know where to go for services and guidance. There must be a one stop center for agricultural solutions.

Harness the IT Dividend.

Uganda liberalized the telecommunication sector thereby opening the market to both public and private investors. This bold step, coupled with the advent of mobile telephone, greatly improved telecommunication in the country. Internet usage is also growing rapidly, standing at 23 million users in a population of 45.74 million people while 26.83 are connected on mobile phones. Coupled with over 228 FM stations and more than 40 TV stations, these are huge platforms for information flow necessary to increase agricultural production and market efficiency.

By upgrading exports to Sudan, Poland and China, and exploring other markets, Uganda's coffee export will swell.

Photo: **Akabozi staff with farmers during a training in Otuke District**

Young urban farmers around Kampala are now using Social and eComerce platforms e.g Facebook, WhatsApp, and Kikubu to market eggs and vegetables etc. State agencies and private sector should accentuate this opportunity. The digital gap in rural areas should be narrowed. Where rural electrification agency has succeeded, ICT centres should be set up to provide timely information to farming communities and other chain actors. The private sector can take a leading role in this.

Revive and revitalize cooperatives.

The cooperatives will organize, provide credit, sale of inputs, market insurance and education services to smallholder farmers. The cooperatives law in place does not adequately address some of the emerging issues within the Co-operative Movement.

The 2008 SACCO Bill which was passed by cabinet but is pending in parliament should be concluded. A similar law, SACCO Societies Act 2007, has already been enacted by parliament in Kenya. Strengthening cooperatives can form a bank for its farmer members. This question can be resolved by a strong cooperative movement.

Provide Business Development Service (BDS) subsidy for smallholder farmers. The BDS dealing with information, training and other business services should be subsidized to increase the range of services available to smallholder farmers and the outreach to all parts of Uganda.

Strengthening and expanding enterprises management programs and their outreach, especially to the women in rural areas will create potential and power of smallholder farmers. How many farmers in Uganda attempt to calculate their production costs- to determine their appropriate price for their produce- or rather their margins? Without this, farmers will never have capacity to govern markets. Efficiency of agencies like Enterprise Uganda and other groups involved in business development services should be subsidized to deepen entrepreneurship skills at the farm level.

Urgently undertake to remove inhibitive market access barriers that are internal-

ly instituted while working with the rest of the member states in East African Community to remove those externally imposed.

For example, the laws between the central and local governments of Uganda should be harmonized, so that they are mutually reinforcing. For example, why should small exporters have to go through alternative access points to acquire formal certification to export a few kilos of maize into Kenya? Can't we have a central access point at Busia border post for a one stop documentation center?

The table below shows the diverse centres and conditions an exporting farmer has to go through.

Certificate of analysis from a recognized laboratory	Uganda National Bureau of Standards and Chemiphar (U) ltd.
Phyto Sanitary certificate	Department of Crop Inspection and Certification (MAAIF)
Fumigation Certificate	Issued by firms registered by Agricultural Chemical Board
Certificate of Origin (EAC/ COMESA)	Issued by Uganda Revenue Authority
Certificate of Conformity	Issued by Intertek

Harness Public - Private Partnership (PPP) to harness farmer extension. Less than 14% farmers in Uganda see an extension worker. Under NAADS , they are only 1600 extension workers mandated to serve 4,000,000 million farmers households in Uganda. This is the ratio of 1:2500 farmer household in this practical? How many days will a NAADS extension worker need to reach 2500 households?

We have 360 days in a year, If a NAADS extension worker was working seven days a week, it will take him 6.9 years to just do one round of farmer households. NAADS should urgently tap into the pool of Extension Link farmers that were trained by Uganda National Farmers Federation (UNFFE) all over Uganda in animal husbandry and agronomic practices.

This will bring down the current expansive farmer-extension worker ratio and close the current information gap at the farm level. There are other private sector companies and Civil Society Organizations like VEDCO and PELUM that have trained and worked with a cartel of extension workers. Government should coordinate and placate them for a national farmer extension services response.

Crops and livestock 'wilts' should be urgently curtailed. The 31% decline in coffee and Other crop and animal diseases like banana wilt, New Castle fever in poultry, pneumonia in cattle, African swine fever in pigs etc. are all big issues affecting agriculture performance.

HIGHLIGHT

Urgently undertake to remove inhibitive market access barriers that are internally instituted while working with the rest of the member states in East African Community to remove those externally imposed.

PRIVATE SECTOR INVOLVEMENT IN AGRICULTURE

Private sector players have made use of the investment climate to initiate projects that are not only increasing general output from the sector but also creating market for local products.

Private sector investors are contributing to extension, value addition, capacity building and industrialisation in Uganda's increasingly commercialised agricultural sector.

They are also a major source of goverment revenue and providers of income generating opportunities for the nation.

IMPROVED RESILIENCE THROUGH SUSTAINABLE PRODUCTION OF GRAFTED TOMATOES IN UGANDA (IRESO) PROJECT

Photo: Solidaridad and other development partners on a project aimed at improving tomato resilience and production sustainability in Uganda

IRESO was a three-year project (2017-2019) that introduced grafting of tomatoes to combat the effects of Bacterial wilt in Mpigi, Luwero, Wakiso, Mukono and Kabale districts of Uganda.

Bacterial wilt is key biotic stressor limiting the potential of tomatoes (*Solanum lycospersicum*) production yet tomatoes is a source of livelihoods for small holder farmers in rural and peri urban areas of Uganda.

IRESO was part of the Food & Business Applied Research Fund funded by the Netherland Organisation for Scientific Research WOTRO with Solidaridad Uganda as the lead partner.

CONSORTIUM PARTNERS

1. SOLIDARIDAD UGANDA, LEAD PARTNER
2. NATIONAL AGRICULTURAL RESEARCH ORGANISATION (NARO),
3. National crop Research Resource Instituite (NaCRRI)
4. MAKERERE UNIVERSITY
5. ENZA ZADEN/ HOUSE OF SEEDS LTD UGANDA

Research Work and Commercialisation

Host resistance is a safe, cost effective way to manage bacterial wilt (Ralstonia solanacearum) disease in tomato. Three rootstocks MT 56 and E15M00025, E2900018 from Makerere University and Enza Zaden Export BV respectively were tested and found to be highly resistant to bacterial wilt. In respect to the trial parameters of wilt resistance, yield and scion compatibility E15M00025 performed best with Anja F1, a scion variety from House of seeds. Anja F1 also showed resistance when directly planted in bacterial wilt infested soils.

Our project proved that the potential of host resistance and low-cost grafting techniques for the effective management of bacterial wilt (Ralstonia Solanacearum) in tomato.

The smallholder tomato growers in the five districts of Wakiso, Luwero, Mpigi, Mukono and Kabale are gradually adopting the technology. This will guarantee improved nutrition from utilization and income from sales of tomato fruits. On the other hand, youths organized in young plant raiser investment clubs are earning a livelihood from grafted seedlings business.

The youths have seen an opportunity in renting land and grow the grafted tomato as it is less risky. House of Seeds Ltd, sole distributor of Enza Zaden Export BV has deepened their business of importing high quality tomato and other vegetables from the Netherlands for sale to horticulture growers in Uganda contributing to reduced hunger, malnutrition, and sustainable growth in agriculture sector of Uganda.

Table: Table showing locations and contacts for Grafted seedlings centres

LOCATIONS AND CONTACTS OF GRAFTED SEEDLINGS

District	Location	Youth Plant Raisers	Contacts
Mukono	Kasenge Riverford Organic centre	Nama Youth Organic Group	0708 737 878
Mpigi	Busomba Village	Busomba youth group	0788 958 694
Kabale	Kyonyo	Kabalisa youth tomato growers' group	0773 305 698
Luwero	Bwooge Village	Luwero youth development group	0752 026 244
Wakiso	Namulonge	Namulonge East Africa youth Agribusiness group	0784 476 740

ACHIEVED OBJECTIVES

i. Our applied research consortium work observed the potential of host resistance and grafting technology as an effective solution to manage bacterial wilt (*Ralstonia Solanacearum*) in tomato in Uganda.

ii. 2,400 beneficiaries in the districts of Wakiso, Mukono, Mpigi, Luwero and Kabale can now grow grafted tomato in bacterial wilt infested plots with no big draw-back unlike before the project. 1,600 of the grower peers in districts of Mpigi and Luwero have bought and grown grafted tomato seedlings from nurseries that have been set up near their localities. 125 youths were trained on grafting, and nursery management as a business. A Business Advisor has supported the youths to register their young plant raiser (YPR) investment clubs.

iii. An Agro app has been developed to register and map production polygons of 500 young plant raisers, 60 community change agents and 4,000 tomato growers. This will eventually evolve into a traceable internal management system for tomato and other vegetables and fruit linked to an online marketing platform post project.

Photos: (insets) Grafted Improved tomato varieties

iv. Four Makerere University MSc. Students have generated new knowledge on potential of grafted tomato in Uganda and by extension sub Saharan Africa Under the funding of the project. Thesis are being prepared for submission to the school of Agricultural sciences, Makerere University Kampala

v. The MSc. Crop Science student pathology major is currently working on her final experiment involving both screen house and laboratory work at NaCRRI.

vi. Five nursery structures were constructed in each participating district. 375 youths are first growing the grafted tomato and other fast-moving vegetables like onions and carrots to raise collateral for hardware loan facilities to set up own nursery structures. Dripline line irrigation worth 500 square metres was constructed in the YPR sites, MUARIK, NaCRRI to promote vegetable production.

vii. Nursery structure was also set up at NaCRRI and two nursery structures at MUARIK were repaired. This will help generate revenue sales, academia like internship for horticultural industry and development partners intra and inter collaboration as 'horticulture centres of excellence along the nodes of the value chain post project.

Above: Tomatoes offer greater yields when good fruiting characteristics are merged with disease resistance. This solution transforms low quality fruit trees into high-yielding varieties

(Left) Logos of the Improved Resilience through Sustainable Production of Grafted Tomatoes (IRESO) Project Team

Uganda Industrial Research Institute (UIRI); Opportunities to be tapped into at UIRI

It has been over a decade since parliament passed an Act in 2002 to have the Uganda Industrial Research Institute restored to its mandate of promoting technology and innovation to grow the industry in Uganda.

The Institute has succeeded in meeting this cause by not only being inclined to research, technology development and transfer as well as product development through value addition. But also be participating in empowering Ugandans to start-up enterprises and grow those enterprises into industries with the capacity to make quality products for both the local and regional markets.

The Uganda Industrial Research Institute is likened to a treasure, which one discovers and has a transformation in which they are converted from job seekers to job creators. This is founded on the Institute's model of nurturing entrepreneurs into industrialists.

Photo: USSIA Cow horn trainees share a moment with the Executive Director

Employing two approaches that are business incubation and training, the Uganda Industrial Research Institute (UIRI) grows small and medium enterprises into leading businesses. This is achieved by employing the teaching factory model, where Ugandans who enroll for support are given mindset changing guidance, business advisory services, technical help, and skills.

Under the business incubation platform, small and medium scale enterprises (SMEs) with high-end products and services register with UIRI for technical support and also use the Institute's facilities as well as machinery. This aims at spurring the SMEs into competitive manufacturing entities. On the other hand, the training platform ensures Ugandan's learn new skills to join the entrepreneurship and manufacturing sector.

Skills development at UIRI covers a wide range of resourceful skilling for agribusiness, cosmetics, technology development and transfer. It also offers product development as well as value addition services. Furthermore, the Institute engages citizens in a sequence of practical learning, mentorship and advisory services both internally and externally. These services also focus on innovating devices, targeting the health and agriculture sector.

Through these two platforms, UIRI has had the opportunity of graduating incubatees and watching trainees become entrepreneurs. Some of the noteworthy incubatees that have graduated from the incubation program include Z-plus that produces Yummy Yoghurt and K-Roma Limited which produces Bella Wine among others. Trainees such as Josmak International Limited and Pelere Group

Through these two platforms, UIRI has had the opportunity of graduating incubatees and watching trainees become entrepreneurs.

Photo: **Mask Project At MMISDC**

UIRI has given a helping hand to innovators in the country who share their ideas with the Institute and make them a reality

Limited have become renowned in the Uganda market with mentions on the international scene. Incubatees like Nyowe Ventures and Spencer have had the opportunity to process products for export. Others such as Premier Dairies have increased their product range venturing into the production of yogurt and bread, besides the Mega Milk.

In line with its mandate of boosting industry, UIRI has given a helping hand to innovators in the country who share their ideas with the Institute and make them a reality. It is through this engagement that products such as Artavol and Wekebere fetal monitors were developed and have been scaled up by their innovators.

The Institute has opened a second campus at the Kampala Industrial Business Park in Namanve called the Machining Manufacturing Industrial Skilling Development Centre. MMISDC which offers an apprenticeship program for engineers and fresh engineering graduates has the capacity of enrolling 200 trainees per session and imparting them with practical skills that will root out theoretically learning thus developing them into manufacturing readied human resources.

One of the landmarks at MMISDC is the mask production project which has trained 265 Ugandan citizens and championed the governments response to preventing the spread of COVID.

Additionally, UIRI also offers world-class analytical laboratory services that enable the manufacturers, incubatees, and trainees to ensure the quality of their produce. Chemistry, Microbiology, Biotechnology, and Food Laboratories serve as quality hubs where products are tested. However, they also serve as facilities in which Ugandans undergo training in cosmetics production and making herbal remedies. Laboratories also play an important role in product development.

The Uganda Industrial Research Institute as a centre of excellence creates the much sought after opportunities that turn the unemployment situation in Uganda round, through its programs and unique services.

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Uganda Industrial Research Institute

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The Journey of Agricultural Insurance in Uganda

According to FAO, in order to meet the globe's food needs by 2050, agricultural production must be 70% higher than the one we are witnessing nowadays. In developing countries, the primary sector is of a very particular importance as it stands for the basis of economic growth.

In Africa, agriculture accounts for 30% to 40% of GDP and nearly 60% of the value of exported products. These values are well below for developed countries. In developing countries, 357 million smallholder farmers, possessing less than one hectare, remain uninsured.

The major challenge faced by agricultural insurance in the future is associated with the capacity to extend insurance coverage to these small farmers. Nearly 80% of the food consumed in low-income countries is produced by smallholder farmers. Any hazard that is likely to disrupt the latter's production would trigger a food disaster. The major objective for creating the conditions for sustainable agriculture and rural development is to eradicate poverty and increase food production in a sustainable way and enhance food security.

Factors such as changing weather and climatic conditions hence affecting productivity of the sector due to such risks. Such factors have exacerbated others that include; high interest rates on Agricultural loans and challenges to acquire credit to increase productivity of the sector. Once this occurs, not only farmers feel the pinch but the entire Agricultural value chain and ultimately the food insecurity affecting the world at large.

The role of Agriculture in Uganda can never be underscored since it is the back bone of Uganda's economy as well as providing employment to a large percentage of famers who are mainly small and medium scale. Thus the government of Uganda has created a number of initiatives key to note is Agricultural Insurance subsidy and Operation Wealth Creation.

By and large, penetration rate for agricultural insurance is strongly dependent on the support of public authorities. This means that the more support provided by public authorities to farmers, the more involved the latter get by underwriting insurance policies The

Consortium has made initiatives through awareness drives to show presence to the Ugandan people. Early this year, AIC signed an understanding with National Farmers Federation (UNFEE), attendance of the Annual Rwenzori regional expo with the National Coordinator to discuss on how to engage and support the farmers

Top: Application of farm mnagement facilitated by an agro Insurance

under OWC, Harvest Money Expo just to mention but a few.

In this AIC has made a number of collaborations through different stakeholder such as funders, government agencies, semi government agencies as well as Non-Government entities. These include; Abi, FSDU, FinTechs, Ministry of Agriculture (MAAIF), cooperatives as well as farmer's groups and projects such as OWC.

The National Agricultural Advisory Services (NAADS) since July 2014 underwent a national reform that gave birth to Operational Wealth Creation (OWC). The OWC was launched in July 2013 with the primary focus of the Intervation was to efficiently facilitate national socio- economic transformation, with a focus on raising household incomes and wealth creation by transforming subsistence farmers to commercial farming to end poverty.

The occrrence of the pandemic has had a huge impact on a number of sectors and Agriculture is not any different. Insurance during such periods has provided compensation to a number of famers thus improving their productivity as well as resuscitate to initial position.

Agricultural Insurance was instituted to improve financial stability, increase productivity and per capita making the functioning of agriculture easy with less costs and ultimately to lead to food security.

To address these concerns and more the government of Uganda created the Agricultural Insurance subsidy to be run under the consortium. The Uganda Agriculture Insurance Scheme (UAIS), a Public Private Partnership (PPP) between the Government of Uganda represented by the Ministry of Finance, Planning and Economic Development (MoFPED) and the private sector started 1st July 2016 and was set out to run for a five (5) year period expiring on the 30th of June 2021.

Apart from addressing cases of Food Insecurity internally and for our external markets the subsidy is aimed at helping farmers and Financial sector players especially those that offer agricultural credit. Among these is increased agricultural credit leading to high investment, increased income per capita and increased loan utilization for the credit suppliers in the market.

The scheme has registered tremendous success with the following achievements as of 30th June 2020.

i. Insured agriculture loans had grown from UGX. 100 Billion to UGX. 916 Billion

ii. More than 196,000 farmers have been insured this far, as opposed to set KPI of increasing the number of insured farmers from 5,800 farmers in FY 2016/17 to 45,000 farmers by FY 2020/21.

iii. The number of farmers interfaced with stand at 6.3 Million.

iv. Total compensation paid out to farmers who have suffered loss is 2.19Bn. Government has extended the roll out of the UAI scheme for a further 4 years effective 1st July 2021.

