Demand Analysis Report- Republic of Uganda

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Chapter - I

AN OVERVIEW OF UGANDA

Uganda is a landlocked country in East Africa. The country is bordered by Kenya on the east, South Sudan on the north, the Democratic Republic of Congo on the west and Tanzania on the south. The country is lying mostly between latitudes4°N and 2°S (a small area is north of 4°), and longitudes 29° and 35°E.

Uganda has a tropical climate. It is generally rainy during the months of March to May and September to November, while in the remaining months, December to February and June to August, it is normally dry.

Much of the south of the country is heavily influenced by one of the world's biggest lakes, Lake Victoria, which contains many islands. Lake Kyoga is in the centre of the country and is surrounded by extensive marshy areas. Besides Lakes Victoria and Kyoga, there are Lake Albert, Lake Edward, and the smaller Lake George. Uganda lies almost completely within the Nile basin. Uganda has 60 protected areas, including ten national parks.

Since its independence from England in 1962, the political environment has been very unstable in Uganda. 1995, after a period of relative stability, the Government had restored the legal system to one based on English common law and customary law. The President of Uganda is both head of state and head of government. The president appoints a vice-president and a prime minister to aid him in governing. The parliament is formed by the National Assembly, which has 332 members. 104 of these members are nominated by interest groups, including women and the army. The remaining members are elected for five-year terms during general elections.

Uganda is divided into districts. The districts are subdivided into counties. There are now 112 districts. Each district is divided into counties, sub-counties, parishes, and villages.

The country has a significant overpopulation problem. Uganda has the fifth highest total fertility rate in the world, at 5.97 children born/woman (2014 estimates). There were about 80,000 Indians in Uganda prior to Idi Amin mandating the expulsion of the Ugandan-Asians (mostly of Indian origin) in 1972, which reduced the population to as low as 7,000. However, many Indians returned to Uganda after Amin's fall from power in 1979,

and the population is now between 15,000 and 25,000. Around 90 percent of the Ugandan Indians reside in Kampala, the capital.

Owing to the large number of communities, culture within Uganda is diverse. Many Asians (mostly from India) who were expelled during the regime of Amin have returned to Uganda.

Swahili, a widely used language throughout the African Great Lakes region, was approved as the country's second official national language in 2005, though this is somewhat politically sensitive. English was the only official language until the constitution was amended in 2005.

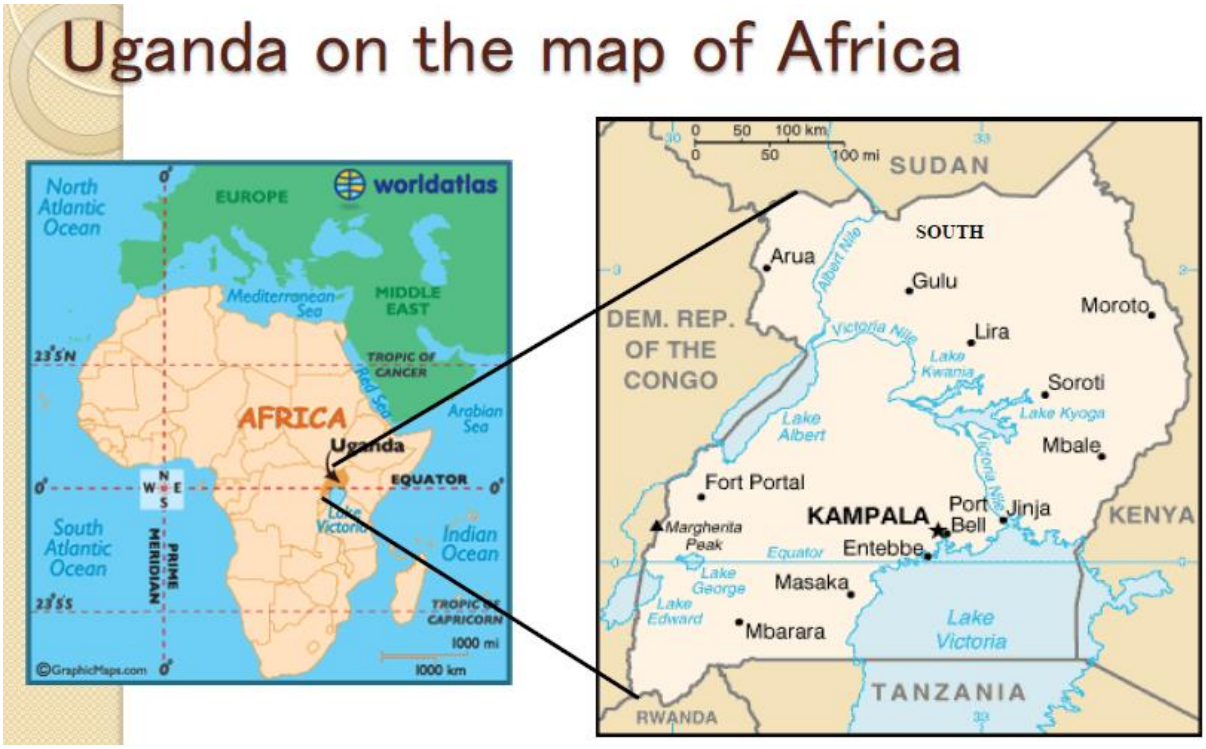
According to the census of 2002, Christians made up about 85 percent of Uganda's population. The next most reported religion of Uganda was Islam, with Muslims representing 12.1 percent of the population. The remainder of the population followed traditional religions (1.0 percent), Baha'i (0.1 percent), other non-Christian religions (0.7 percent), or had no religious affiliation (0.9 percent).