UAIS through the implementers Uganda Insurers Association and its members under the Agro Consortium remain committed to the ethos that led to the inception of the scheme and undertakes to continue as well as calling for continued support from the public in taking on Insurance and relevant stakeholders to send the message of Insurance to the entire farming community.

AIC collaborates with stakeholders:

- **Funders**
- **Government agencies**
- **Semi government agencies and**
- **NGOs.**

Includes:

- **Abi**
- **FSDU**
- **FinTechs**
- **MAAIF**
- **Cooperatives**
- **Farmer's groups**
- **OWC projects.**

Written by

Kalule Gava Ibrahim
Public Relation & Market Development Officer, Uganda

Heifer International Uganda

Started with boosting dairy development in Uganda and now its focused on building Pro-poor value chains that intergrate Youths, Women empowerment and environmental sustainability.

Who we are:

Heifer International is a global nonprofit organization founded in 1944 that works towards ending hunger and poverty while caring for the earth. Heifer International Uganda (HIU) began operations in 1982 in Northern Uganda with a handful of cows and has since grown into one of the country's leading agricultural and community development organizations, with focus on building pro-poor value chains that integrate Youth, women empowerment and environmental sustainability.

Program Goal:

By 2030, Heifer International Uganda will have helped 360,000 families in the places where we work – who currently experience extreme hunger and poverty to secure an annual living income that takes them out of poverty to resilient, self-reliant lives.

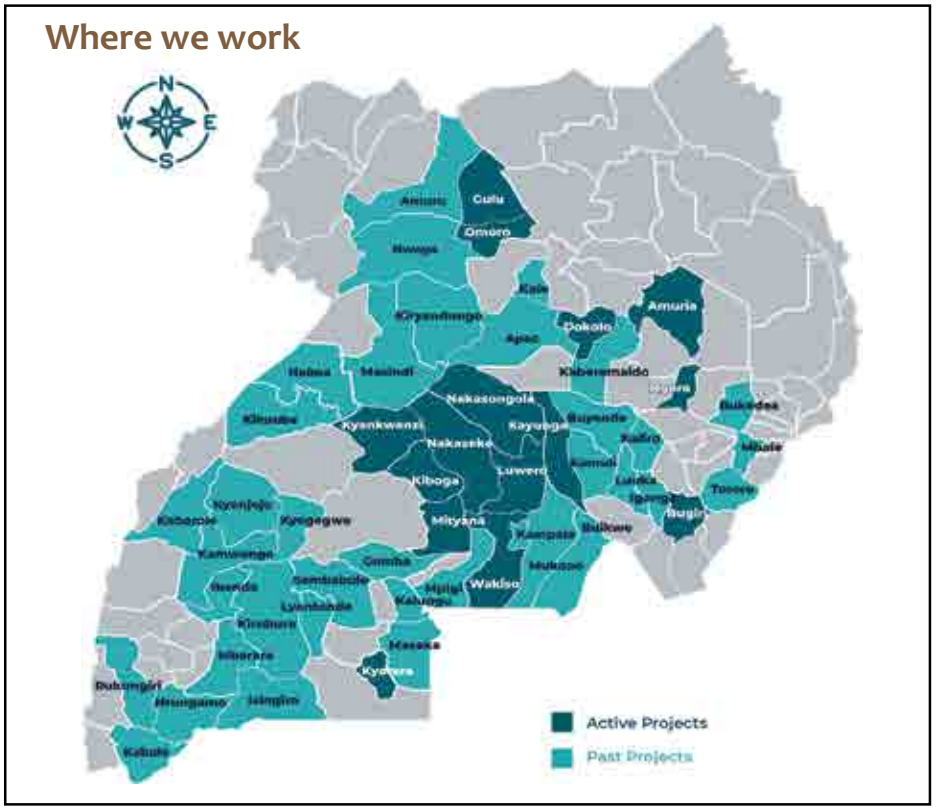
A living income is all the income of a household earned/generated or transferred whether cash or in-kind, sufficient to enable all members of the household to afford a decent standard of living.

Photo: Impact of HIU on Farmer extention and marketing outputs.

Core Program Areas:

- **Economic Development:** We work with farmers and their communities to identify opportunities that deliver living incomes, creating solutions to local challenges that are designed to build inclusive and resilient economies.
- **Youth & Women Empowerment:** Investing in women is key to ending hunger and poverty and it is at the very center of our community development approach.
- **Environmental Sustainability:** We work with smallholder farmers as they integrate climate-smart agricultural practices on their farms to increase resilience and crop production.
- **Food Security and Nutrition:** We work with farmers to improve productivity, diversify their businesses, and increase incomes. With a living income they can provide quality food for themselves and their families.

Where we work



Our strategy

Our vision: 2030 goals: By 2030, Heifer Uganda's Program goal is to support 360,000 smallholder farmers toward attaining a Living Income and build sustainable and resilient economies. This will be achieved through community led, demand driven, and ecologically reparative agricultural production in North, East, Central and Mid- western Uganda.

To achieve the 2030 goal, Heifer uses the "Accelerate Strategy" that combines Values-based Holistic Community Development (VBHCD) with inclusive market development to create an exponential cycle of economic growth. The strategy is anchored on four Strategic Objectives namely:

- **Determine best value chain opportunities**: Develop best-in-class expertise in identifying, analysing, and recommending demand-driven, pro-poor, wealth creating value chains as the essential basis for the next three objectives
- **Identify, ssupport and strengthen agri-enterprises**: Facilitate and partner in the development and growth of competitive agri-businesses, cooperatives and social enterprises that attract capital and generate economic opportunities.
- **Deploy capital and technology**: Identify, mobilize and deploy blended capital and appropriate technologies.
- **Mobilize Values-Based Private Sector Partnerships** Focus on strategic partnerships with values-driven, customer- and consumer-facing companies that genuinely embrace the triple bottom line: social, environmental and financial returns.

Our Vision:

A world of communities living together in peace and equitably sharing the resources of a healthy planet

Our Mission:

To work with communities to end hunger and poverty and care for the Earth

Currently, Heifer International Uganda is implementing 4 projects highlighted below:

The East Africa Youth Inclusion Program (EAYIP)

- Goal: To improve livelihoods of 15,000 economically disadvantaged young people in Uganda by increasing their income through employment and enterprise development
- Target: Youth between 15-24 years in Central & Eastern regions
- Districts: Amuria, Bugiri, Ngora, Luwero, Kiboga & Wakiso.
- Main Value Chains: Poultry, dairy, beef, maize and horticulture
- Period: 2016 - 2021
- Funder: Mastercard Foundation and Heifer International

Learn for Agribusiness (L4AB)

i. **Goal:** To Enable 3,200 youth in Northern Uganda (Dokolo) to earn decent and dignified living through agriculture value chains

ii. **Target:** Youth between 18-30 years in Northern region

iii. **District**: Dokolo (Kwera & Dokolo Sub Counties).

iv. **Main Value Chains**: Soya bean, Groundnuts and Sunflower

v. **Period**: 2018 – 2020

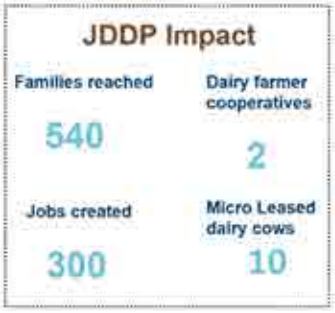
vi. **Funder**: Heifer International, Edukans Foundation and Heifer Netherlands

Accelerate Dairy Production and Productivity (ADAP)

- **Goal:** To Improve income and dairy enterprise profitability of 3,500 farmers and processors in the Central Uganda milk shed.by 2022.
- **Target:** 3,500 dairy farmers in Central region
- **Districts:** Wakiso, Kiboga, Kyankwanzi, Mityana, Kayunga, Nakaseke and Nakasongola.
- **Main Value Chain:** Dairy
- **Period:** 2020 - 2022
- **Funder**: aBi Development and Heifer International

The Jinnai Dairy Development (JDDP)

- **Goal**: To transform lives of 540 smallholder farmers through affordable micro-leasing of dairy cows, improved dairy farming system and formation of a dairy cooperative in Unyama Sub County, Gulu District.



- **Target**: Women, men, and youth in Northern region
- **District:** Gulu (Unyama Sub County).
- **Main Value Chain:** Dairy
- **Period:** 2019 - 2022
- **Funder**: Japan International Cooperation Foundation (JICF)

Our Impact

Increased farm Production and Productivity:

- Total Volume of milked sold increased from 8.78 million liters in 2014 to 45 million liters in 2018 a

- Total dairy Farmer cashflows increased from 1.99 million in 2014 to $ 11.44 million in 2018 from 46,671 framers.
- Average of 160 tons of Soybean and Sunflower bulked and sold by 2 youth farmer cooperatives per season in Dokolo district.
- 63,837 inseminations have been conducted in South West, Central and Near East regions.
- Increased adoption of improved feeds and fodder by the farmers for example making of silage improved from less than 1% to 4%, use of Calliandra improved from 13% to 18% and use of concentrates improved from 11% to 67%.

Community based extension service structures strengthened

- HIU has built the capacity of 388 community extension service providers (140 women, 246 men) with background in crop, livestock production, agribusiness skills and social capital skills that support smallholder farmers directly.
- 397,971 smallholder farmers (214,904 women, 182,467 men) have been reached and supported through training, access to ago-inputs, linkage to financial service providers, markets, animal treatments, vaccinations, artificial insemination, and demonstration of improved technologies.

Farmer owned agri-businesses strengthened:

- 79 Producer Organizations (POs) established and successfully operate as a "one-stop shop" and channels for the supply of agro- inputs, trainings, extension services, financial services. bulking and chilling of milk, aggregation of crops and marketing of farmers' products to the commercial sector.
- POs are providing a strong market to farmers with fair market prices for instance 2 youth owned POs dealing in oil seeds have contracts with three oil seed companies i.e. Ngetta Tropical Holdings, Trafford Ltd, Tropical Dynasty and Soybean Africa that provide the farmers with high quality seeds and inputs, at fair and reliable market price for their crops.
- Currently there are 21,046 (9,892 women, 11,154 men) PO registered members with each PO having around 350 members on average.

63,837 insemination-tions have been conducted in South West, Central and Near East regions.

Photo: HIU's strategies for increased farm produce and productivity.

- HIU promoted local production, distribution, and consumption of healthy probiotic yoghurt reaching 215,000 people.
- Average annual turnover of each POs stands at Ushs 2.23 billion.

Empowerment of Youth and Women:

- 18,000 youth (10,080 women, 7,920 men) trained in vocational and agri-business skills and 8,500 engaged in service and agri- enterprises.
- 23,000 jobs have been created across various agribusiness sectors especially for youth and women in value addition (yoghurt production and marketing), milk transportation, livestock and crop production and trade (small businesses).
- Increased participation of women in leadership positions up to > 30% at Self Help Group level, PO and community level structures.
- Joint decision making at household and community level has improved. On average, 80% of the women in the project areas are empowered to make joint decisions.
- Control over household income and productive assets has improved as well; currently statistics indicated a rate of 70% control by women and ownership of productive assets like land, housing, businesses.

Improved climate change adaption and resilience:

- 5,660 biogas plants constructed across the country
- 55 community valley tanks constructed with a holding capacity of 1.5 million liters of water, 63 shallow wells and 14 rain water harvesting tanks of 8,000 -15,000-liter capacity.
- Adoption of agro-forestry practices

increased from 65% to 84.2% amongst Heifer supported farming families

- Use of renewable energy sources increased from 6.0% to 14.3% amongst Heifer supported farming families
- Farming communities have reduced stress on water, land, and ecosystem, while ensuring sustainable production, productivity.

Increased access to financial products and services:

1,427 Saving and Lending groups are active with accumulated savings amounting to Ushs 9.5 billion.

- 1,298 youth have been supported to access 1.5 billion from financial institutions to start/expand their business (Post Bank)
- Heifer piloted a Livestock micro leasing product; 46 livestock leases were provided targeting 33 women and 13 men. All have fully paid their leases.

Photo: Bio gas bringing smiles to households.

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Bukoola Chemical Industries Ltd is one of the oldest and largest agro-chemical distributing companies in Uganda.

The company started as a general merchandise family business in 1973, which later evolved into an agrochemical business trading as the Associated Chemical Industries Limited (ACIL) in 1980. In 1996, Bukoola Chemical Industries Limited was born with a vision of being the leading importer, formulator and distributor of quality and affordable crop protection products in the region. The Company is currently the industry leader in Uganda with presence in Tanzania and a network of product distribution in Rwanda, Burundi, Congo, South Sudan and Malawi.

Bukoola Chemical Industries Limited is known for top quality solution-based products and excellent customer conscious services.

Bukoola Chemical Industries Ltd boosts of the widest range of Crop Protection products in Uganda including:

- Over 20 recipes of tough insecticides to control both crop insect pests and pests of public health importance.
- More than 10 both selective and non-selective Herbicides for clearing weeds in both crop and non-cropland and for weed management in crops such as maize, beans, rice, orchards, forestry, banana, pineapple, soybean, sugarcane etc.
- 6 carefully selected biological pesticides of both plant and microbial origin
- 10 inescapable fungicides to control over 80% of diseases affecting crops of economic importance in Uganda.
- A selection of the most important plant nutrients in 10 specially formulated foliar and soil applied fertilizers.
- Plant Immune boosters, anti-stress & grain storage products and an assortment of pesticide application equipment.

Top: A well managed plantation

Selection of Pesticides

- Proper identification of the pest problem will guide the selection of pesticide one needs. I.e. Insecticide for insect pests, Fungicides for fungal diseases, Bactericides for Bacterial diseases etc.
- Often pesticides are developed for control of pests in a specific crop or a range of crops, so you should select a product that is suitable for the crop you would like to treat.
- Pesticides are manufactured in different formulations e.g. Powders, Granules, Soluble Liquids (SL), Emulsifiable Concentrates (EC) etc. each with pros and cons. One need to make choice of the easiest and safer to use among options.
- In order to avoid unnecessary risk for you and the environment you should select the less toxic pesticide. You can do this by looking at the color of the toxicological band (Red, Yellow, Blue and Green in order of toxicity)

- At all times you should select a good quality genuine product from trusted Agro-input dealer.

Photo: **Farmer guiding on product usage and management.**

Bukoola Chemical Industries Ltd

We are known for top quality products and customer based services in the range of insecticides, fungicides, bactericides, immune boosters, fertilizers, herbicides, organic and biological pesticides.

Pesticide Label

- The pesticide label contains most of the important information a user needs to be equipped with to use the products rightly and responsibly. Such information as product name, distributor/manufacturer, Expiry dates, target pests, mixing/application rates, type of PPE to wear, PHI, disposal or empty containers and first aid information among other things.
- Unfortunately, many users never take trouble to read or be read and explained to the content of the pesticide label. At all times carefully read the pesticide label before use.

Personal Protective Equipment

- It is extremely important to protect oneself before handling any pesticide. It is not uncommon to find a user spraying in open field without any form of protection. Open bodies provide multiple points for pesticide contact, entry/absorption and subsequent poisoning that may result into acute and or chronic effects ranging from mere skin irritation to permanent organ dysfunction and death.
- Pesticide users should at all time wear appropriate Personal Protective Equipment to guard against accidental poisoning.

Observance of Pre-Harvest Interval (PHI)

- As we strive to support food production in Uganda and in the region our efforts are not only towards quantity and food security but also towards food safety and quality. All pesticides do have a PHI, which simply is the number of days that must elapse before a sprayed crop is harvested for consumption. Farmers have a duty to ensure consumers of their produce do not consume contaminated food with excessive amounts of pesticide residues by strictly adhering to application guidelines.

Photo: **Farmers showing off a good harvest**

Biyinzika was founded in 1990 as a poultry breeder farm and has grown steadily to become one of the leading brands in the Ugandan poultry industry. The company is the leading supplier of both day-old chicks and feeds in the country, with a network of 38 branches countrywide and employing over 900 staff.

Breeder Farms

Our 7 breeder farms are located around the Mukono area, about 30kms from Kampala. These currently produce up to 300,000 broiler eggs per week and 100,000 layer eggs per week. Current breeds are Ross 306 and Cobb 500 for broilers, and H&N Brown Nick for layers.

We also supply commercial broilers and produce up to 48,000 birds per week which are supplied to various abattoirs as well as to the live bird markets.

Hatcheries

Our 2 hatcheries are also situated in the Mukono area at Kigunga and Kabembe, and have a combined hatching capacity of 1,620,000 eggs per month.

Feed Mill

Our modern state-of-the-art mill is fully automated and HACCP and Q-Mark accredited. It has a capacity to produce 12.5 tonnes of pelleted feeds per hour. We believe that it is vital to have continuous on-site monitoring of our feed quality and consistency.

Our NIR Machine (Near Infra-red Spectroscopy) permits us to quickly and accurately determine nutrient levels both in all incoming raw materials as well as in all outgoing finished product.

Having the capacity to store 30,000 tonness allows us to buy in maize, dry it to the requisite moisture content and store from one season to the next.

All the above allows us to supply high quality pelleted broiler feeds, layer feeds, pig feeds and dairy feeds.

BIYINZIKA POULTRY
INTERNATIONAL LIMITED

BIYINZIKA POULTRY INTERNATIONAL LIMITED

@biyinzikaug | Biyinzika Poultry International Limited
Biyinzika Poultry International Limited

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Website: www@biyinzika.co.ug

Sasakawa Africa Association;

Increasing Uganda's competitiveness in the Agriculture sector

Sasakawa Africa Association (SAA) started interventions in Uganda in 1996 when it signed an MOU with the Government of Uganda through the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF). Interventions were aimed at promoting agricultural development among the rural small holder farmers with a major goal of improving food security, nutrition and household incomes.