At the 2002 census, Uganda had a literacy rate of 66.8% (76.8% male and 57.7% female). Uganda has been among the rare HIV success stories. Infection rates of 30 per cent of the population in the 1980s fell to 6.4% by the end of 2008. However, there has been a spike in recent years compared to the mid-nineties. The 2006 Uganda Demographic Health Survey (UDHS) indicated that roughly 6,000 women die each year from pregnancy-related complications. In July 2012, there was Ebola outbreak in the Kibaale District of the country that killed at least 16 people. It was announced by the Health Ministry on 16 August 2013, that three people died in northern Uganda from a suspected outbreak of Congo Crimean Hemorrhagic Fever (CCHF).

Uganda is one of the poorest nations in the world. In 2012, 37.8 percent of the population lived on less than $1.25 a day. Despite making enormous progress in reducing the countrywide poverty incidence, poverty remains deep-rooted in the country's rural areas, which are home to 84 percent of Ugandans. People in rural areas of Uganda depend on farming as the main source of income and 90 per cent of all rural women work in the agricultural sector. Gender inequality is the main hindrance to reducing women's poverty. Women submit to an overall lower social status than men.

Uganda's economy generates export income from coffee ($466.6 million annually), tea ($72.1 million), fish ($136.2 million), and other products. Uganda has substantial natural resources, including fertile soils, regular rainfall, and sizeable mineral deposits of copper and cobalt. The country has largely untapped reserves of both crude oil and natural gas. While agriculture accounted for 56 percent of the economy in 1986, with coffee as its main export, it has been surpassed by the services sector, which accounted for 52 percent of GDP in 2007. In the 1950s, the British colonial regime encouraged some 500,000 subsistence farmers to join co-operatives. Economic growth has not always led to poverty reduction. Despite an average annual growth, poverty levels are increasing.

Uganda at a brief:



Location and climate

- Located in East Africa & a landlocked country
- Bordered by Sudan, Kenya, Tanzania, Rwanda and DRC.
- Altitude of 1155m above sea level
- Total land area of 241,550.7 sq km
- Temperature ranges from 16-31oC whereas rainfall ranges from 582-1690mm/year

- Relative humidity of 78- 83%

Development Indices

Total population	34.5 Million people
Average population growth rate	3.2%
Life expectancy	54.07 years
Population Under poverty (<2 USD/day)	31.1% of the total population
Per capita GDP growth rate at constant market prices	1.9%
GDP growth rate at constant market prices	5.2%
Average land holding per household	1.1ha

People

- Official language is English
- Over 30 ethnic groups with 40 different languages
- 85% live in villages. 84% are Christians
- Literacy level is 66.7%
- 8.9million people provide active labour force for Agriculture.
- 37.7% of the people live on less than 1.25 dollar/ day

Gifts of Nature

- Blessed with Bio diversity (ranked among top 10 in the world
- Wild life (game parks)
- The source of the Nile river
- Beautiful Mt Rwenzori (5110m)
- Forests (Mabira)
- Oil and Gas
- Fertile soils

Agriculture sector

- Spear headed by MAAIF
- Annual growth ranges from 0.9- 2.4 %
- NARO spear heads Agric research (19 PARIs)

- AADs, District local governments (120), NGOs and CBOs handle Agric Extension services

Contribution of Agriculture to GDP

- •Agriculture sector employs about 73% of the total population.
- •Agriculture contributes 22.8% to GDP at current market prices
- •Crops 13.1%, forestry 3.6%, fishing 2.8%, Livestock 1.7%

Major Crops

- Cash crops: Coffee, cotton, Tea, cocoa, Tobacco, Sugar cane and Flowers
- Food crops: plantain Banana, Cassava, Maize, Millet, Beans, and G.nuts.
- Rice is an upcoming crop both as a cash crop and food crop.
- Number of Rice Farmers has greatly increased from 4000 in 2004 to over 35,000 in 2007.