With funding from the Nippon Foundation of Japan since 1996 and other development partners such as aBi Trust, K+S Kali GmbH- Germany, CIMMYT, WFP, European Cooperative for Rural Development (EUCORD) and National Agricultural Advisory Services (NAADS), International Fund for Agricultural Development (IFAD), SAA has operated in 64 districts and reached out to over 1,500,000 smallholder households.

Smallholder farmers and extension agents were supported through building their capacity to manage value chain of the focus crops through equipping them with knowledge and skills for value chain management.

This has helped in addressing the challenges of insufficient extension workforce, low productivity, poor quality

Photo: A maize shelling PSP offering his services to a maize farmer in Bala, Kole district

produce, high postharvest losses, poor nutrition, food insecurity and low household incomes among the farmers. The organization has used a number of approaches for specific interest groups like the youth and women to improve on their incomes through promotion of agro processing enterprises, private services providers and Postharvest trading centers (Value adding enterprises).

These approaches are identified as extension models through which technologies are transferred to smallholder farmers. These models include;

Farmer Learning Platform (FLP) model:

Is an approach where farming technologies and practices are transferred from research to farming communities using an interactive demonstration and learning process. It involves training, demonstrations of technologies, farmer field days and evaluation of such methodologies and technologies. The FLP model has been modified to include climate smart technologies such as resilience-building production technologies.

Community Based Seed Multiplication (CBSM) model:

Is a community-based approach of local seed banks where farmer groups and individuals engage in seed multiplication as a business while observing the set standards for quality declared seeds. The seed business is selected based on area specific needs. CBSM was initiated as a community-based intervention strategy aimed at improving farmers access to quality seeds.

Quality declared seed for Bala Women and Youth Group a community-based seed multiplication group in Kole District

Private and Extension Service Provision (PESP) Model:

The PESP model aims at improving farmers' access to value chain support services such as advisory and or extension services, production and post-harvest handling services as well as commercial linkages to between producer groups and buyers and value chain (VC) actors (Agro-Input companies, Insurance and micro finance institutions).

Photo: SAA program officer with farmers at a demonstration garden examining a plant in Isingiro District

Kenneth a Community Association Trader (CAT) in his shop in Ntungamo District

The model works through the Community Association Trader (CAT) who collaborates with village agents to for improved service delivery (input and output markets) to SHFs at village level.

It works through Government Extension Agents at district level together with Community Based Facilitators (CBFs - individuals selected within the community to train SHFs) whose capacity in key extension approaches and methodologies is built for effective knowledge transfer to SHFs. The model empowers Private Service Providers (PSPs) who are individuals and or farmer groups in technology service delivery within the community. They acquire technologies like shelling equipment to provide services to the farmers at a fee and manage it as a business. The service offered include ploughing, spraying, weeding, harvesting and shelling/threshing.

Agro-processing and Enterprise Centers (APECs) model:

This focuses on establishment of food processing and value adding machineries as a business for farmers and groups. It is a place with a building for food processing

equipment (rice mills, maize mills, etc.) where farmers add value to commodity in order to attract better marketing price.

Farmers especially, women are also trained on adding value to make confectionery as a business. The model involves working with One Stop Centre Associations (OSCAs) is aimed at strengthening institutional capacity of farmer associations, linking farmers to agricultural services through a multipurpose infrastructure, providing productivity-enhancing services to members and the rural community as well as availing market opportunities for the rural farmers.

The Sasakawa Fund for Extension Education (SAFE) Demand Driven Curriculum Model:

This is a collection of approaches and methodologies through which capacity building services is offered to the mid-career agricultural professionals through partnerships with agricultural universities and colleges. The SAFE models include mid-career student sponsorship program, the Supervised enterprise projects and technical support in the curriculum development and review to suit agricultural market demands.

These models have attracted various actors along the crop value chain leading to job creation specifically among the youth and women in the SAA intervention areas. As a result of these interventions, SAA has registered tremendous successes in the areas of intervention.

SAA Operations during the global pandemic;

The Covid-19 pandemic has affected the food value chain system limiting farmers' productivity. In Uganda, the Government instituted stringent measures to control the spread of the pandemic, which include but not limited to; instituting nationwide lockdown that affected the movement of resources and agricultural value chain actors.

It was against this background that SAA conducted a rapid impact assessment to assess the impact of Covid-19 pandemic on food systems in Africa. Key findings indicated that: Due to travel restrictions, farmers experienced limited access to agricultural inputs and products, limited sales as a result of ban on weekly markets, increased transaction costs and reduced food rations, reduced number of meals and low uptake of nutritious foods as well as limited access to face-to-face extension advisory services.

Accordingly, SAA-Uganda launched a project, "Extension Measures to sustain agricultural productivity to mitigate the effects of Covid-19 pandemic on food systems" to support smallholder farmers cope with the impact of the pandemic. In this project, SAA is implementing several strategies to support farmers cope with the effects of the pandemic.

These include:

SAA is collaborating with M-Omulimisa a company providing innovative mobile-based extension services to farmers to support farmers access to extension advisory services. M-omulimisa is an agricultural extension platform that allows

CSIA model is a transparent, structure and informal rural micro-finance system strengthening approach in which a group of not more than 30 members save for a purpose for a specified period of up to 12 months

Photo: **Group members of Agali Awamu Saving group during their saving meeting in Kiboga District.**

Community Savings for Investment in Agriculture (CSIA) model:

This is a transparent, structure and informal rural micro-finance system strengthening approach in which a group of not more than 30 members save for a purpose for a specified period of up to 12 months. Money saved is shared out at the end of cycle and every member invest their shares into purpose for which it was saved with special focus on agribusiness.

Extension Agents to share knowledge through question and answer interactions with farmers and facilitates linkages of farmers to value chain support services. Farmers and Extension agents' interactions can be done in the local languages for faster understanding.

SAA-Uganda is working with Akorion an agriculture tech company that digitizes the agricultural value chain to deliver better production and marketing services to farmers and other agribusinesses. SAA-Uganda is building the capacity of Community Association Traders (CATs), Village Agents and Agro-input dealers on using e-extension. Through using this approach, EAs are able to transmit extension services to farmers under stringent restrictions.

In an effort to increase farmers access and consumption of highly nutritious foods, SAA is promoting vegetable growing, cassava and with support from IFPRI/HarvestPlus, SAA is promoting the iron rich beans and orange sweet potatoes (rich in vitamin A).

SAA has gone ahead to train farmers on combination of foods and basic nutrition. SAA is aggressively conducting radio talk shows in the districts of Kiboga, Kole, Mubende Rakai and Isingiro and Otuke districts.

The talk shows sensitize farmers on good agricultural practices: use of climate resilient technologies, pest and disease management, soil and water conservation technologies, post-harvest handling, use of hermetic storage, and food hygiene and dangers of aflatoxin. SAA partnered with the International Food Policy Research Institute (IFPRI) and HarvestPlus, nutrition sessions have been also aired, specifically on the benefits of high iron beans. Moreover, the radio talk shows have covered a larger audience beyond the SAA intervention areas.

In effort to promote record keeping among saving groups, SAA is piloting a digital saving platform akaboxi that allows saving groups to keep their records as well save their money as opposed to the metallic box. The platform allows farmers to calculate their credit score which they can use to apply for loans from financial institutions.

Photo: SAA staff together with Local District officials in a studio during a radio talk show in Mubende District

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INVESTMENT OPPORTUNITIES

Agriculture remains the major source of livelihood in Uganda. According to the Uganda National Household Survey (UNHS) 2016/17, the bigger proportion of the working population is engaged in agriculture, forestry and fishing (65%). Among the females in the working population, 70% are engaged in agriculture compared to 58% of the males.

How important is agriculture in Uganda?

Agriculture remains the major source of livelihood in Uganda. According to the Uganda National Household Survey (UNHS) 2016/17, the bigger proportion of the working population is engaged in agriculture, forestry and fishing (65%). Among the females in the working population, 70% are engaged in agriculture compared to 58% of the males.

Furthermore, 38% of persons in employment were in paid employment with a higher proportion of males (46%) compared to females (28%). The Agricultural sector accounted for the largest share of employment (36%).

The agriculture sector had a total contribution to GDP at current prices of 24.9 percent in the FY 2016/17 compared to 23.7 percent in FY 2015/16.

The food crop sub sector registered the highest contribution within the agricultural sector of 13.6 percent in FY 2016/17, an increase from 12.1 percent in FY 2015/16.

Photo: The President launching the ACDP value-addition equipment

Why invest in Uganda's Agricultural Sector?

Uganda's agricultural sector presents multiple highly-profitable investment opportunities both for profit-oriented investments and partnerships.

As one of the 55 member states of the African Union, Uganda has steadily picked the pace in agricultural development and was highlighted as one of the 20 leading countries in delivery on development targets of the Comprehensive Africa Agriculture Development Programme (CAADP).

The transformation presents even more opportunities for investment as explored in the Agriculture Sector Strategic Plan, accessible on the MAAIF home page.

With notable success registered in Public Private Partnerships and steady increase in investment by government each financial year, Uganda is a dependable destination for investment and highly competitive player on the international market

Greater fortunes for local and international investors

The Value of agricultural exports as a percentage of the value of total exports stood at 72.9% in the FY 2016/17 representing a drop from 74.1% in 2015/16. The value of traditional exports increased from 2016 to 2017 by 36%. This was attributed to the increased (19%) volume of traditional exports.

The exports in 2016/17 Agriculture contributed about 73% Still in 2016/17 Traditional exports increased to about 19%.

Steady growth in production of root crops, plantain banana and pulses

The overall production of the major root crops (sweet potatoes, potatoes and cassava) increased from 5,196,810 tons in 2016 to 5,862,280 tons in 2017 indicating a 12% increment. This positive shift was attributed to the relatively stable rainfall.

The production of plantain banana increased from 4,530,880 tons in 2016 to 4,803,000 tons in 2017 reflecting an increase of 6%. This was attributed to the relatively stable weather and use of disease resistant planting materials.

The production of the major pulses (beans, field peas, cow peas, pigeon peas) increased by approximately 14% from 2016 to 2017 with beans contributing significantly to the increase in the quantity of pulses produced.

The production of the major Oil Crops including simsim, groundnuts, soybean and sunflower generally increased by 19% from 2016 to 2017. This was attributed to the increased use of improved seed and enhanced extension services provided to farmers

The agriculture sector had a total contribution to GDP at current prices of **24.9** percent in the FY 2016/17 compared to 23.7 percent in FY 2015/16.

Positive trends, increasing profitability of traditional cash crops

The main traditional cash crops of Uganda include: Coffee, Tea, Cotton and Tobacco. Coffee contributes the highest revenue for the country.

Cotton which is one of the main traditional cash crops produced in Uganda and contributes greatly to the country's GDP and household livelihood is on a steady and promising growth path with increased potential of creating jobs and value addition targeting both local and international markets.

The quantity of cotton produced declined between FY 2013/14 and 2014/15 and increased from 20,339MT in 2015/16 to 27,950MT in 2016/17. The statistics also indicate that the country exports (93%) most of the cotton produced as reported by the Cotton Development Organisation (CDO).

Similar trends have been experienced with tea, cocoa and coffee production since 2012 as highlighted below.

The production of Cocoa increased from 17,935 tons in 2012 to 25,712 tons in 2016 while that of tea increased from 57,932MT in 2012 to 69,000MT in 2016.

The quantity of coffee produced increased from 4.5 million 60 kg bags in FY 2015/16 to 5.4 million 60 kg bags in FY 2016/17, an increase of 21%.

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

The projected value of coffee exports for the FY 2016/17 was US$ 478 million. The cumulative value of exports realized was US$ 490 million (Robusta US$ 350 million; Arabica US$ 140 million) compared to US$ 351 million (Robusta US$ 249; Arabica US$ 102) for the previous FY2015/16, an increase of 40%.

Photo: Ginger and Coffee, some of the cash cows

Investment Opportunities in Uganda's Agriculture Sector

Uganda is endowed with ample fertile land (almost half of East Africa's arable land), warm climate and periodical rainfall (2 seasons). Such attributes have made Agriculture the backbone of Uganda's economy; contributing about 37% to its economy.

The sector employs over 70% of women compared to 58% of men, making it the major source of livelihood.

Uganda's advantageous location as an agribusiness location arises from the availability of large tracts of land suitable for mechanized farming of various agro-products and the existence of well-developed value chains, particularly in grain, fruit, sugar cane, sunflower and soya growing areas.

Major subsistence crops grown include Plantains, Cassava, Sweet potatoes and Maize. The major export crop is coffee (Uganda is the 2nd top coffee producer in the Commonwealth after India, 2nd in Africa after Ethiopia and 8th in the world) but tea, tobacco and cotton are also important. Uganda has one of the fastest population growth rates of around 3.3%, and this itself is the principal driver for the increase in the consumption of crops in Uganda.

The sector presents investment opportunities that exist in Primary production, Value addition and Services in the agriculture sector.

Photo: (Left) Hon. Minister of Agriculture looking on as President Museveni launches Primary Processing equipment for farmer organisations at Namalere Mechanisation Centre.

Photo: **Green House farming**

These include:

Primary Production

- Commercial farming opportunities exist in traditional and non-traditional cash crops targeting local, regional and international markets; apiculture development; and sericulture development
- Horticulture
- Commercial fish farming
- Poultry farming
- Animal husbandry farming
- Greenhouse farming for seasonal commodities like vegetables fruits and flowers so they are available all year round.

Value Addition

Food Processing: Coffee roasting and grinding plants; grain processing; fish and beef canning; tomato paste; fruit juice extraction; Natural fiber processing; instant coffee processing. Butter and cheese production, yoghurt, milk curds, UHT milk; hides and skin processing; honey processing; bees wax; silk textiles; production of animal feeds, as well as fertilizers; making pasta out of maize; manufacture of cooking oil from nuts and maize; hatcheries.

Services

- Storage facilities for grain, milk, coffee.
- Transport management and logistics.
- Packaging
- Setting up abattoirs in different parts of the country
- Commodity brokerage
- Agricultural Institutional financing
- Advisory services for both crops and animals
- Farm implements, inputs and machinery
- Irrigation
- Veterinary and plant medicine

Uganda Investment Authority (UIA) has developed some pre-feasibility studies in the sector for Small and Medium Enterprises. In a bid to promote agro-processing, UIA has also compiled Private and Private Public Partnership viable projects in the sector for investment.

The Government of Uganda has put in place a generous incentive regime to support the growth and development of the agriculture sector. These include:

- 10 years tax holiday if the assembly or manufacturing company is going to export at least 80% of the products
- Zero (0%) import duty on importation of Plant and Machinery for use in Agro Processing.
- Almost all agricultural inputs are exempt from import duty and VAT
- VAT Exemption on agricultural supplies: Animal feeds and premixes, Crop extension services, Irrigation works and sprinklers, Supply of agriculture insurance, etc.
- For commercial farming, registration for VAT allows for claiming and refund of VAT incurred in setting commercial farming enterprise.
- 100% deduction of Scientific research expenditure and training expenditure.

In place are also, Investment Protection and Double Tax Treaties with UK, Netherlands, Italy, Denmark, India, Mauritius, Norway, and South Africa.

Uganda is also signatory to a number of trade Agreements creating market opportunities for its agricultural exports among others. Core trade membership is enjoyed in: EAC (177 million population), COMESA (560 million population) as well as the Tripartite COMESA-EAC-SADC Free Trade Area and ultimately the continent's AfCFTA and EPA (EU). There are no restrictions on inflow And outflow of capital, foreign exchange and 100% foreign ownership of investments is permitted and joint venture partnerships with domestic investors are encouraged.

Improved Business Operating Conditions

In order to ease the doing business environment, the Government of Uganda transformed UIA into a One Stop Centre for investors. About 12 Government investment related agencies are hosted at the UIA Head Offices to enable investors access all services under one roof. The same services are accessed via an online One Stop Centre eBiz platform at www.ebiz.go.ug . This has eased the process of facilitating investors with primary and secondary certificates and licenses hence creating an attractive business environment that gives investors the ease to register up and start operations in the shortest possible time, with the least amount of administrative and bureaucratic procedures.

For details contact:

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Photo: A NAADS farmer in Kabarole.

Compliance to Standards for Competitiveness

Penetration of both regional and international markets requires comprehensive knowledge of the standards that are expected in direct market destinations in order to compete favorably. Standards are therefore a vital element for the assurance of a strong presence in the market and Uganda is responding to the evolving global campaign for phytosanitary quality management in agribusiness for fresh fruits, vegetables and other agricultural exports.

Increased awareness and compliance to standards enhances a market – driven agribusiness sub sector.

The role of compliance to standards in agribusiness

The economic importance of agriculture in Sub-Saharan economies depends largely on earnings from exports and value-added products. However, this importance can be compromised by failure to meet the satisfaction of the buyer. Standards guide production to satisfy buyers in terms of both quantity and quality.

Agricultural standards by definition standard is a set of rules and guidelines for a process, product or service. These requirements are sometimes complemented by a description of the process, product or service. Standards are the result of a consensus and are approved by a recognized body and aim at achieving an optimum degree of order in any given context.

Agricultural and food standards are not a new phenomenon however they have not been embraced enough across the value chain because of the lack of awareness or mechanisms for enforcement.

Why we need comprehensive awareness of standards

Application of standards ensures uniformity in doing business amongst trading partners, because they define levels of acceptable quality, fitness for purpose and also gives guidelines on safety for consumer protection.

Agricultural standards such as those that define what chemicals should be used on farms and in what levels. It should be noted that Sanitary and Phytosanitary Standards (SPS) as stipulated in the World Trade Organization SPS/TBT Agreement are utilized to protect animal, plant and human health. These standards are also used by member countries of the WTO to regulate trade amongst each other and

Photo: Basic tools used in materials testing and assessment for road and building constructions

ensure the safety of plant and animal life. Standards compliance has a far-reaching effect on the economy because by their nature, standards deter- mine access to markets because they define compliance.

Who is responsible

The levels of compliance to standards are assure through internationally agreed compliance assessment measures including inspection, testing and certification by recognized bodies. These bodies are further ac- credited by international analysis organizations to assure their competence to certify products and systems. In Uganda, there is a fairly fragmented certification infrastructure with interdependent and collaborative government bodies including the Ministry of Agriculture, Ministry of Trade and the Uganda National Bureau of Standards (UBOS) involved in assuring consumer safety and compliance to standards.

Private testing laboratories and private certification licensed bodies also issue certifications as proof of compliance of products and services and production systems. Already, a significant number of agricultural firms have been able to obtain certification at various levels and this has enabled them to become more competitive in the local, regional and international markets.

Existing progress

The role of compliance to agricultural and food standards in Uganda is evident in some sectors, such as the coffee sub-sector. The development, implementation and enforcement of standards led to significant growth in production and productivity as well as value. The Uganda Coffee Development Authority (UCDA) was set up with the mandate of ensuring that the best practices are in place and understood by all players along the value chain.

Enforcement with harsh punishments and sector regulation with the oversight of UCDA has created significant impact. Uganda exported more than 3.6 billion 60kg bags of coffee at reasonably good prices and has maintained this growth in the recent past. This sector growth should be attributed to the existence of a mechanism for ensuring standards implementation, compliance assessment and enforcement in the sector.

The detriment of non-compliance

Sectors which had been largely fragmented and with- out proper regulatory mechanisms suffered negatively and caused loss of GDP to the country and in addition to loss of jobs, income and livelihood.

Key to note here is the fish industry which suffered a ban between 1999 and 2000. This ban was due to the existence of disease-causing micro-organisms and traces of pesticides in fish exported from Uganda to the EU. When the ban was effected, Uganda lost about U$41.6 billion in export revenue for one year.

In addition, more than 10 fish processing plants were closed and close to 70,000 directly employed people lost jobs. After the government streamlined its regulatory services through the Department of Fisheries Resources under the Ministry of Agriculture, Ani- mal Industry and Fisheries (MAAIF) and with the participation of government institutions including the Uganda National Bureau of Standards

Photo: Tested and Certifed Timber in compliance to standards

EU ban on fish: When the ban was effected, Uganda lost about U$41.6 billion in export revenue for one year.

(UNBS) together with the United Nations Industrial Development Organization (UNIDO), Ministry of Trade, Private sector and other sector players this challenge was overcome.

In 2005, the contribution of fish exports was more than 10% of Uganda's agricultural exports in terms of value and this is a direct indication of the significance of Standards compliance and the impact it can have on the economy.

Trade advantage

Uganda is strategically positioned within the East African Community (EAC) and the Common Market for Eastern and Southern Africa (COMESA) region with links to South Sudan, the Democratic Republic of Congo, Kenya, Tanzania, Rwanda and Burundi.

According to recent studies by the Eastern Africa Grain Council (EAGC), Uganda contributes 90% of the informal cross border trade in grains including maize, rice, millet, sorghum soya bean and sunflower. This fact notwithstanding, the value of the country's commodities fetches averagely 15-35% less than the normal market prices in our trading partner states within the region, largely due to poor quality of our grain. Again, this is a result of poor production standards during post-harvest and primary processing.

Photo: **Processed fish for export**

Reaping from compliance

The need to embrace food production, handling and processing standards promotes optimum production, ensuring higher yields and ensuring that production is done with minimal resource utilization. Simple standard operating procedures have enabled minimum tillage and conservation agriculture such as use of basin technology, standard approved pesticides and fertilizers that have improved yields by more than two-fold. For example, a group of farmers in Kiboga District in the Ntwetwe sub- county under an area cooperative called Twezimbe Area Cooperative were able to produce up to 3MTs of maize grain per acre using minimum tillage.

The application of such agricultural standards has enhanced the commercialization of agriculture even on smallholder farms. Additionally, such improved methods of farming have an enormous contribution to protecting the environment, preserving natural nutrients in the soil and ensuring sustainability in agriculture.

The role of standards in international trade is one very significant area that Uganda must examine and care- fully tap into. Standards remove unnecessary

trade barriers that may be used unfairly by countries to protect their own indigenous markets. With the cur- rent liberalization of trade through several fair-trade agreements, it is important that Uganda complies to standards from the farm up to the final consumer.

The country has had harmonization of standards in the recent past which means that the quality and safety of agricultural products has been harmonized within the East African Community (EAC) and other trading blocs.

If we therefore are able to comply with international standards, we shall be able to out compete imported inferior goods and also our products whether raw or processed will be able to meet the standards of the countries to which they are imported.

For example, the recent efforts to harmonize standards in the grain sector spearheaded by the East African Grain Council, World Food Programme and donor agencies like aBi Trust and USAID has already created significant impact.

The harmonization and implem-entation of these standards has seen Uganda contribute about 90% of cross border trade within the EAC with 33% of our grain now exported to Kenya and another 54% going to South Sudan and with a high potential for growth.

Photo: UIRI serves as quality hubs to enable Incubatees & trainees to ensure quality of their produce

The extension approaches

There is a significant opportunity in the newly introduced Operation Wealth Creation that is coordinating NAADS operations on the ground whereby a lot of positive strides have been made by this intervention and it seems to be going in the right direction.

The UPDF is already considering hiring professionals that may not necessarily be combatants to give valuable technical assistance to promote standards implementation across agricultural value chains. The model of utilization of farmer field schools, popularly known as demonstration plots or farms which are practical learning centres for agronomy, post-harvest handling and basic agricultural standards are being used to ensure more success.

Involving the leadership

Further promotion of good farming standards will require involvement of local level leadership, with the Local Councils having a specific representative for agricultural production with structured reporting up to the District Production and Commercial Offices at the LC5. This will be a sure way of ensuring that standards in agricultural production are brought to the grassroots.

Embracing standards will enable farmers, exporters, processors and locally marketed food to not only appeal to the international and regional market, but also remain relevant within Uganda.

Photo: Farmers in Masaka.

As NAADS pushes for agro-industrialisation, increasing production & productivity is key in order to sustain the value addition facilities constructed that require raw material.

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Photo: NAGRIC & DB

Post-Harvest Management; A cushion against post-harvest losses in Uganda

Government of Uganda, FAO, WFP, IFAD make strides in development of a comprehensive strategy plan to reduce post-harvest losses in grains

Key agriculture stakeholders in Uganda have commended national efforts towards addressing food and nutrition insecurity as well as increasing national income through strategies to reduce post-harvest losses in grains. The vote of confidence in the government was made during a high-level consultative workshop on the development of a comprehensive strategy and action plan for reduction of post-harvest losses in grains in Uganda, which was held on 30 May 2019 at the Golf Course Hotel in Kampala.

Development of the National Strategy for Post-harvest Loss Reduction in Grains comes at a time when the contribution of Uganda's agricultural sector to national economy, is threatened, by among others- high food losses. High food losses result from poor post-harvest handling practices (poor drying and high moisture content at time of storage), inadequate and inappropriate storage facilities, limited value-addition, filth and contamination, poor marketing systems, damage by insects, rodents and other pests and infestation by micro-organisms especially fungus that leads to aflatoxin. Food losses contribute to and exacerbate hunger situations, poverty and food insecurity. Currently, annual post-harvest loss stands at 17.6% for about 2.8million metric tonnes (MT), 12.4% of about 214 000MT and 13.5% of 230,000MT of maize, millet and rice produced in the country respectively.

Therefore, the Strategy, prepared by MAAIF with the support from the Food and Agriculture Organization of the United Nations (FAO), World Food Programme (WFP) and the International Fund for Agricultural Development (IFAD), will focus on reducing post-harvest losses in

Photo **Farmers of Nyakyeera ACCE in Ntungamo district bulking, cleaning and sorting beans for Savana Commodities in June 2020**

grains, which are critical for food security and household income generation. The Strategy will address four key issues;

i. Increase general awareness and trigger a mindset change towards grain post-harvest management,
ii. Enhance the knowledge and skills of post-harvest management practices,
iii. Increase availability, accessibility, adoption and utilization of appropriate and improved grain post-harvest and quality enhancing technologies and
iv. Strengthen coordination and collaboration for efficient and effective implementation of post-harvest management actions.

The strategy will focus on the grains value chain, including cereals such as maize, sorghum, millet, rice and wheat; pulses such as beans, peas and groundnuts, and oil crops such as sesame and sunflowers.

While officiating at the workshop, Permanent Secretary in the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), Pius Wakabi, reiterated the relevance of critical actions to reduce post-harvest losses and urged stakeholders to support implementation of appropriate interventions.

"Post-harvest losses affect quality and quantity of produce and this eventually affects access to better markets, prices, results in loss of revenue and real income for different value chain actors and reduces the country's overall national income" he said. "Interventions and strategies that reduce postharvest losses are highly required to ensure sustainable quality food supply and this automatically translates into enhanced food security and income" he added.

He pledged the commitment of his ministry, to implement the Strategy and realize benefits in agricultural production for Ugandans.

To achieve the objectives of this strategy, the Government will require about USD 10million (UGX 37Billion) over a proposed five-year implementation period (2020/21- 2024/25). Funding is expected to be drawn/mobilized from government and development partners.

According to Antonio Querido, FAO's Representative in Uganda, food loss and waste amount to waste of resources, including water, land, energy, labour and capital and needlessly produce greenhouse gas emissions, which in turn contributes to global warming and climate change. The World Bank estimates that grain losses in sub-Saharan Africa alone could be worth up to US$4 billion a year – enough to provide the minimum food requirements for at least 48 million people.

Currently, annual post-harvest loss stands at **17.6%** for about 2.8million metric tonnes (MT), **12.4%** of about 214 000MT and 13.5% of 230,000MT of maize, millet and rice

Photo above: Handling Soyabean drying.

Post-harvest losses: Estimates range from

15% to as high as 50%

of what is produced, are manifold

" Development of the Strategy and Action Plan to reduce food losses and waste during and after harvest and subsequent upstream activities, in grains, are very timely" he said. "FAO, together with other Rome-based UN agencies- IFAD and WFP therefore aim at contributing to addressing food loss reduction in the country through this strategy and other efforts to share knowledge and experiences on post-harvest loss reduction, including capacity building for relevant officials" he added.

While presenting the National Strategy for Post-harvest Loss Reduction in Grains, Professor Augustus Nuwagaba, the lead consultant pointed out some of the gaps in post-harvest management as: poor policy framework, limited awareness and communication, inadequate skills and training on postharvest management, limited coordination of actors, inadequate research and development, limited mechanization, weak extension services and limited Agro-processing. The strategy is therefore expected to help address these gaps while helping to ensure food security for Uganda's growing population

Mireille Totobesola from the Food and Nutrition Division of FAO elaborated on the relationship of the national strategy aspirations with the African Union expectations and contribution to the sustainable development goals.

The validation workshop was also attended by officials from the Ministry of Trade, Industry and Cooperatives, IFAD, WFP, local government officials and representatives from national and regional grain councils, farmers associations and development organizations

Post- Harvest Losses Management

The postharvest sector includes all points in the value chain from production in the field to the food being placed on a plate for consumption. Postharvest activities include: harvesting, handling, storage, processing, packaging, transportation and marketing.

Significant amounts of the food produced in developing countries (Uganda inclusive) are lost after harvest thereby aggravating hunger. The causes of post-harvest losses, which some estimates suggest could range from 15 to as high as 50% of what is produced, are manifold. These include: harvesting at an incorrect stage of produce maturity, excessive exposure to rain, drought or extremes of temperature, contamination by micro-organisms and physical damage that reduces the value of the product.

Food losses contribute to high food prices by removing part of the supply from the market. They also have an impact on environmental degradation and climate change as land, water, human labor and non-renewable resources such as fertilizer and energy are used to produce, process, handle and transport food that no one consumes.

There are a wide range of postharvest technologies that can be adopted to improve losses throughout the process of pre-harvest, harvest, cooling, temporary storage, transport, handling and market disbursement. Recommended technologies vary depending on the type of loss experienced and include: Using liners for existing packages, sorting produce by quality, providing shade, using tables, using dry ice for insect control, low

energy cold storage, monitoring produce temperature, improved transportation, low-cost food processing, solar drying and curing.

Strategies for loss prevention include:

1. Use of genotypes that have longer post-harvest-life;
2. Use of integrated crop management systems and Good Agricultural Practices that result in good keeping quality of the commodity; and
3. Use of proper post-harvest handling practices in order to maintain the quality and safety of fresh produce.

Top Tips on How to Reduce Post Harvest Loss & Waste:

1. **Assess Maturity to Reduce Post Harvest Food Loss**

   The first step in the post harvest handling process is assessing maturity. You must make sure you pick the crop at the appropriate stage, and you make sure the pickers are trained on evaluating maturity

2. **Ensure Evaluation of The Water Quality Always to Reduce Post Harvest Food Loss**

   Using tests strips to evaluate chlorine content etc.

   If you have a tank you're using to dunk the produce in, ensure you check the water and change it always. As time goes on and more produce come in from the field, the water can become contaminated and spread to the other fruit.

   For sanitizing, use sodium hydrochloride, bleach, hydrogen peroxide, peroxyl acetic acid, or ozone. All of these can be used for either conventional or organic crops. This will ensure you are not transferring the pathogen from one fruit to the other. The packinghouse manager should know after how many trips the water should be changed. If there is a bad quality load, you should be able to change the water immediately after the load.

3. **Check Your Water Temperature and Make Sure the Water Is Not Too Cold to Reduce Post Harvest Food Loss**

   When the produce comes from the field, it can vacuum cooler water in from the cutting point and cause internal damage.

   For example; some fruits using colder water will cause internalization of soft-rot bacteria into the fruit stem scar and subtending tissue.

   When the fruit cools and tissues contract, a vacuum is created, causing water and any potentially pathogenic organisms suspended in the water to be drawn into micro-wounds, pores, or other natural openings in the fruit.

Avoid Injury to Reduce Post Harvest Food Loss

When you have cut or crack in the fruit, it creates entry points for microorganisms.

Photo: Best post-harvest practice - a mature tomato ready for harvest

4. Avoid Injury to Reduce Post Harvest Food Loss

When you have cut or crack in the fruit, it creates entry points for micro-organisms. To avoid this, make sure that knives are sharp, and that your crew is trained very well. The knives must not only be sharp and clean.

When transporting from the field to the packinghouse, avoid overloading the truck, because the fruit at the bottom can get compressed.

Gently load the produce onto trucks. Do not toss or throw produce onto the truck. This will help you avoid bruising.

5. Keep Your Produce Cool

Harvest in the morning when it is cool, and be sure to keep fruit out of direct sunlight. After it's been harvested, move the product to the processing facility as soon as possible, and move the fruit into a cooler quickly after processing.

Procedures to increase the rate of cooling include forced air cooling (within the storage room), hydro cooling, and icing (which is not always recommended).

i. Proper Storage

Reduction of post-harvest losses can increase food availability to the growing world population, decrease the area needed for production, and conserve natural resources.

Although minimizing post-harvest losses of already produced food is more sustainable than increasing production to compensate for these losses, less than 5 percent of the funding of agricultural research and extension programs worldwide is devoted to activities related to maintenance of produce quality and safety during post-harvest handling. This situation must be changed if success is to be achieved in reducing post-harvest losses of produce.

Photo: (Above) Storage facility for Grains and Pulse.

(Below): Proper post-harvest handling of vegetables

ADC; Empowering farmers in Uganda through free e-Learning Solutions

The Agribusiness Development (ADC) powered by DFCU bank and RABO foundation offers farmer Based Organization trainings in good governance, financial literacy, marketing, and price risk management.

SOMA
A Free e-Learning Solution For Farmers

To access the platform:

www.soma.adc.ug

Email: info@adc.ug

@agribdcu

Agribusiness Development Centre (ADC)

ADC has trained over 140 farmer Based Organizations(FBO) with over 10,000 individual farmers in the East, West, Central and Northern region, our goal is to train 375 Farmers Based organizations by 2022 with SOMA, we shall be able to reach our goal.

SOMA is an eLearning platform which was developed based on an identified learning gap; mismatch between demand of learning services and the capacity of the ADC to match this demand in the physical and high cost of carrying out one on one trainings for each individual farmer.

Developing the eLearning is an opportunity to bridge the gap between demand and supply of the ADC technical services at a cost-effective way. It is designed to be a self-based learning where members can access the system, register for accounts, and choose any courses they may wish to learn and gain skills on.

With SOMA, we can render a unique learning experience to users through a variety of content mainly in the categories of video, graphics, audio, and text. We plan to reach over 10,000 + farmers remotely by 2022.

SOMA will give the farmers the opportunity for education without the restrictions of time or location. This is going to solve the challenge of gender imbalance since most women miss the lessons due to other home obligations.

Furthermore, some learners prefer working at their own pace and prefer not to restrict their learning to a specific location, this will help the farmers save on transport to go to learning centers.

ADC's long plan is to establish learning centers or hubs in different FBOs where farmers can be able to come take lessons in their own time of convenience. When a farmer registers for a lesson and starts learning, the system offers the learner resume capabilities that is; they can always stop and later continue from where they last stopped.