Major Challenges of Agriculture sector

- Lack of machinery and equipments
- Climatic change
- Lack of value addition
- Poor funding (limited research)
- Prevalence of pests and diseases
- Limited access to quality inputs
- Poor marketing

Chapter - II

AN OVERVIEW OF AGRICULTURE SECTOR, POLICIES, PROGRAMMES AND PRIORITIES OF UGANDA

AGRICULTURE SECTOR

The agricultural sector is dominant in Uganda's economy. The agricultural sector employs 82 percent of the workforce, accounts for 90 percent of export earnings, and provided 44 percent of GDP. Moreover, the farmers in Uganda's 2.5 million smallholdings and scattered large commercial farms provide the majority of their own and the rest of the country's staple food requirements. Uganda is able to rely on agriculture due to the country's excellent access to waterways, fertile soils, and its regular rainfall.

Uganda's key agricultural products can be divided into cash crops, food crops, and horticultural produce. The most important cash crops are coffee, tea, cotton, tobacco, and cocoa. Uganda is second only to Kenya as Africa's largest producer of tea. It is an exporter of unmanufactured tobacco and cocoa beans. The primary food crops, mainly for domestic consumption, include plantains, cassava, maize, millet, and sorghum. The more recent development of cultivating horticultural produce includes fresh flowers, chilies, vanilla, asparagus, and medicinal plants. The economy of northeast Uganda is dominated by pastoralism (cattle farming). Although agricultural production is apparent in some areas, this is normally a mixture known as "agro-pastoralism" (integrated cattle and crop farming).

Low levels of productivity across most enterprises, declining soil fertility coupled with low application rates of productivity enhancing inputs, high losses due to pests, vectors and diseases, over-exploitation of fish stocks, uncertain land rights leading to under- investment in agricultural land, the struggle to comply with increasingly demanding international quality standards for traded food and agricultural products, inadequate infrastructure for value addition processes including marketing, storage and distribution, inadequate access/feeder roads, multiple policy frameworks and an associated uncertain environment for investors, uncoordinated efforts among public sector implementing agencies, the poor quality of public investment in agriculture, inadequate institutional

coordination and linkages, negative consequences of climate change, degradation of the natural resource base and capacity constraints to effectively address these issues are observed to the daunting set of output-level challenges being experienced by the Ministry of Agriculture, Animal Industry and Fisheries of Uganda.

POLICIES

Recently, there have been a number of different policy frameworks operating in the agriculture sector, sometimes in parallel, and this has raised concerns with regard to issues of policy consistency and the extent to which this might affect the performance of the sector. It is useful to trace the evolution of these different paradigms.

National Development Plan (NDP) which is expected to be approved this year. Under the theme, Growth, Employment and Prosperity, the NDP will have as its objectives: (i) Increase household incomes; (ii) Enhance the quality and availability of gainful employment; (iii) Improve the stock and quality of economic and trade infrastructure; (iv) Increase access to quality social services; (v) Promote innovation and industrial competitiveness; (vi) Harness natural resources and the environment for sustainable development; and (vii) Strengthen good governance and improve human security.

Restoration of agricultural growth as an engine for employment creation, poverty reduction and industrialization are central in the NDP.

As for the agriculture sector itself, investments have, since 2000, been guided by the **Plan for Modernisation of Agriculture (PMA)** whose main objective was poverty reduction through agricultural commercialisation. The PMA was designed as a multi-sectoral approach to agricultural development.

The **Rural Development Strategy (RDS)** had three main objectives: (i) Increasing farm productivity of selected commodities; (ii) Increasing household output of selected agricultural products, and (iii) Adding value and ensuring a stable market for agricultural products (MoFPED, 2005). The actions that were proposed to achieve the objectives of RDS included: (i) Provision of support to farmer groups; (ii) Enhancing rural micro-finance service provision; (iii) Establishing a community information system (CIS); (iv) Enhancing market access for agricultural produce; (v) Facilitating delivery of agricultural inputs through market mechanisms, including produce dealer/processor credit; (vi) Enhancing

agricultural productivity through demand- driven agricultural extension; (vii) Agro-industrial development through enhanced support to research and development of agro-processing prototypes and implementing appropriate processor-producer linkages; and (viii) Enhancing quality control and assurance through support to the Uganda National Bureau of Standards.

Prosperity for All (PFA), a programme has the cardinal principle to identify and support economic enterprises that will enable households to earn daily, periodic and long-term incomes, with a target of UGX 20 million per household per year.

It is important to point out that the PFA is not introducing new programmes but rather establishing more effective supervision and coordination of existing programmes with a common vision and target.

The **National Agricultural Policy (NAP)** will be guided by six principles that are derived from the country's experiences.

1. The Government of Uganda is pursuing a private sector led and market-oriented economy. In doing this the government will work on constraints that hinder the private sector to invest more in agriculture.
2. Agricultural development that divided the country into ten agricultural production zones. Commodities that are best suited for each zone will receive extra public sector support.
3. Agricultural development services will be provided to all farmer categories as individuals or in groups, ensuring gender equity.
4. Government will continue to provide agricultural services through the decentralized system of government and will work to strengthen it.
5. Government interventions will pursue growth and equity.
6. Government will ensure that key agricultural resources including soils and water for agricultural production are sustainably used and managed to support current and future generations.

PROGRAMMES

Ongoing Programmes and Projects

Vegetable Oil Development Project - Phase 2

This project aims at increasing the domestic production of vegetable oil and its by-products, thus raising rural incomes for smallholder producers and ensuring the supply of affordable vegetable oil products to Ugandan consumers. The project is helping farmers to increase their production of crushing material (both oil palm and oilseeds) and establish commercial relations to link them directly to processors. In the course of the project, about 3,000 smallholder farmers will directly benefit from oil palm development and 136,000 households from oilseed development.

Agricultural Technology and Agribusiness Advisory Services (ATAAS) Programme

The ATAAS Programme's objective is to increase the agricultural productivity and incomes of participating households by improving the performance of agricultural research and advisory services. At the same time, it seeks to enhance environmental sustainability and resilience to climate risks and land degradation. The programme aims at promoting public-private partnerships in service delivery and agribusiness development. It also builds the organizational capacity of poor people, develops human and social assets, and supports economic activities. The Programme will continue to promote the provision of advisory services on a demand-driven basis. An estimated 20 per cent of Uganda's farmers have benefited from the advisory services provided. The Programme aims to expand outreach to 40-50 per cent of Ugandan farmers, or about 1.7 million households.

Community Agricultural Infrastructure Improvement Programme

This programme builds on the experience gained under the completed Area-Based Agricultural Modernization Programme, and aims to reduce the isolation of poor rural communities and improve their access to markets and services.

District Livelihoods Support Programme

This programme builds on the achievements of the District Development Support Programme and scales up the decentralized development approach in 13 districts that encompass a population of almost 2 million living in poverty. The target group includes landless people, small-scale farmers and fishers, and, in particular, women and youth.

Rural Finance Services Programme

This programme supports the efforts of the government and other development partners to build a strong, extensive rural finance system. The objective is to increase the capacity of the poorest rural people to save, acquire assets and invest in production and enterprises.

Following is the list of some completed programmes and projects:

- Vegetable Oil Development Project –Phase I
- National Agricultural Advisory Services Progamme
- Area-Based Agricultural Modernization Programme
- District Development Support Programme
- Cotton Sub-sector Development Project
- Smallholders' Cotton Rehabilitation Project
- Southwest Region Agricultural Rehabilitation Project
- Agricultural Development Project
- Agricultural Reconstruction Programme in Northern and Eastern Uganda

PRIORITIES

- Community Tree Growing
- Land Degradation Management
- Strengthening Meteorological Services
- Community Water and Sanitation
- Water for Production
- Drought Adaptation
- Vectors, Pests and Disease Control
- Indigenous Knowledge (IK) and Natural Resources Management
- Climate Change and Development Planning

Chapter - III

AN OVERVIEW OF HORTICULTURE, ANIMAL HUSBANDRY AND FISHERIES

HORTICULTURE

Horticulture in Uganda can contribute to economic development and poverty alleviation through foreign exchange earnings, employment opportunities, income generation and rural development. Horticulture is an important and increasingly reliable source of foreign exchange earnings and economic growth.

Horticulture industry generates a significant number of jobs in Uganda. The country's 20 floriculture farms directly employ more than 4,000 permanent staff; about 3,000 small-scale farmers grow fresh fruits and vegetables for export; and more than 20,000 smallholders grow vanilla (usually on less than 0.2 hectares). Even a larger number of smallholders are estimated to be involved in production of fruits and vegetables for the domestic and regional markets. This sector provides opportunities and careers for agricultural graduates and diploma holders.

The potentials of the horticultural sector to significantly contribute to poverty alleviation through income generation activities in both rural and urban areas are considered to be very high. Horticultural production contributes to rural development in terms of: wages to the rural and urban economies, provision of jobs, incomes, and public services, widening of the tax base, and human resource development through training, researchers, technicians and supervisors.