The other uniqueness of SOMA is that it offers a certificate for each course completed. The fact that most of the farmers we are training are semi illiterate, this is also a motivation for them to complete these lessons. A farmer who has completed these lessons is at an advantage of being able to do business with financial Institutions, buyers, and processors.

It goes without mention that the COVID 19 has compelled most business to include technology in their activities, farmers are the back born of this country therefore there is need for them to adopt real quick and ADC is here to support them.

PRESIDENTIAL INITIATIVES IN AGRICULTURE

H.E. Yoweri Kaguta Museveni came up with several models to transform the economy. In this regard, he established special direct intervations in critical areas like health (especially on HIV/AIDS, Malaria & Covid 19), Anti - Corruption Unit, Poverty Eradication, Research & Value Addition especially in Agriculture to act as growth pillars upon which other sectors of the economy would be anchored for growth & development

Presidential Initiative on Banana Industrial Development (PIBID/BIRDC); Enhancing Agribusiness through incubation and Banana value chain development in Uganda

Photo: A delegation of officials tasting a range of TOOKE products.

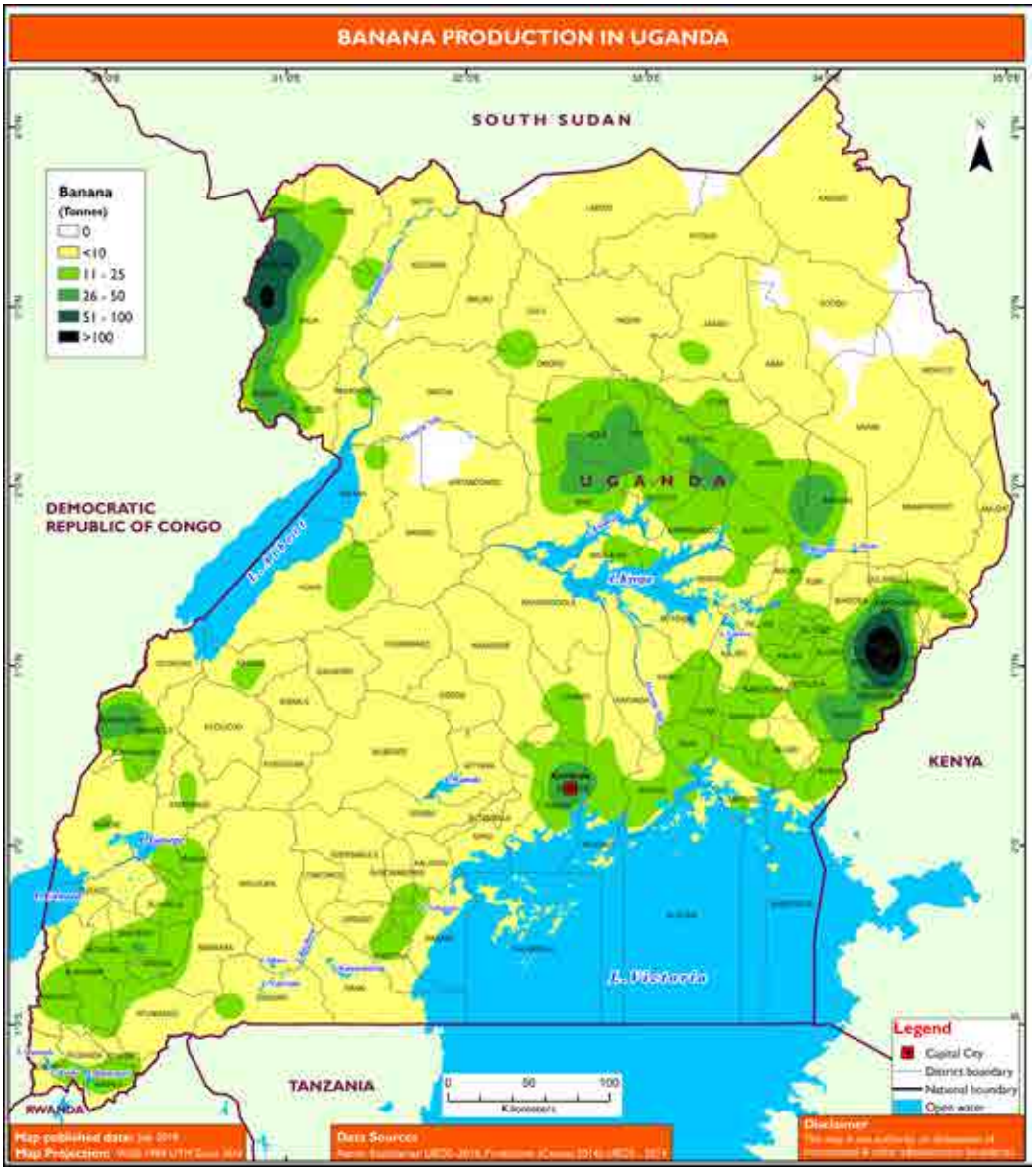
Uganda's abundant natural resources, tropical climate, rich soils and well-distributed rainfall provides an ideal environment for its agricultural sector, which employs 80% of the country's work force. The country's hospitable environment also makes two cropping seasons per year possible for most staple food crop.

Although subsistence farming currently dominates agriculture in Uganda, the sector still has great potential to drive major economic growth and lift millions of people out of poverty.

Banana is a tropical crop and is among the Ugandan staple foods. Banana cultivation forms part of everyone's daily life and deeply embedded in the culture of people in areas that grow bananas. The banana growing has been sustained by

the cultural, social and economic values that the Ugandans attach to the crop and the naturally sufficient rainfall and good soils in areas that grow bananas. It's mainly grown in the central, southern and southwestern regions of the country. The bananas are mainly grown on small scale by household for food and the surplus to sale on the market.

Uganda produces about 9.9 million metric tonnes of banana, which is (33% of worlds production) and is the second largest producer of bananas after India with banana covering over 1.6 million hectares (37 % farmland). Uganda is the largest producer of bananas in sub-Saharan Africa (SSA), followed by Rwanda, Ghana, Nigeria, and Cameroon. Plants produce fruit year-round and for a long time provided they are taken care of and bananas are suitable for intercropping with a number of crops including cabbages.



Map: A Map of Uganda showcasing the banana in Uganda

Photo: **Rev. Prof. Florence Muranga,** Director General, Banana Industrial Research & Development Centre (BIRDC).

BIRDC
BANANA INDUSTRIAL RESEARCH & DEVELOPMENT CENTRE
Knowledge for Excellence & Prosperity

Photo: A PIBID/BIRDC Banana demonstration garden at the TBI, Nyaruzinga.

Q What is PIBID/BIRDC & how did it come into existence?

Presidential Initiative on Banana Industrial Development (PIBID) is a project of the Government of Uganda under the Board and Management Committee (BMC), PIBID, whose underlying theory of change is that rural farmers with access to science-led processing and value addition enterprise under the patronage of H.E. the President of the Republic of Uganda, will be able to rapidly access profitable market chains that supply local, regional and international markets, resulting into increased household incomes.

It is modeled around a rural Technology Business Incubator (TBI) and an Industrial Technology Park (ITP), models that enhance success of early stages of technology transfer and diffusion, and entrepreneur among entrepreneurs, researchers and academics.

The initiative was developed to add value to bananas (cooking banana) and exploit the niche markets evolved out of a background of persistent alarming statistics in the banana production sector, of increasingly high production volumes, high post-harvest losses, very low export volumes and subsequent insignificant contribution of the banana sector to the GDP.

The underlying problem identified that the cooking banana was predominantly eaten in Uganda and the Great Lakes regions only. Subsequently increases, in local consumer demand, above population growth, seemed unlikely given that per capita consumption is already, by far, the highest in consequently targeting the fresh banana market as a growth strategy would easily hit a dead end particularly given Uganda's landlocked situation. The processed banana market therefore was envisaged to constitute a viable alternative for the accelerated market growth given the wide potential range of products that have been generated by research to date.

Q What is the Objective of the Project (PIBID)?

The main objective of the Presidential Initiative on Banana Industrial Development (PIBID) Project therefore, was to kick-start a model industry in banana value addition through a state-of-the-art industrial platform that leverages University's academic research and technical leadership in realizing optimum benefits for the primary stakeholders (the rural farmers) while assuring product market strength and competitiveness. The latter was designed to be achieved by establishing a strong research, training and technology development and transfer mechanism between researchers from Universities and rural entrepreneurs.

To offer rural farmers technical/ scientific services outreach and Research & Development opportunities in:

- Sustainable banana production
- Sustainable and competitive value addition to bananas,
- Business and product process development,
- Product quality assurance safety,
- Process/product technology transfer and commercialization.

PIBID is establishing a Technology Business Incubator (TBI) with the objective of harnessing rural farmers' value addition activities through a Research and Development (R&D) framework. The project therefore is slated to improve banana productivity status so as to transform banana production from peasant to commercial levels.

In the project design, an Industrial Technology Park (ITP) is also in the pipeline, targeting the scaling up of drying operations and adding secondary value to processed matooke flour from the Technology Business Incubator (TBI) in Bushenyi District. Besides, the ITP will nurture and promote private sector entrepreneurship while providing hands on training opportunities for university graduate students and post-doctoral students. The significance of the banana, both as a food and cash crop in the country and the level of commitment required to realize the success of this type of venture industry made it necessary to seek and be granted the patronage of H.E. the President of the Republic of Uganda for the Project.

The projects Mission

To enhance University capacity for training entrepreneurs, conducting client-oriented research, and steering of the banana industrialization process by fueling community-based, primary value-addition industries.

The Goals

To develop extensive state of art banana based sustainable processing enterprises using Technology Business Incubator (TBI) and system principles paired to ITP so as to sustainably empower rural farmers add value to matooke and entrepreneurs (private sector) to scale up the drying operations and the secondary and tertiary processes in the value chain.

The Technology Business Incubator (TBI) was designed to meet four critical goals targeting the realization of easy access of services critical to rural farmers outreach and R & D opportunities.

Namely to support:

1. Sustainable plantation management,
2. Business and product process development,
3. Product assurance and safety,
4. Process/product technology transfer and product commercialization.

Photo: Workers in the processing plant at the Banana Industrial Research & Development Centre

Photo: (Above)
Offloading of fresh matooke at the banana processing factory at the TBI, Nyaruzinga.

(Below) A bag of Tooke flour.

The Specific Project Objectives are as follows;

1. To establish benchmarks for starting a rural based pilot banana processing industry in Bushenyi
2. To build capacity for the rural farmers in new production technologies and agronomic practices, so as to ensure sustainability of matooke banana production in Bushenyi district for a pilot banana processing industry.
3. To ascertain sustainable processing of quality, market driven products by a startup of rural value addition enterprise through a Technology Business Incubation framework for local and global markets.
4. To link rural farmers /seed entrepreneurs of favorable micro mechanism/ facilities to ensure sustainability of both banana production and rural processing industries.
5. To establish reliable supply chain models that link rural farmers/ seed entrepreneurs to more profitable market outlets with medium and large-scale food processers so as to ensure sustainability of venture banana processing industry.
6. To asses project impact on environmental sustainability, overall economic wealth, food and nutrition security at macroeconomic level.
7. To transform Bushenyi TBI into a Banana Industrial Research and BIRDC.
8. To promote entrepreneurship-in the private sector and training at public institutions through establishment of a ITP near Lake Mburo

Novel products of the project;

Three generic Matooke flours: Raw, Instant and Extruded forms and matooke starch. A range of second-generation products including Bread, Cakes, Biscuits/ Cookies, Children's foods, Soups, Porridges and starch.

Q What is incorporated in the Project Design:

A RURAL TBI & ITP

The project design provides for a field research station in Bushenyi District incorporating: A TBI for value addition and quality control; Banana tissue culture nursery; Agro-forestry/tree nurseries; Demonstration farms for banana production best practices.

TBI Functions

A: Value addition

1. Training in value addition
2. Establishment of Community Processing Associations (CPAs)
3. Product development & pilot testing
4. Bulking and storage
5. Milling & packaging
6. Export.

B: Quality Control

1. Training in quality control
2. Establish Hazard Analysis of Critical Control Points (HACCP)
3. Establish product grading criteria & quality mark
4. End use profiling of quality specific attributes.

C: Marketing Function

1. Identify market opportunities and create market strategies for banana value-added products.
2. Collaborate with UNBS to create a Presidential Quality Mark.
3. Build end-user responses to new product formulations/ recipes
4. Test end-user responses to new product formulations/ recipes
5. Carry out awareness building/adoption campaigns.

ITP AT SANGA FUNCTIONS

1. New product Development & manufacture testing/ scaling up of the banana flour enterprises by SMEs.
2. A drying/plant for scaling up operations,
3. A Business centre/for training & staff up ventures.
4. A Management centre TBI- & private sector market information network.

A Food Technology centre furnished with all key facilities.s in the shortest possible time, with the least amount of administrative and bureaucratic procedures.

Photo: Some of the TOOKE products. Biscuits, Bread, Cookies and Crisps.

6. Conduct training in business management and marketing
7. Facilitate & promote linkages among farmers, processing associations, processors, consumers & service providers,
8. Establish a network of market information centres.

D: Production Function

Achieving of optimal market-oriented productivity through transformation of matooke from a food crop to a cash crop.

1. Best practices in soil & banana cropping system management
2. IK/R&B Disease control approach.

Photo: The banana processing factory based in Nyaruzinga in Bushenyi district.

Manifesto Implementation 2016 - 2021; Governments promise and commitment to the development of the Agriculture sector in Uganda.

Agriculture is among the four key sectors highlighted in the Uganda vision 2040 that will greatly contribute to wealth and employment creation. Agriculture remains the main thrust of Uganda's economic growth with Agriculture-based products accounting for about 45% of exports in FY 2018/19.

The Agriculture sector also contributed 22% of the GDP and registered improved growth rates from 2.8% in FY 2015/16 to 5% in FY 2018/19. The Agriculture sector also employs about 64% of all Ugandans (and about 72% of all youths) highlighting its importance to household income growth and consumption, and thereby stimulating growth in the other sectors.

Due to the transformation in the agriculture sector, the country has witnessed a reverse trend in exports and imports between Uganda and our major trading partner Kenya. In 2018, Uganda exported to Kenya commodities worth USD 580.15 million, against imports from Kenya worth 515.85 million. The key commodities that contributed to this trend include maize, fish, poultry, coffee, dairy and dairy products.

MAAIF's MANDATE

"To promote and support sustainable and market oriented agricultural production, food security and household incomes"

VISION

"A competitive, profitable and sustainable agricultural sector"

MISSION

"To transform subsistence farming to commercial agriculture"

STRATEGY

The overall development and growth of the sector is anchored on four strategic objectives or priorities, as outlined in the National Development Plan 2 (NDP2) and the Agriculture Sector Strategic Plan (ASSP) 2015/16 - 2019/20:

i. To increase production and productivity of agricultural commodities and enterprises;

ii. To increase access to critical farm inputs;

iii. To improve access to markets and value addition and strengthen the quality of agricultural commodities; and

iv. To strengthen the agricultural services institutions and also create an enabling environment for the sector to grow.

These are intended to improve our balance of payments constraints and provide the much-needed foreign exchange to the country. These will also address the issue of unemployment, especially among the youths and ensure inclusive development of our country.

The 2016 NRM manifesto committed to support key strategic commodities to ensure greater impact on household incomes and national export earnings. Emphasis of the interventions has therefore focused on commodity value chains, focusing on: research;

extension; pest, vector and disease control; provision of inputs; promoting sustainable land use and soil management; post-harvest handling; improving market access and infrastructure; and value addition.

A number of interventions have been undertaken by Government in the Agriculture sector that have led to increased employment, increased household incomes, food security and exports. The 2014 Population and Housing Census figures indicated that close to 80% of the households in the country are involved in agriculture. The sector contribution to the national economy still remains strong. Between FY 2015/16 and FY 2018/19, the sector contribution to national GDP averaged 23.7%. In the same period, the sector annual growth rate rose from 2.8% to 5%; The country is therefore on the right course towards archiving the targeted 6% annual growth rate in the Maputo/Malabo declaration undertaking. The value of agriculture exports increased from USD 1.326 billion to USD 1.5 billion representing a growth of 20% in the past four financial years.

Over the last four years, the sector has been on track in implementing the 2016 NRM Manifesto whose objective is taking Uganda to modernity through Job creation and Inclusive development. This has been possible through prioritizing and integrating the Manifesto commitments and the Presidential directives/resolutions in all the programs as highlighted below.

IFAD has seen over

5 million

households benefit directly from 18 projects which have financed with a sum of over US$385.7 m

in loans on highly concessional terms.

Coffee agro-processing is on the rise, with the last year witnessing an increase of 30 coffee processing hullers (from 548 in FY 2017/28 to 578 in FY 2018/19); an increase of 6 coffee roasters (from 17 in FY 2017/18 to 23 in FY 2018/19)

Manifesto Commitments and Implementation Status

Commitment #1: Support key strategic commodities to ensure greater impact on household incomes and national export earnings. Emphasis of the interventions to focus on provision of planting materials for the key enterprises namely; Maize, Beans, Coffee, Tea & Fruits (Citrus, Mangoes, Pineapples, Apples) through:

1. Distribution of improved seeds and breeding materials under Operation Wealth Creation.
2. Ensuring that good quality seedlings are supplied to farmers and ensure prompt payment for the same;
3. Availing planting materials to farmers well in time to take advantage of rains;

Status

The Ministry through NAADS put in place new framework contracts to address challenges of quality of inputs and timely distribution of the inputs. This new process involves registration of nurseries and mother gardens in the respective District Local Governments.