Small-scale farmers in many parts of the country can produce vanilla, cocoa,and papain, and their potential as cash crops to supplement coffee has been largely untapped. Further, small-scale growers in remote areas have a comparative advantage in vanilla over large-scale commercial farms. The horticulture sector in Uganda has great potential in the following areas: There is significant growth potential for export of Ugandan horticulture. There is significant growth potential for exports of Ugandan floriculture. Uganda has distinct competitive advantages over other African and Southern hemisphere countries for certain types of roses, gerbera, foliage, tropical flowers, and chrysanthemum plant cuttings.

There is great growth potential for exports of vanilla from Uganda. Vanilla is the highest value crop ever grown in Uganda. There is great potential for increasing regional exports of horticultural products from Uganda into neighbouring countries of Kenya, Sudan, DRC, Tanzania, and Rwanda.

Although processing of fruits and vegetables is almost non-existent in Uganda, there is good long-term potential for it. Small market niches exist for solar-dried banana, pineapple, mango, papaya, and chili as well as passion fruit juice and concentrate. Because of Uganda's dependence on airfreight for extra-regional horticultural exports, the sector is restricted to very high value products that can support the cost of airfreight.

The industry has great potential in the organic niche market, given Uganda's predominantly organic production that has evolved rather by default due to lack of agricultural inputs.

Although diversification and identification of new products is useful, in the short term Uganda should focus on achieving maximum growth of existing products. Importance are given for the development, multiplication and dissemination of high yielding varieties of horticultural crops and production of seeds and planting materials. There are few institutional or legal barriers to the main markets for Ugandan products.

There are no serious market constraints facing these horticultural crops, except the need for continuity and quality of product. The challenges are: Like most agricultural sub-sectors, horticulture is affected by several constraints that have limited optimal and efficient utilisation of resources including those within reach of the smallholder farmers. The main constraints are highlighted below:

- Lack of improved varieties
- Land preparation is generally done using manual tools like the hoe and occasionally with oxen and as such not deep enough to allow good root development
- Limited use of recommended technologies/inputs
- Poor post-harvest management/Quality Control
- The impact of extension services on production of horticultural crops is not visible.
- Limited access to information
- Poor Infrastructure

- Lack of Finance/credit
- Lack of Expertise/Technical skills
- Lack of private sector investment
- Limited research in horticultural sector

ANIMAL HUSBANDRY

The livestock sub-sector contributes 7.5% of GDP and 17% of agricultural GDP. The livestock sub-sector and most livestock farmers in Uganda have suffered huge stock losses over the years from civil unrest and instability, theft and cattle rustling.

Most of the livestock population is concentrated in 29 Districts in Uganda and contain 40% of the population, 55% and 42% of the indigenous and exotic cattle, respectively, 42% of sheep and goats, 36% of the pigs and 38% of the poultry flock.

The employment patterns are gendered, with women being the majority providers of labour. Many women own and raise free-range chickens, goats and a few pigs, while men mostly own and raise cattle. The pastoral system, agro-pastoral system, settled mixed crop-livestock system, ranching, commercially oriented intensive system and non-ruminant system are the various types of livestock systems that existed in Uganda`

Shortage of livestock numbers and low livestock productivity, endemic diseases, inadequate feeding, scarcity of water for livestock, inadequate infrastructure for livestock markets, abattoirs, and dip tanks and poor livestock market information network are the various constraints of animal husbandry sector in Uganda.

Major Livestock types

Animal type	**Year**		
	2008	**2009**	**2010**
Cattle	11,409,000	11,751,000	12,104,000
Sheep	3,413,000	3,516,000	3,621,000
Goats	12,450,000	12,823,000	13,208,000
Pigs	3,184,000	3,280,000	3,378,000
Chicken	37,444,000	38,557,000	39,714,000

78% of poultry are indigenous chicken

Abundant pasture and indigenous animal breeds, enormous lands available for grazing, huge water source, an ideal tropical climate, fertile soils, sufficient agro-industrial by-products exist for supplementary feeding in the dry season, farmers quite knowledgeable in animal husbandry are considered to be the potential areas of animal husbandry in Uganda. The country's natural environment provided good grazing for cattle, sheep, and goats, with indigenous breeds dominating most livestock in Uganda.

Uganda's dairy farmers have worked to achieve self-sufficiency in the industry but have been hampered by a number of problems. Low producer prices for milk, high costs for animal medicines, and transportation problems were especially severe obstacles to dairy development. Uganda had ample grazing area and an unrealized capacity for dairy development.

Goat farming also contributed to local consumption. The poultry industry was growing rapidly. The major constraint to expanding poultry production was the lack of quality feeds.

FISHERIES

Uganda produces up to 15 000 tonnes of fish from aquaculture, including production from small-scale fish farmers, emerging commercial fish farmers and stocked community water reservoirs and minor lakes. There are an estimated 20 000 ponds throughout the country with an average surface area of 500 m² per pond. Production ranges between 1 500 kg per hectare per year for subsistence farmers to 15 000 kg per hectare per year for emerging commercial fish farmers. With improved market prices for fish, government intervention for increased production and stagnating supply from capture fisheries, aquaculture has begun to attract entrepreneurial farmers seeking to exploit the business opportunity provided by the prevailing demand for fish.

This recent expansion in aquaculture has also resulted in the transformation of 20 percent to 30 percent of the smallholder subsistence ponds into profitable small-scale production units through developments in management as well as scale of production. It is estimated that there are 2 000 such farmers who own nearly 5000 ponds, with an average pond size of 1 500 m² per pond.

The new entrants, mostly from the middle and working class as well as a few businessmen, target specific and established markets. They have adopted improved production systems including inputs from technical experts for better planning and management. Pond surface is in the range of 5 000 m² to 50 000 m² numbering 500, an estimated 20 percent to 30 percent of which are active. This category includes commercial hatchery operators and a number of grow-out farmers. Most farms/companies at this level are only in the process of putting their infrastructure in place or are at the initial stages of the production process. The majority of such companies are targeting production at the regional markets and plans to enter international markets by activating the currently non-utilized fish processing capacity in the country.

About 20 percent of Uganda's surface area is water and catch fisheries is one of the country's key industries. The sector is estimated to employ about 250,000 people directly (with the processing sector about 5,000). Fishing activity is artisanal and based on traditional small vessels and canoes.

There are several issues that need to be considered:

- In addition to the formal market channels, fishes are exported 'informally', much of it illegally, to the neighbouring countries of the Democratic Republic of Congo, Sudan, Kenya and Rwanda, which is 14 percent of all informally traded goods from Uganda.
- The number of people depending on the sector increased from 700,000 to over 1.2 million people.
- While catches from Lake Victoria are dwindling fast, the situation for the other lakes is even worse.
- Fish processing factories have closed and are threatened with closure.
- Inadequate knowledge on the status of fish stocks in all water bodies on the basis of which to establish sustainable levels of fishing;
- Loss of biodiversity;
- Inadequate facilities for seed multiplication and artificial propagation for restocking and stock enhancement;

- Breeding and nursery grounds are not identified, mapped and gazetted;
- Inadequate capacity of fisheries management;
- The resurgence of water hyacinth and the emergence of new weeds;
- Lack of species-specific management plans;
- Prevalence of HIV/AIDS in the fishing communities;
- Inadequate mechanisms for fishing communities to save and invest;
- Lack of clear understanding on the economics of fisheries development; and
- Lack of feeds to sustain the real opportunities in aquaculture.

To reverse the declining fortunes of the industry, Government will focus on strengthening controls of illegal fishing, promoting and supporting aquaculture and cage farming and stocking of small water bodies including dams. Emphasis will also be placed on ensuring fish quality at all levels.

Chapter - IV

PRESENT STATUS AND CHALLENGES IN AGRICULTURAL EXTENSION, MARKETING, INSURANCE, AGRICULTURE MECHANIZATION, FOOD PROCESSING AND INFRASTRUCTURE IN UGANDA

AGRICULTURAL EXTENSION

Agricultural extension in Uganda has undergone a number of transformations. There have been marked changes in the concept of agricultural extension itself, which is increasingly seen in terms of commercial or farming for market with emphasis on "modernization" of agriculture as opposed to family farming, which produces most of the food consumed in Uganda. The dilemma is that the majority of the Ugandan farming community is predominately focused on subsistence and thus may not be suited farmer owned contract extension systems favoured by today's global agri-business.

Agricultural extension services are under constant pressure to be responsive to ever-growing challenges of, and to show impact in, food production. The pressure is giving rise to calls for changes in the traditional public extension systems which are now seen as outdated, top-down, paternalistic, inflexible, subject to bureaucratic inefficiencies and therefore less able to cope with the dynamic demands of modern day agriculture.

There are even calls for re-examining the term 'extension' as it is seems to reinforce the thinking in terms of downward technology development and transfer (dissemination) processes.

In sub-Saharan African countries, the pressure to change has been exacerbated by the consequences of economic structural adjustment programmes which were implemented in the late 1980s and early 1990s and which rendered the traditional extension systems inappropriate.