The new procurement and distribution strategy not only seek to deepen and localise the production of planting materials and selection of suppliers from within the target beneficiary district or within the closest vicinity to the beneficiary district, but also increases income generating opportunities for our youth and women groups.

1. COFFEE

Coffee is the principal export for Uganda. In line with the Presidential Directive made in December 2015 for the coffee sector to raise production from 4 million 60 kg bags to 20 million 60 kg bags, the Ministry embarked on a process to actualize this directive in collaboration with the Prime Minister's Delivery Unit (PMDU).

During the past four financial years, government through UCDA has distributed 582,995,184 coffee seedlings to coffee farming households as part of the long-standing replanting and rehabilitation program to replace the stock lost to Coffee Wilt Disease, and, as part of the implementation of the national plan to increase production from the current 6.95 million to 20 million bags by 2025. These efforts have increased coffee production by 56% from 4.46 million (60kg) bags in FY 2015/16 to 6.95 million (60 kg) bags in FY 2018/19.

Coffee agro-processing is on the rise, with the last year witnessing an increase of 30 coffee processing hullers (from 548 in FY 2017/28 to 578 in FY 2018/19); an increase of 6 coffee roasters (from 17 in FY 2017/18 to 23 in FY 2018/19); and, an increase of 12 export grading plants (from 24 in FY 2017/18 to 36 in FY 2018/19). These efforts have increased the volume of coffee exported by 17% from 3.56 (60 kg) bags in FY 2015/16 to 4.17 million (60 kg) bags in FY 2018/19 while the value of exports has increased by 18% from USD 351.5 million in FY 2015/16 to USD 416.2 million in FY 2018/19.

2. MAIZE

Government of Uganda prioritized Maize due to its high potential for food security and contribution to national export earnings. Through the NAADS/Operation wealth creation programme, the Ministry distributed a total of 19,562,506 kgs of maize seed to both small holders and commercial farmers in 120 district local governments in the last four years.

Due to this intervention, the production of maize has increased by 85% from 2.6 million MT in 2016 to 5 million MT in 2019. The volume of maize exports has also increased by 185% from 263,114 MT in 2016 to 750,000 MT in 2019 while the value of formal exports has increased by 12% from USD 84.99 million in 2016 to USD 95.48 million in 2019. The improved performance along the maize value chain is attributed mainly to distribution of seed by government, increased adoption of improved maize varieties by farmers, increased value addition by private sector and increased vigilance by Government to control pests and diseases

3. CASSAVA

Cassava has been identified as one of the most important crops in the recent years, and our research shows that we can produce various products including flour, animal feed, alcohol, starches for sizing paper and textiles among others. The Ministry has therefore strategically developed programs to promote research into high yielding and climate resilient varieties which are now being disseminated in the areas with the best production potential.

The Ministry through the NAADS/OWC programme provided support to both small holders and commercial cassava farmers in more than 60 district local governments that prioritized cassava. A total of 793,223 bags of cassava cuttings were distributed. These interventions have led to a 131% increase in cassava production from 3 million MT in FY 2015/16, to 7 million MT in FY 2018/19.

4. TEA

The Ministry continues to implement its strategy of ensuring increased tea production in the traditional tea growing areas and in new ones. During the past four financial years, the Ministry through NAADS/OWC has distributed 410,737,788 tea seedlings in 21 tea growing districts and these efforts have increased tea production by 19% from 67,000MT in the FY 2015 to 79,466 MT in FY 2019. In addition, the volume of exports increased by 37% from 50,782 MT worth USD 69.94 million in FY 2015 to 69,520 MT worth USD. 77.96 million in FY 2019.

The sector interventions together with the farmers' own initiatives has stimulated establishment of more tea factories from 27 to 33 factories including 2 new ones established in Kabale and Kisoro with the support from the Ministry. Additionally, 15 new tea factories are being established and are at different levels in several districts including; Kyenjojo (2), Buhweju (4), Kanungu (1), Bushenyi (1), Rukiga (1), Kisoro (1), Ntungamo (1), Kamwenge (1), Mbarara (1) and Luwero (1).

5. FRUITS (CITRUS, MANGOES, PINEAPPLES, APPLES)

In the last four financial years, support has been provided towards production of fruits focused on provision of seedlings tolerant to pests and diseases and with

A total of 793,223 bags of cassava cuttings were distributed. These interventions have led to a

131%

increase in cassava production from 3 million MT in FY 2015/16, to 7 million MT in FY 2018/19.

desirable fresh and processing characteristics, improvement in post-harvest handling and establishment of processing facilities for citrus, mangoes, apples and pineapples in 10 district local governments. A total of 41,426,303 citrus seedlings; 28,706,281 mango seedlings; 2,439,155 apple seedlings and 36,446,670 pineapple suckers were distributed. The various Government interventions over the last 10 years have already resulted into a 20% increase in export volumes of fruits and vegetables from 57,358 MT in 2015 to 68,862 MT in 2019 while the export values have increased by 13% from USD 32.1 million in 2015 to USD 36.1 million in 2019.

Government is also setting up fruit factories across the country including the Soroti fruit factory (completed), a Mango processing factory in Yumbe district (6 MT per hour capacity), a multi fruit factory in Nwoya district (12 MT per hour capacity), a multi - fruit processing plant in Kapeeka (6 MT per hour capacity) and, a pineapple processing plant in Kayunga district (0.5 MT per hour capacity). Government also plans to establish 2 additional fruit factories in Busoga and Greater Masaka sub regions in FY 2019/20.

Photo: A Cocoa farmer monitoring growth performance.

6. BEANS

Beans remain another important food crop, grown by households all over the country with high potential for increasing household incomes. Over the last four years, the Ministry has distributed a total of 7,086,504 kgs of bean seed to smallholder farmers in all district local governments that prioritized beans in the past four years.

The production of beans has however decreased over the past four years, from 1 million MT in 2016 to 0.6 million MT in 2019. Beans export volumes have also decreased by 6%, from 113,977 MT in 2016 to 107,678 MT in 2019 while the value of exports has reduced from USD 65.85 million in 2016 to USD 61.97 million in 2019.

7. COCOA

Cocoa is ranked among the high value export commodities that offer great economic opportunities for increasing farmers' incomes and foreign exchange earnings for the country.

The Government has distributed a total of 21,526,743 cocoa seedlings to both small holders and commercial farmers in district local governments that prioritize cocoa production in the past four years. Due to this intervention cocoa export volumes have increased by 19% from 29,761 MT in FY 2015/16 to 35,318 MT in FY 2018/19 while the value of our cocoa exports increased by 3% from USD 75 million to USD 78 million in the reporting period.

Commitment #2: Support companies, individuals in livestock breeding in order to meet the demand within the country for dairy cows, poultry, pigs

The interventions in the area of livestock aimed at increasing production and productivity of priority livestock for improved household food, nutrition and income security; as well as export earnings. It is worth noting that these interventions put special emphasis on special interest groups, especially youth and women and beneficiaries in urban and semi-urban areas.

Status

1. The Ministry through Dairy Development Authority continued to partner with dairy farmer associations and other dairy value chain actors to boost diary production and productivity in the country. These efforts have resulted into improved performance along the dairy value chain. Milk production increased from 2.08 billion litres in 2015/16 to 2.51 billion litres in 2018/19.

   The volume of marketed milk has been maintained at 80 % between 2015 and 2019. The country has 355 Milk Collection Centers (MCCs) with a total capacity of 1.5 million litres. The export value of milk and milk products has increased by 310% from USD 50 million in 2015 to USD 205 million in 2019. The exports were mainly UHT milk, milk powder, casein protein, ghee and butter oil.

2. For breed improvement, the Ministry through NAGRC&DB is promoting crossing local animals, to F1-50% and F 2-75% which can produce 12 and 18 liters of milk per day respectively. With F1 a farmer with good management gets 1.5 million Uganda shillings per animal per year. Six Cows of 75% dairy crosses earns more than 20million a year from milk.

- NAGRC & DB has improved the beef animal's average daily weight gain to 250 gms per day with F1- 50% and this has reduced the market age tremendously from 3-4 years to 1- 1.5 years.
- Kroiler chicken which are disease resistant and faster growth have been introduced. The Kuroiler hens lays between 150-200 eggs in a year compared to the 40 eggs produced by the indigenous birds. Cocks weigh between 3-4 kg within four months. 2, 305,194 were distributed to 5,500 households and 40,000 birds have been exported to the regional markets.
- Through genetic improvement NAGRC&DB goats have been improved to reach an average daily weight gain (ADG) to 145g/day compared to 25 – 30 g/day for the local goats which is an increase in household income by 67% per goat from sales.
- Early maturing pigs have been introduced where they can produce at 10 months at an estimated weigh of 80-90 kgs live weight compare to the locals one year and two months at an average weight of 40-60 Kgs. Breeds such as Comborough can produce over 14 piglets (28 piglets/animal/year) and at UGX 150,000 translates into 4,200,000/= per sow/year.

NAGRC&DB goats have been improved to reach an average daily weight gain (ADG) to 145g/day compared to 25 – 30 g/day for the local goats which is an increase in household income by

67%

per goat from sales.

NARO has strengthened its capacity to produce breeder and foundation seed to key strategic food security and income generating commodities for multiplication by the private.

Commitment #3: Support companies, Uganda Prison Services, individuals and companies involved in seed production and other planting materials to invest.

Status

1. The National Seed Policy was approved by Cabinet and regulations were gazette to provide a regulatory framework for the private sector to invest in the seed sub sector.
2. NARO has strengthened its capacity to produce breeder and foundation seed to key strategic food security and income generating commodities for multiplication by the private.
3. The Ministry has scaled up the establishment of partnerships between its Agencies and Projects with Seed Companies and Farmer Groups involved in the production of seed to ensure more availability of affordable and quality seed across the country. The Ministry has also strengthened the capacity of the Seed Certification Services to eliminate counterfeited seed from the market.

Commitment #4: Enhance capacity of young farmers to engage in market/commercial agriculture and initiate a youth fund for mechanized agriculture

Status

1. The National Strategies for Youth Employment in Agriculture and that of Knowledge Management and communication were disseminated. In order to improve the youth postharvest handling and storage management skills, seven youth groups from Masindi, Kiryandongo, Iganga and Jinja were mobilized and trained in sustainable market linkages along the rice and maize value chains.
2. Under the dairy sub-sector, to enhance value addition, a total of 216 dairy stakeholders; majority being the youth were skilled in value addition especially on how to make yoghurt, cheese and ice-cream. Most of the trainees have already established dairy cottages and others are employed along the value chain as a result of the trainings. There has also been a deliberate effort to target youths and women while distributing inputs, planting and breeding materials

Commitment #5: Modernize Agriculture to provide raw materials for industries and boost export earnings

Status

1. Agriculture modernization involves improvement in agronomic practices including use of improved technologies, provision of extension services, control of pests, vectors and diseases, mechanization, irrigation, among others. The Ministry has made tremendous strides toward modernized agriculture as a result boosting export earnings by 20% from USD 1.326 billion in 2015/16 to USD 1.585 billion in FY 2018/19.
2. The Ministry has continued to promote cotton growing in order to sustain the country's textile industries and for export of yarn. These efforts have resulted into a 25% increase

in production from 151,081 (185 kg) bales of lint in 2016/17 to 189,443 (185 kg) bales of lint in FY 2018/19. Lint exports also increased by 8% from 167,542 (185 kg) bales of lint valued at USD 48.3 million in 2016/17 to 180,290 (185 kgs) bales of lint valued at USD 54.26 million in FY 2018/19.

Cotton value addition is also increasing, with six cotton wool manufacturing firms fully operational and producing absorbent surgical cotton wool and Mama Kits from locally grown cotton. These directly employ about 300 people and produce over 700 Mt of surgical cotton wool annually. Also, nine oil mills have been established and produce edible oil, cotton seed cake and soap stock from cotton seed. These directly employ a total of about 600 people and produce a combined total of over 2,000 Mt of edible oil and approximately 12,000 Mt of cotton seed cake used in animal feeds annually.

3. The Ministry has developed an irrigation policy and was approved by Cabinet which provides a regulatory framework for the private and public investments which defines the roles of MAAIF and MWE in irrigation. Government has continued to invest in the construction of irrigation schemes. Five irrigation schemes that were highlighted last year will soon be completed.

   These are Torchi, Ngenge, Mobuku ll, Doho ll and Wadelai is ongoing, with the progress as follows: Tochi (500 ha in Oyam District) – 72.3%; Ngenge (880 ha in Kween District) at 90%; Mubuku II (480 ha in Kasese District) at 68%; Doho II (1,178 ha in Butaleja District) at 85%; and Wadelai (1,000 ha in Pakwach/ Nebbi) at 29%. The schemes will greatly contribute to increased production of rice, aquaculture and horticulture (fruits and vegetables).

4. In addition, in FY 2018/19, detailed engineering designs were completed for Acomai irrigation Scheme in Bukedea District (1,480 ha and 1,600 households are targeted); Atari Irrigation scheme in Kween/Bulambuli District (680 ha and 2,667 households targeted); and Namatala Irrigation Scheme in Budaka/ Mbale/ Butaleja District (3,450 ha and 4,923 households targeted).

5. In FY 2018/19, using the assorted sets of heavy equipment acquired by Government, 456 valley tanks were constructed with a total holding capacity of 6,840,000 m^3. The increased access to water for agriculture production by our farmers has resulted in increased yield and production in the irrigated areas. With increased access to water, productivity under the crop, livestock and fish subsectors is projected to increase in the short and medium term across the country.

Photo: Mubuku irrigation scheme in Kasese.

Commitment #6: Ensure self-sufficiency in rice production as well as promoting growing of upland rice to avoid destruction of wetlands

Status

1. The Ministry through its research arm, NARO, released and promoted 14 upland rice early maturing and drought tolerant varieties. The varieties are resistant to rice yellow mottle. NARO has availed 10 MT of foundation seed to seed multipliers.

2. The six major commercial farmers took upland rice as their major commercial enterprises included Omer Farm, (4,000 ha cropped rice each year), Vinayak Agro Farm Limited (7,000 ha cropped rice each year), Amatheon Limited (1,000 ha cropped rice each year), Victoria Farm (8,000 ha cropped rice a year), Panyimur Farm (1,000 ha cropped rice a year) and Farmers groups (600 ha cropped rice per year).

Photo: **NARO released and promoted 14 upland rice early maturing and drought tolerant varieties, including (below) NARORICE 2, MET 12/ TOCI.**

Commitment #7: Promote cassava production in northern and eastern Uganda, and seek investors to establish factories for value-addition and production of cassava-related products

Status

1. Cassava is a predominantly staple food crop and it's also becoming a strong agent for import substitution as it's targeted to contribute about USD 30 million per year in import-substitution.

2. In the last four years, the following interventions have been undertaken to promote cassava production in northern and eastern Uganda:

   - production and distribution of clean planting material resistant to crop pests and diseases (high yielding varieties like NASE14, TME14, BAM);
   - developing monitoring and diagnosis systems for pests and diseases, provision of support for marketing and establishment of adequate storage utilities for fresh cassava roots; support cassava farmers and SMEs to engage in processing of quality flour and chips, as well as agribusiness enterprises.
   - Also, twelve (12) acres of cassava seed multiplication site has been maintained by NaCRRI.

3. In an effort to commercialize cassava production, Government through NAADS is supporting an Integrated Cassava Industry Development Project for Northern Uganda (ICIDP), initiated by Gulu Catholic Arch Diocese to address rural poverty and stimulate industrialization of this commodity in Northern Uganda.

Commitment #8: Use four Acre-Land-Model as part of the National Strategy for commercialization of agriculture

Status

1. The Directorate of Agriculture Extension Services carried out trainings of extension staff and non-state actors on the principles of the four Acre-Land-Model that will be piloted based on the concept of the Village Agent Model

2. The Nucleus Farmer and Parish Model farmer concept has been submitted to Cabinet for approval. The model is meant to streamline ways in which Government can empower progressive farmers in specific value chains to be the means of creating linkages between Government, Local Governments, Extension services, input dealers, NAADS/ OWC activities, Financial and Insurance service providers, Agriculture Research and other private sector value chain actors. The model is also meant to mobilize farmers into groups and higher-level producer marketing associations and link the farmers to input dealers, traders and financial services.

Nucleus Farmer / Enterprise Model on Selected Value Chains

Commitment #9: Provide 18 million hand hoes to support agricultural production among small farmers

Status

1. So far, the Ministry has procured and distributed 1,220,000 hoes to support 1,220,000 farming households in all regions of the country. The Government will procure and distribute another 3.17 million hoes in FY 2020/21.

Commitment #10: Roll out the single spine extension services system to districts by ensuring that every sub-county has veterinary, agricultural and where applicable fisheries officers

Status

1. Following the adoption of the Single Spine Extension System, Government embarked on the recruitment drive of Agricultural Extension Staff in Local Governments. 3,812 extension workers have been recruited which is 68% of the targeted 5,630 extension workers to be recruited. This has resulted to the reduction in the ratio of extension worker to farmer from 1:5000 in FY2015/16 to 1:1800 in FY 2018/19.

2. The Government procured and distributed 1,061 motorcycles and 126 vehicles to support mobility of agricultural extension staff.

3. The Government has also developed and successfully piloted a farmer register to regularly collect data on farming households. All farmers will be registered including their enterprises, acreage, production figures, and storage facilities. As the sector improves the quality and timeliness of data collection, appropriate interventions will be implemented for the different farmer categories.

The Government procured and distributed

1,061 motorcycles and

126 vehicles

to support mobility of agricultural extension staff.

Commitment #11: Increase Investment in improved post-harvest handling, storage and value-addition for commercial farming and transformation of small holders and peasant agriculture

Status

1. The Government of Uganda is implementing the Public Private Partnership Act through which it is entering partnerships with the private sector to commercialize the agriculture sector.