Concerned with sources of agricultural growth for the future, the Uganda government has developed a new plan based upon two strategic pillars—raising overall agricultural yields and productivity and diversifying smallholder production patterns into a mix of higher value, export oriented commodities, along with lower value food staples.

Developed by a broad constituency of stakeholders— officials and politicians, farmers, NGOs, civil society, and the community of donors— the new plan places a high priority on agricultural research and extension and especially on improving the process of technology generation and transfer through the decentralisation of activities, greater participation of potential users, and improved utilisation of knowledge found in local communities.

Major reforms of agricultural extension are planned under National Agricultural Advisory Services (NAADS). These include further decentralisation of extension responsibilities, from the district to the sub-county level; contracting extension services from a range of providers; involving farmers in programme planning, evaluation, and decisions about extension providers; establishing cost sharing between national and local governments and farmers; and the creation of more effective operational links between farmers, markets, extension workers, and agricultural researchers.

The Ministry of Agriculture, Animal Industries and Fisheries (MAAIF) will ensure that NAADS operates within well-defined policy guidelines and a regulatory framework. The NAADS Secretariat will help districts and sub-counties develop the capacity to participate in the programme. Farmers (through farmers' forums) together with sub-county administrations will manage the processes of planning, financing and contracting the service providers.

The new approach in Uganda stands in contrast to past extension programmes in a number of ways. It moves away from monolithic and civil service heavy structures by explicitly encouraging plurality in extension providers and methodologies. Perhaps most importantly, the NAADS design is an attempt to make extension advisory services much more directly responsive to farmers' self-identified needs.

The original concept of extension was that of bridging the gap between the farmers and the sources of information or knowledge. Such sources included organisations or institutions generating knowledge and technologies such as research centres, universities and government administration agencies. This was based called traditional model;

Research → Extension → Farmer

The informal type of education is one that has no syllabus. Its syllabus is the farmers' problems and needs. It also has no classroom, since its classroom is the farmer's home or farm. The teaching of the extension worker to the farmers is based on the farmers' conditions and setting. The non-formal type of extension education on the other hand is planned, has written objectives and content, can be examined but in most cases it is not.

MARKETING

Uganda has three tiers of agricultural markets: rural trade centers, medium-sized town centers, and large urban markets located primarily in Kampala. One myth people like to tell about Ugandan farmers is that they don't produce enough food—enough to feed their families, or to sell at market and improve their quality of life.

Kudu is a cell-phone-based auction market for agricultural trade in developing countries that has been piloted in Uganda since January 2013. Kudu started as an effort to design a system that would reduce inefficiencies in the Ugandan agricultural market. It showed huge differences between produce prices in rural and urban areas, differences that were too high to account for transport costs between these locations. High returns on investment for farmers and traders who stored produce during harvest periods (periods of plenty) and then sold during planting seasons (seasons of scarcity).

In an efficient market, timing and location alone would not offer such large opportunities for profit. It shows that a small group of people has been able to take advantage of an inefficient system: if more people knew it was so profitable then more people would do exactly that, helping to drive prices up in the rural areas, and down in the city. More buyers would compete for the available produce, and farmers could make more money. Agricultural trade in Uganda and most sub-saharan countries has changed very little since the early 1900s.

Agricultural trade typically starts with small scale farmers carrying their produce on their heads or using bicycles. Bulk transporters also have known stopping points in rural areas where they pick up produce for delivery to markets mostly in urban areas.

But the current system is troublesome for buyers too. The sellers (farmers) are usually uncertain of when the traders will come and how much they will be willing to pay. Traders, on the other hand, are usually uncertain of what produce is available, and how

much of it is up for sale. Most of the challenges in the current market environment arise from information aggregation failures. Because farmers are uncertain of selling their produce at all, they typically do not have any incentives to collaborate and sell as teams. Instead, farmers aggressively compete for the few buyers who show up at their farms, reasoning that their best chance of selling produce is to sell it before their neighbors do.

Nakasero market (A retail market for agricultural produce in Kampala) : All this chaos has a significant negative impact on the growth of agriculture and the trade in the country. A farmer that fails to realize profits from his/her produce will not be motivated to increase productivity and quality. The traders are also more inclined to pay as low a price as possible to offset uncertainty about produce quality and availability. If a trader has to drive along several different routes to buy as much produce as he requires, then he will try to push down the purchasing price as low as possible to compensate for transportation costs.

Kudu provides an SMS-based auction market for farmers to send their Asks and for Buyers to send their Bids. The SMS interface is available in English and two local languages (Luganda and Luo).