   The Government of Uganda through the National Agricultural Advisory services (NAADS) constructed farmer-based community grain stores across the country to support farmer access to markets through collective marketing.

   NAADS/OWC entered in a partnership with World Food Programme through a Memorandum of Understanding in 2016 to jointly address identified gaps in food storage capacity, post-harvest losses eradication, value addition and collective marketing systems, besides improving access to agri-inputs in selected parts of the country.

   The NAADS/OWC – World Food Programme partnership has seen the construction of 12 Community Grain Stores in 11 different districts of Napak, Adjumani, Kiryandongo, Masindi, Hoima, Kyenjonjo, Mubende, Kakumiro, Kiboga, Nakaseke and Kyegegwa. The World Food Program supported capacity building activities of both farmers and agricultural extension staff in postharvest handling in more than 40 districts.

2. The Government of Uganda has continued to develop the oil palm value chain through a partnership with BIDCO Uganda Limited in Kalangala and is now expanding to Buvuma, Mayuge and Masaka.

   Over the past four years, there has been a marked increase in production of oil palm fresh fruit bunches and incomes earned by the farmers. The smallholder oil palm farmers harvests increased by 127% from 19,465 MT in FY 2015/16 to 44,221 MT valued at UGX 21.1 billion in FY 2018/19. The value of the smallholder oil palm harvests also increased by 140% from UGX 8.78 billion in FY 2015/16 to UGX 21.1 billion in FY 2018/19.

   The oil palm households with mature gardens in Kalangala earn an average of USD 4,676 each year and are already in the middle-income bracket. The palm oil enterprise in Kalangala produced 40,005 MT of crude palm oil in 2019 which saved the country USD 23 million.

3. The Government signed an agreement with M/s Alvan Blanch based in UK, to create partnerships with our local investors in order to boost value addition especially in the area of cereals i.e. Rice, Maize e.t.c. The objective is to establish processing facilities including driers, cleaners and sorters with storage capacity of 4,000 tonnes each in the next 5 years. Other interventions include:

   Korean International Cooperation Agency (KOICA) continued to support agro-processing and marketing activities including post-harvest handling and storage in pilot demonstration centres in Masindi, Kiryandongo, Jinja and Iganga.

The oil palm households with mature gardens in Kalangala earn an average of USD

4,676 each year and are already in the middle-income bracket

4. The Ministry through DDA has over the past four years procured and distributed 121 sets of milk coolers and matching generators to dairy farmer organizations in Kiboga, Kyankwanzi, Palisa, Apac, Gulu, Bugiri, Kibuku, Kamuli, Luwero, Nakaseke, Ssembabule, Lyantonde, Isingiro and Kiruhura districts.

Commitment #12: Enhance co-ordination of the production value chain from the farmers to the final consumer through OWC

Status

1. The National Agricultural Advisory Services (NAADS) has, since the refocusing of its mandate to supporting farmers with the provision of agricultural inputs through the implementation of Operation Wealth Creation (OWC) programme, there has been remarkable coordination improvement in this program as evidenced by increased acreage, production and productivity of the distributed inputs.

   Currently, planting materials (seed & seedlings) and stocking/livestock materials are based on both national priority commodities and Zonal/district specific priority commodities for particular agro-ecological zones and districts. Emphasis will also focus on Tea, Fruits (Citrus, Mangoes Apples and Pineapples) and Cocoa which are an important component of the four-acre model.

2. In addition, there has been improved Support to Agricultural Value Chains Development under NAADS/OWC coordination, where, Medium scale fruit processing equipment; Motorised; Maize milling equipment (grinding mills-hullers, shellers, etc.); Milk coolers and generators; Rice milling equipment (threshers, hullers-polishers, cleaners, graders, etc.) have been procured and distributed.

Commitment #13: Restructuring relevant government institutions to enhance the effectiveness of OWC

Status

1. Under the restructuring, NAADS was restructured and the staff at LGs were integrated into the single spine extension service.

2. The Directorate of Agricultural Extension Services (DAES) was established to reorganize the agricultural extension service into a harmonized, well-coordinated and integrated delivery system.

Commitment #14: Ministry of Local Government should instruct CAOs to issue guidelines to Parish Chiefs to guide their supervision of OWC activities

Status

1. The Minister of Local Government issued a circular to all Chief Administrative officers dated, 8th December, 2016 on seven (7) additional responsibilities of Parish (Muluka) chiefs which include monitoring and supervising Operation wealth creation (OWC) as well as other Government interventions.

Currently, planting materials (seed & seedlings) and stocking/ livestock materials are based on both national priority commodities and Zonal/district specific priority commodities for particular agro-ecological zones and districts.

The Ministry is focusing on creating mindset change among farming communities and educating the farmers on the importance of fertilizers to increased productivity. This is being undertaken through providing fertilizers for demonstration focusing on strategic commodities

2. The Agriculture extension conditional grant guidelines for FY 2019/20 have provided for facilitation of the Parish chiefs to maintain the farmer register which analyses various data including the quality and quantity of inputs supplied to farmers.

Commitment #15: Promote use of manure, organic fertilizers, inorganic fertilizers and appropriate irrigation technology to beat climate change challenges.

Status

1. Following the formulation of the fertilizer policy and strategy by the Ministry, Government undertook the construction of the Tororo Sukulu fertilizer factory which project is in the advanced stages of construction. The Sukulu fertilizer factory is almost complete through a Public Private Partnership and will produce 300,000 tons of fertilizers; 300,000 tons of steel products; 200,000 tons of sulphuric acid; 300,000 tons of gypsum; 100,000 tons of Rare Earth Elements (REE) minerals; and 40,000 tons of Niobium annually.

2. The Ministry is undertaking a comprehensive update of the national soil suitability maps. This will help the farming community to understand exactly what kind of fertilizers are suitable for each farming region in Uganda. This will also help the Extension workers to recommend the right fertilizers to be used in a particular farming area for a particular commodity. Therefore, Government will complete the already ongoing exercise of updating the National Soil Suitability Maps. This which will involve our researchers in NARO, Makerere University, the Ministry of Lands, Housing and Urban Development and the Ministry of Energy and Mineral Development.

3. The Ministry is also updating the National Agriculture Zoning Strategy to suit the current geological settings and emerging strategic commodities in various parts of the country. The revised National Zoning Strategy will be used by the private sector to make investment decisions. The National Zoning Strategy will map the Agricultural production zones for food security and farmer incomes; identify the enterprises of high export potential for each zone based on Competitive and Comparative Advantages.

4. In the meantime, the Ministry is focusing on creating mindset change among farming communities and educating the farmers on the importance of fertilizers to increased productivity. This is being undertaken through providing fertilizers for demonstration focusing on strategic commodities. Fertilizers are being provided through Government intervention of NAADS/ OWC, Uganda Coffee Development Authority (UCDA), Cotton Development Organisation (CDO), the Vegetable Oil Development Project in Kalangala and under the sunflower and soybeans projects.

5. Government is also demonstrating how the use of ICT can increase efficiency in the distribution of inputs such as fertilizers through the E-Voucher system under the Agriculture Cluster Development Project. By the start of the first season of 2020, 97,788 farmers had been enrolled onto the E-voucher system.

Commitment #16: Promote mechanization by availing machinery for hire at affordable rates

Status

1. The Ministry has finalized formulation of the new Agriculture Mechanization Policy which will soon be tabled to Cabinet. The policy is meant to streamline farmers' access to mechanization equipment, streamline tractor hire services, streamline access to credit for mechanization equipment and also guide private sector investments in agriculture mechanization/ tractorization. To this effect, procured and distributed 320 tractors and matching implementation to 115 disticts. The Ministry also has trained 50 private heavy equipment operators, engineers, technicians, and mechanics in equipment operation, maintenance and management. The Ministry has so far recruited 33 Senior Agricultural Engineers in 33 district Local Governments.

- Due to the increase in the number of heavy equipment sets acquired, the Ministry has increased its capacity to bush clear and open land for agriculture production from 3,500 hectares per year in FY 2016/17 to 24,496 hectares per year in FY 2018/19. The intervention has greatly supported rice, coffee, maize, cotton, sunflower, pasture, beans and cassava growing households. The intervention has greatly reduced the cost of opening land and saved farmers a lot of time hence enabling them to make big chunks of land productive in time with the recommended planting times of the season. This has also enabled more women and youths to participate in the agriculture sector, with their energy better utilized in less time-consuming productive activities.

- The assorted mechanization equipment has enabled the Ministry to increase its capacity to open, improve and rehabilitate farm access roads. The number of kilometers of farm roads opened has increased from 440 kms in June 2018 to 521 kms in June 2019. Between July and December 2019, another 59 kms of farm roads were opened increasing the number of kms opened with the MAAIF mechanization equipment to 580 kms. This has reduced time spent by farmers travelling long distances on bad roads to access improved inputs and also opened up their villages to markets for their produce. The farmers are also better placed to negotiate for better prices with improved linkage and connectivity to the markets.

- The ministry has continued to revamp the Namalere Agricultural Mechanization Workshop for skilling and increasing knowledge for Ugandans in agricultural mechanization, assembling of machinery, operating, maintenance and servicing of all the government equipment. More support from Government is required to make it our Centre of Excellence.

2. The Ministry is constructing 4 regional mechanization centers in Buwama – Mpigi district (Central Region), Agwata – Dokolo district (Northern Region), Kiryandongo district and Mbale district. The regional mechanization centers will further decentralize the irrigation and water for agriculture production services.

The assorted mechanization equipment has enabled the Ministry to increase its capacity to open, improve & rehabilitate farm access roads.

The centers will be managed by a Senior Engineer who will work with a Mechanical Engineer, an Irrigation Engineer and a Civil Engineer. The centers are being equipped with tractors and maintenance tools/ mobile workshops. The centers will also be responsible for maintaining Government tractors and repair/ maintenance of privately owned tractors in the district at cost recovery basis. The establishment of the centers was phased and by December 2019, Buwama was at 60% completion while Agwata was at 50% completion.

3. The Ministry trained 50 private heavy equipment operators, engineers, technicians, and mechanics in equipment operation, maintenance and management. More trainings are being rolled out targeting districts with more tractors. We plan to ensure that all districts have trained operators, engineers, technicians and mechanics to increase the benefits from the Government machinery recently acquired and distributed country wide by Ministry of Works and Transport to District Local Governments. This will greatly reduce the Government budget on operation and maintenance of machinery, with less losses due to redundancy and vandalism of machinery.

To fight tsetse flies, NARO developed the

NARO-Ngu trap

which captures 106 flies per day compared to 22 flies trapped by the pyramidal trap.

Commitment #17: Invest in research in diseases and pests control

Status

1. The Ministry through NARO developed, released and promoted three coffee wilt disease resistant and high cup quality clones. The varieties NARO KR8, NARO KR9, and NARO KR10 yield 3.1, 3.9 and 4.8 t/ha/year respectively.
2. To fight animal diseases, NARO developed two anti-tick vaccines to effectively control blue ear ticks (Boophilus decoloratus) and two (2) bio-acaricide formulations to manage the emerging challenge of tick resistance to available acaricides, (3) drugs botanical de-wormers for control of internal (Nematode, Cestode and Trematode worms) and external parasites in ruminants. In a related development, NARO has developed African Swine Fever (AFS) diagnostic kit prototype, a rapid and cheap on-farm detection of ASF. This is in addition to the designing of the national tick distribution map to guide tick control programs and initiatives.
3. To fight tsetse flies, NARO developed the NARO-Ngu trap which captures 106 flies per day compared to 22 flies trapped by the pyramidal trap.
4. To boost the poultry and fisheries sub-sectors, through feeds, NARO developed a green protein feed Supplement for both poultry and fish feeds. It replaces the fish ingredient in poultry diets by 16% and the farmer saves UGX 100 per KG of feed resulting into a total saving of UGX 500 per bird.
5. Over 96 various crop varieties (maize, beans, soya bean, ground nuts, cassava, sorghum, etc) have been released among which include 32 disease-resistant and nutrition enhanced varieties to ensure increased production and productivity.
6. The Ministry through the National Agriculture Research Organization also continues to explore biological responses to track and respond to emerging challenges like the Desert Locust outbreak.

Commitment #18: Ensuring that Agro Processing is done together with strict disease control.

Status

1. The Ministry recruited additional 14 Veterinary and 24 Agriculture Inspectors to beef up certification services. The Ministry is also building the capacity of the recruited extension workers on the recommended farm-based disease control practices. The Government is emphasizing the role of the farmers to appreciate that their farm-based pest and disease related decisions determine the quality of the value-added products produced and marketed.
2. MAAIF is also rehabilitating and equipping its laboratories at Entebbe, Namalere to support evidence-based decision making in disease management. This will also enhance the testing of products to ensure they meet the international regulations and standards.
3. The Ministry has put in place mechanisms for surveillance and early detection of crop pests and diseases, and through regional collaborations, the major diseases affecting crop production are being controlled. For example, Government has come up with mechanisms to control the Fall Army Worm which was a problem in 2016. Government also came up with mechanisms of controlling the banana bacterial wilt. Through research, the Ministry continues to study and come up with both biological and chemical means of tackling the major crop pests and diseases which are often caused by global climatic changes.

Commitment #19: Strengthen regulation and surveillance to ensure that the right pesticides, insecticides and acaricides are on the market

Status

1. To strengthen the regulatory function of the Ministry, the Ministry has finalized and submitted three (03) Regulations on Agricultural Chemicals (Control) Act 2006 for approval. These include;
    a. Regulation on pesticides
    b. Regulations on fertilizers
    c. Regulations on application equipment
2. The Ministry has intensified the inspection and certification of seeds, plants and plant products and agro-chemicals. In this arrangement; 26,411 ha of crop fields were inspected and certified, 266 agro input dealers and their premises approved for registration, 235,000MT of plants and plant products worth 569Million USD for export Inspected and certified, 247 seed stockists and premises Inspected, 97 chemical products approved for registration and, conducted Distinctness, Uniformity, and Stability (DUS) trials for 44 candidate varieties where 15 varieties were approved and released.

The Ministry recruited additional 14 Veterinary and 24 Agriculture Inspectors to beef up certification services. The Ministry is also building the capacity of the recruited extension workers on the recommended farm-based disease control practices.

UGX 10 billion has so far been released as a subsidy for mainly small-scale farmers to promote their interest in the agriculture risk management tool

Commitment #20: Continue with the Agricultural Finance Credit scheme operated through commercial banks with support from the Government with a view of keeping interest rates low. Furthermore, partner with some microfinance institutions to reach out to more farmers. Also, work with the insurance sector to design measures that ease insurance in agriculture in order to increase agriculture financing and sensitize farmers on this undertaking

Status

1. Government is implementing the Insurance Agriculture Scheme (UAIS) through the Ministry of Finance, Planning and Economic development, and it's a Public Private Partnership between the government of Uganda and private sector (Insurance companies). UGX 10 billion has so far been released as a subsidy for mainly small-scale farmers to promote their interest in the agriculture risk management tool. The funds are for sensitization and awareness on insurance basics, premium subsidy, data support and fostering lending to the agriculture sector by financial institutions. The uptake of agriculture insurance has increased from 3000 beneficiaries to 65,000 beneficiaries.

Commitment #21: Invest in agricultural marketing infrastructure such as storage facilities to reduce post-harvest loses including encouraging district councils to pass by-laws that discourage drying of produce on open grounds

Status

1. Government has through the Public Private Partnership Act partnered with private sector to invest in agriculture marketing infrastructure. For example, Government through MAAIF has signed an MoU with M/s Alvan Blanch from UK to create partnerships with our local investors in order to boost value addition including establishment of storage facilities especially in the area of cereals i.e. Rice, Maize etc. The objective is to establish processing facilities including driers, cleaners and sorters with storage capacity of 4,000 tonnes each in the next 5 years. This is in addition to interventions by the World Food Program and Korean International Cooperation Agency (KOICA) as mentioned above.

Commitment #22: Create a regulatory body to ensure that Good Agricultural Practices (GAP) are domesticated and complied with attain internationally acceptable standards of our products.

Status

1. In addition to interventions mentioned above intended to strengthen the regulatory, inspection and certification services, the Ministry developed the National Seed Implementation strategy 2018 and submitted to cabinet for approval.

2. Also, the Ministry developed and disseminated the Tea Strategy and guidelines for seedling production, procurement and distribution in the 22 Tea Growing Districts. The Ministry finalised the National Aflatoxin

and Mycotoxin Mitigation Action Plan, and developed the Horticulture Export promotion strategies, developed and disseminated Post-Harvest Handling Guidelines for Maize, Beans and Rice, and developed five (05) commodity Handbooks for Cassava, Rice, Beans, Coffee and Maize.

Commitment #23: Continue to establish value –addition processing factories where response from the private sector is slow

Status

1. Government is pursuing partnerships with the private sector to establish processing facilities to increase market access by our farmers, reduce imports and increase exports of value-added commodities. on-going interventions to boost industrialization include:

a. Mango processing plant for farmers in Yumbe district is on-going and Juice factory in Soroti started. Also, a Tea factory in Kabale has been initiated as mentioned earlier.

b. Six cotton wool manufacturing firms mentioned earlier,

c. The over 110 vegetable oil mills invested in the Eastern and Northern Uganda as well as the two palm oil mills in Kalangala and a palm oil refinery in Jinja by BIDCO in partnership with Government.

- Government created a conducive environment and refined the regulations governing dairy production and processing. Government further divested its former Uganda Dairy Cooperation. These efforts have increased investment in the dairy value chain and have resulted in a 53% increase in dairy processing capacity from 1.9 million litres in 2015 to 2.9 million litres in 2019.

2. In a bid to increase the quality of beef exports, the Ministry completed construction and equipping of Katonga animal holding grounds and so far, construction and equipping of animal holding ground in Kyankwanzi, NALI stands at 90%

Commitment #24: Create a regulatory body responsible for policing the lakes against illegal fishing

Status

1. The Government approved the new Fisheries and Aquaculture Policy which was to guide sustainable fishing activities on the major water bodies and also guide public and private investments in aquaculture.

2. The Ministry registered and licensed 12,274 vessels, and 26,320 fishers by the end of December 2018 on all water bodies with a view of eliminating illegal fishing activities.

3. The Ministry, strengthened enforcement of sustainable fisheries rules and regulations along the major water bodies through the Fisheries Protection Unit. As a result of these interventions, the declining trend of the quantity and value of fish and fish products has been reversed.

4. Over the past 4 years, there has been a general increase in fish stocks across all the major water bodies mainly as a result of increased enforcement on the water bodies. There has been a 43% increase in fish catch from 391,260 MT in 2016 to 561,065 MT in 2019 and in effect, resulted in the re-opening of 4 fish factories, and a

The Government approved the new Fisheries and Aquaculture Policy which was to guide sustainable fishing activities on the major water bodies and also guide public and private investments in aquaculture.

AgriLED initiative has been formed by Government to provide comprehensive production and value addition capacity in the greater Rwenzori.

50% increase in the volumes of fish exports, from 19,546 MT in 2016 to 29,263 MT in 2019. The value of fish exports has also increased by 38% from USD 164 million in 2016 to USD 227 million in 2019.

5. This was largely attributed to the strict enforcement of fisheries regulations and on-going efforts to address key challenges including poor quality fingerlings and limited access to feeds. These efforts have resulted in the re-opening of 4 fish factories - Gomba (in Jinja), Iftra (in Kampala), Marine and Agro (in Jinja) and Ngenge (Kampala), increase in the operational capacity of all fish factories from 91Mt per day in 2017 to 150 Mt per day in 2019.

6. In addition, Construction of model communal aquaculture parks in Kalangala and in Apac commenced in FY 2019/20. These are pilot model parks which if successful will be rolled out to other parts of the country, targeting women and youths.

Commitment #25: Establish seven zonal agro-processing facilities at Arua, Soroti, Luwero, Kayunga, Ntungamo, Masaka and Kasese to provide access to quick processing of agricultural products and ease marketing

Status

1. The Government of Uganda through NAADS/Operation Wealth Creation are implementing the Presidential initiative on Agro-Industrialization for Local Economic Development (AGRILED). The AgriLED strategic interventions being piloted in Rwenzori sub region and some of the on-going undertakings include establishment of the Kasese & Kabarole Industrial and Business Parks respectively. At the Kasese Industrial Park, to date the progress includes Opening of Roads, construction of water pipe network, construction of 33KV High Voltage Power Line network: while for Kabarole Industrial park, the development of the Master Plan for establishment of the Kabarole Industrial park is on-going and therefore infrastructure works will commence once the plan is in place.
2. The Government established a fruit processing facility in Soroti
3. Government provided a conducive environment for the private sector to set up the Kapeeka Industrial Park in Nakaseke District in Luwero triangle.
4. The AgriLED initiative has been formed by Government to provide comprehensive production and value addition capacity in the greater Rwenzori.

Commitment #26: Eliminate common livestock diseases like foot-and-mouth in order to promote the export of beef and other livestock products such as poultry and pork

Status

The Ministry procured one million three hundred thousand (1,300,000) dozes of assorted animal vaccines for FMD, Rabies and CBPP. The Ministry also carried out interventions for the Fall Army Worm and Banana Bacterial Wilt (BBW) in 92 districts across the country. Trials of a new acaricide (Vectorclor) to deal with resistant ticks was carried out and was 85% successful. The acaricide zoning strategy and implementation plan to manage movement of acaricides across zones after cleansing in the 27 affected districts. A proposal to produce animal vaccines is also in place.

NARO has also developed the following:

- two anti-tick vaccines to effectively control blue ear ticks (Boophilus decoloratus)
- two (2) bio-acaricide formulations to manage the emerging challenge of tick resistance to available acaricides.
- (3) drugs botanical de-wormers. for control of internal (Nematode, Cestode and Trematode worms) and external parasites in ruminants
- a national tick distribution map to guide tick control programs and initiatives.
- African Swine Fever (AFS) diagnostic kit prototype, a rapid and cheap on-farm detection of ASF.
- NARO-Ngu trap which captures 106 flies per day compared to 22 flies trapped by the pyramidal trap.
- A green protein feed Supplement for both poultry and fish feeds. It replaces the fish ingredient in poultry diets by 16% and the farmer saves UGX 100 per KG of feed resulting into a total saving of UGX 500 per bird.
- And released 32 disease-resistant and nutrition enhanced varieties to ensure increased production and productivity.

Commitment #27: Support and Strengthen cooperatives and farmer groups as vehicles to empower farmers to store, add value and collectively market farmers' produce

Status

1. the Ministry has developed a working mechanism with line ministries and agencies including Ministry of Trade, Industry and Cooperatives, in collaboration with national level farmer oriented organizations including Uganda Cooperative Alliance and Uganda National Farmers Federation in formulating strategies for strengthening farmer institutions and organizations, including farmer groups, commodity associations, platforms, federations and co-operatives to enhance the Capacity of farmers to participate and benefit from the NAADS/OWC interventions.
2. In the meantime, Government development projects and programs are building the capacity of farmers to form strong farmer groups and associations through which they will be able to aggregate demand for inputs and aggregate their produce to demand better prices.

Government development projects and programs are building the capacity of farmers to form strong farmer groups and associations

Photo: Typical scenery of the outbreak of desert locusts in Karamoja, Teso, Lango, Acholi and Eastern Uganda

CHALLENGES

The Sector is currently experiencing the following challenges:

1. Prevalent pests, vectors and diseases, notably; Fall army worm, tick resistance, Foot and Mouth Disease which constrained the sourcing and timeliness of delivery of stocking materials. For example, the prolonged quarantine in source districts for livestock due to outbreak of Foot and mouth disease led to slow progress in the distribution of livestock materials particularly dairy heifers.
2. In addition, the outbreak of desert locusts in Karamoja, Teso, Lango, Acholi and Eastern Uganda, stretched the sector in terms of technical personnel and other resources. Disease outbreaks come with all associated costs during operations which hinders performance and delivery of the institution's mandate. However, the Ministry is putting in place mitigation measures to avert the trends including intensifying research in the diseases.
3. Weak linkage between provision of agricultural inputs and provision of agricultural extension services; as the extension service in Local Governments is still constrained by low staffing in some areas and mobility to reach out to all farmers. This was partly addressed through the provision of motor vehicles and motorcycles to Districts and sub-counties.
4. Overwhelming demand for inputs against a limited budget; including supporting unforeseen strategic/ special intervention which require budget re-allocations in the course of budget implementation.
5. Inadequate capacity for supply of good quality planting and stocking/ livestock materials on the market for crop and livestock commodities. For example, some crops notably banana (tissue cultured material), Beans, and Irish potato seed leading to limited coverage of the target District Local Government
6. Changing weather patterns which affect timely distribution of planting materials sometimes resulting into wastage of planting materials and low crop survival rates, excessive rainfall in some parts of the country affecting seasonal crops especially legumes.
7. The recent outbreak of the COVID -19 Pandemic has affected farming activities due to limited movement of both the technical personnel to provide the much-needed technical advice, distribution of farm inputs and the farmers access critical farm inputs. The pandemic broke up at the beginning of the first planting season (March-May).

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DEVELOPMENT PARTNERS

As the world continues to evolve, mutual growth is vital for countries to address issues that affect populations and economic stability in the various areas of jurisdiction.

This target is embedded in the 8th Millennium Development Goal that urges nations to “Develop a global partnership for development.”

In the journey to “A Transformed Ugandan Society from a Peasant to a Modern and Prosperous Country”, the country has a synergy of partners who supplement the already established foundations by the government and private sector in areas of infrastructural development, services, Information Technology, and agriculture, among others.

Partnership for Development: Contributing to the transformation of agriculture in Uganda

The Ugandan economy is propelled by a synergy of efforts from both within the country and from elsewhere to ensure sustainability and dependable multi-sectorial development.

Development partners that have made progress in Uganda's agricultural sector include the Danish Development Agency (DANIDA), the German Development Cooperation (GIZ), USAID, FAO, the Japan International Cooperation Agency (JICA), DFID, and the European Union among others

As the Government allocates funds and invests more in the agriculture sector every financial year, research by the Ministry of Finance indicated fast growth of the economy, valuing it at $ 113.476 billion. PPP 2020 estimate. Owing to the growing investment and land under cultivation.

Agriculture, which has attracted numerous funding agencies and Non- Governmental Organizations over the years, is projected to grow at 5.9% in 2018, 6.1% in 2019, 6.5% in 2020 and even further with the growing partnership of the public sector with the private sector, as well as developed countries from around the world.

In addition to the massive investment by the government, an estimated US$1.7 billion is contributed by donor agencies and governments of development partners annually to development projects across the country.

Thus far, development partners that have made progress in Uganda's agricultural sector include the Danish Development Agency (DANIDA), the German Development Cooperation (GIZ), USAID, FAO, the Japan International Cooperation Agency (JICA), DFID, and the European Union among others whose wholesome contribution accounts for about 1/10 of Uganda's Gross National Income.

Enhancing agricultural research

The Danish Development Agency has made a landmark partnership with the Ministry of Agriculture (MAAIF) on a series of nationwide projects. Three outstanding projects include the second phase of the Agricultural Sector Programme Support (ASPS II) and the Public Sector Agricultural Support (PSAS) that were initiated in 2005 and 2010 respectively attracting an estimated DKK 300 million from DANIDA. The third one is UPSIDE, a private sector development program, which aims at creating sustainable and inclusive economic growth based on agricultural development with a total budget of DKK 605 million (EUR 88 million) for 2018-2022. The main beneficiaries are smallholder farmers and small and medium-sized enterprises within agri-business, including refugee and their host communities.

Post-conflict initiatives by the European Union

The European Union is another development partner that has made a substantial contribution to raising the prosperity for war-affected Northern Uganda through the Northern Uganda Agricultural Livelihoods Recovery Programme (AL- REP) and the Karamoja Livelihoods Programme (KALIP).

The ALREP initiative supports the enhancement of productive assets for agriculture and training farmers through the Farmer Field Schools methodology (FFS) while the Karamoja Livelihoods Programme (KALIP) aims at ensuring food security and supplementing basic incomes as well as general peace and security in areas that are being resettled.

Techniques for modernization

The Japan International Cooperation Agency (JICA) in conjunction with the Ugandan government introduced the NERICA rice variety in 2006 to supplement the incomes of the farmers and the high level of food shortage in the country with over 12,000 farmers and 1,677 non-farmers trained in the NERICA cultivation techniques and 64.3% of the trained farmers started cultivating NERICA rice.

The Japanese government worked with their Ugandan counterparts, NARO and NAADS in the implementation of the "Development Study on Poverty Eradication through Sustainable Irrigation Project in Eastern Uganda" from 2003 to 2007.

Eradicating hunger and widespread poverty

USAID embarked on global hunger and food security program, "Feed the Future initiative" that focuses on the development of three value chains; maize, coffee, and beans for host nations, including Uganda.

USAID works to transform subsistence farms into more commercial operations by increasing farmers' skills in improved production and introducing post-harvest handling while also boosting storage technologies.

USAID also goes the extra mile to train farmers, empower Youths and agriculture dealers in developing their business skills and technical capacity to increase their participation in national and regional trade. They go further to avail expertise to expand agricultural production, extension services to farmer associations, bulk marketing techniques, and nutrition counseling to communities while also focusing on creating trade linkages and making Ugandan products more competitive in national, regional, and international markets.

Funding global movements in agriculture

With over 39 years of commitment to reducing poverty in Uganda, IFAD has seen over 5 million households benefit directly from 18 projects which have financed with a sum of over US$385.7 million in loans on highly concessional terms. The projects spearheaded by IFAD have empowered poor people and improved food security in the country's rural areas.

The consequent contributions made by the Government in collaboration with development partners as highlighted are reflected in the growth status the country currently delights in and continuing in this direction, the Ugandan economy is projected to grow by 6.5 percent in real terms this financial year, 2019 - 2020.

IFAD has seen over

5 million

households benefit directly from 18 projects which have financed with a sum of over US$385.7 m

in loans on highly concessional terms.

Directory for Agric Sector

Agricultre Sector Listings

REGULATORY

MINISTRY OF AGRICULTURE ANIMAL INDUSTRY AND FISHERIES
P.O. Box 102, Entebbe
Plot 16-18, Lugard Avenue, Entebbe Uganda.
Tel: 041 4320004
Em: info@agriculture.go.ug
Web: agriculture.go.ug

AGRICULTURAL DEVELOPMENT CENTRES

AGRI-BUSINESS DEVELOPMENT CENTRE
Plot 18, Prince Charles Drive, Kololo
P.O. Box 7007, Kampala
Tel: 041-4255482/3
Fax: 041-4250360

FARM ENGINEERING INDUSTRIES LIMITED
Plot 127, 6th Street, Industrial Area
P.O. Box 27400, Kampala
Tel: 041-4340640/1, 031-2262767
Fax: 041-4340639
Mob: 0752-222926

AGRICULTURAL EQUIPMENT & IMPLEMENTS

AB Matra (U) Ltd
Plot 12/16 Entebbe Rd, Nxt to Centenary Bank
P.O. Box 35022, Kampala
Tel: 0414-348873,
Fax: 0414-348874
Mob: 0712-330501
Em: abmatra@yahoo.com, abmatra@gmail.com

AGRO CORNER
Plot 3-7 Spring Rd, (Old Port Bell Rd), Bugolobi
Mob: 0776-000700, 0705-000700
Em: agrocorner@gmail.com

AGRO WAREHOUSING LIMITED
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P.O. Box 709, Lira-Uganda.
Tel: 0750706611, 0750706612
Em: infoug@mountmerugroup.com
Web: www.mtmerugroup.com

AKAMBA (U) LTD
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Tel: 041-4340406/ 343588
Fax: 041-4340408
Mob: 0782-451310
Em: akambaultd@yahoo.com

AUTO SOKONI (U) LTD
Plot 29/29A Nkrumah Rd, Christeve House
P.O. Box 1555, Kampala
Tel: 041-4257601, 041-4257607
Mob: 0712-401352, 0752-401352, 0772-401352
Em: asul@utlonline.co.ug j-madhvani@yahoo.com

BALTON UGANDA LIMITED
Plot 47/51 Kibira Rd, Industrial Area
P.O. Box 852 Kampala
Tel: 041-4255852, 233602/7/8
Fax: 041-4255853
Em: balton@imul.com balton@balton.co.ug

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Web: www.engsol.co.ug

FARM ENGINEERING INDUSTRIES LIMITED
Plot 127, 6th Str, Industrial Area
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Fax: 041-4340639
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MUKWANO GROUP OF COMPANIES
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Tel: 0312313200

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Web: www.asps.or.ug

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Em: info@adritexug.com

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JR Complex Corner of Jinja Road and 3rd Street, Industrial area
Tel: +256414346335, +256783065273
Em: ugenquiries@dayliff.com

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Tel: 0392175835
Em: info@siracoirrigation.com

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Em: info@sprinktechug.com

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Tel: 041 4235054

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P.O. Box 7136, Kampala,
Plot 9, Lourdel Road
Tel: 041-4 347854, 041-4 347855
Em: ps@mglsd.go.ug
Web: www.mglsd.go.ug

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P.O. Box 7272, Plot 6, Lourdel Road
Tel: +256417712260
Em: info@health.go.ug
Web: www.health.go.ug

MINISTRY OF LOCAL GOVERNMENT
P.O. Box 7037, Plot 1, Pilkington Road
Em: ps@molg.go.ug
Web: www.molg.go.ug

MINISTRY OF TRADE, INDUSTRY & COOPERATIVES
P.O. Box 7103 Plot 6/8, Parliamentary Avenue
Tel: 0312 324 000/0312 324 268
Em: mintrade@mtic.go.ug
Web: www.mtic.go.ug

NATIONAL PLANNING AUTHORITY
Planning House
P.O. Box 21434, Plot 17A Clement Hill Road
Tel: +256414250229, +256-312-310730
Em: npa@npa.ug

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Plot 37, 2nd floor, UEDCL Tower
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Em: info@ugandexports.go.ug
Web: www.ugandaexports.go.ug

MAAIF AGENCIES

CONTROL OF TRYPANOSOMIASIS IN UGANDA
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Wandegeya, Kampala
Uganda
Tel: +256-414-250726
Em: admin@coctu.go.ug
Web: http://coctu.go.ug

COTTON DEVELOPMENT ORGANISATION
P.O. Box 7018, Plot 15, Clement Hill Road
Tel: 041-4230309/4232968
Fax: 256-41-4232975
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Em: cdo@africaonline.co.ug
Web: www.cdouga.org

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Plot 1 Kafu Rd, Nakasero
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Fax: +256 414-250270
Web: www.dda.go.ug

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Web: www.naads.or.ug

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Tel: +256 414 320 831
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Web: www.nagrc.go.ug

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Fax: +256-414-256994
Email: info@ugandacoffe.go.ug

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Fax: +256 417-801050
Em: info@nita.go.ug

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Plot 42-44 spring road
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Toll Free: 0800222777
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Em: ucc@ucc.co.ug

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AGRIBUSINESS DEVELOPMENT CENTRE (ADC)
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Kampala, Uganda
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