If a buyer submits a bid with a price below the farmer's ask price, then no match takes place. As such, Kudu creates incentives for farmers who wants to sell quickly to submit a low asking price, and for buyers who are in a hurry to bid high in order to increase their chances of completing a trade. Our clearing algorithm also periodically matches buyers and sellers with each other and with details of the offer presented to accept or reject. Buyers can search across multiple districts, and use a web interface to view multiple matches at once on a large screen.

Most rural farmers have access to mobile phones and can effectively use them for basic communication of voice and SMS. It seems that most small scale farmers have access to mobile phones and have the ability to use basic functions for voice and text. The market currently has 1024 buyers and sellers. It has been amazing to see the size of asks that come from rural areas often presumed to be low on resources.

INSURANCE

According to USAID's recently released "Guide to the Use of Digital Financial Services in Agriculture," there are an estimated 1.5 billion smallholder farmers worldwide producing approximately 80 percent of the global food supply, who together face an estimated $430 billion shortfall in critical financial services that are needed to support production.

In Uganda, where smallholder farmers are responsible for 70 percent of total agricultural production, the Feed the Future Uganda Commodity Production and Marketing Activity (CPM) is promoting access to financial services like crop insurance in an innovative way: by using ICT to create market linkages among stakeholders in the coffee, maize, and beans value chains. In addition to the primary benefits of protecting the financial security of smallholder farmers from the consequences of pests, disease, climate change, and other unpredictable weather events, crop insurance is also increasingly recognized as a means to incentivize financial institutions to extend credit to smallholder farmers by reducing the risk of loan default in the event of catastrophic production losses, since insurance companies will typically insure up to 80 percent of the expected crop value in a given harvest season in exchange for a 5 percent premium, based on CPM's recent experience working with local insurance providers.

Crop insurance is therefore one of the critical linchpins in the financial ecosystem to ensure smallholder farmers in Uganda can secure financing to cover the cost of inputs, agricultural equipment, and postharvest handling services. Kyazanga farmers would have had no recourse when their crops later sustained heavy damage from floods. Fortunately, the farmers were able to recoup up to 70 percent of lost production value through the insurance policy, mitigating the impact of the disaster and making them more financially resilient in the face of hardship. The challenge is that these benefits are not widely known among smallholder farmers, and even for those who are aware of the benefits, the cost of the insurance premium is often a barrier.

AGRICULTURE MECHANIZATION

Mechanised agriculture is the process of using agricultural machinery to simplify farming with the aim of increasing productivity. Though Uganda is endowed with fertile soils and favourable climate, the major factors that influence agriculture, the country continued to produce at a law scale. 99.4% smallholder farmers in Uganda use traditional, rudimentary and obsolete technologies and methodologies for post-harvest operations. These are contributing factors to low farm output. To change this, the Government came up with agriculture mechanisation as a strategy of restructuring the sector. Efforts were put in place, which has seen farmers change their ways of farming, mechanisation has become one of the key pillars of agricultural transformation and modernisation. The efforts directed into the occupation of cost-effective farm tools and the Government has tried to integrate majority Ugandans who represented over 70% of the country's labour force.

Besides improving production efficiency, mechanisation encourages large-scale production and improves the quality of farm produce. A lot is needed to ensure that mechanisation is promoted at a large scale. The Government needs to strengthen the current mechanisation policy; commit funds for the farmers and private sector to acquire farm machinery and equipment. There is also need to promote local manufacture of farm tools and equipment for post harvest handling and creating Government-managed central and regional workshops to provide technical back-stopping and critical maintenance services.

The Government has tried to put all these in place. But since the system is new in Uganda, it takes time for the common people to adapt to it. Mechanised operations are largely limited to land preparation; 8% utilise draught animal power and 2% use tractors. The Government has come up with many programmes that have helped farmers in Uganda. Farmers have been provided with equipment and quality seeds, which has helped them grow on large scale. Farmers are also educated on better and modern methods of farming. Farmers are also advised to collect money to buy one tractor that can be shared with in the group. This is important because farmers, even those who cannot afford to hire all the time can get the services since they are group members.

This would save farmers from risking their plots of land and other properties as security for bank loans, which have high interests. Also, the Government introduced cost-

friendly irrigation pumps that have helped many farmers in dry areas to access water using cheap and small pumps.

However, despite the efforts made, many challenges still hinder agricultural mechanisation. The majority of farmers have minimal access to information on the availability of affordable equipment, which can enable them improve on their outputs. Mechanisation focuses on production (land opening) without addressing the complete value chain to markets, which is a disincentive to mechanised farming. On the other hand, it displaces unskilled farm labour, causes environmental pollution, deforestation and erosion. Other challenges include limited access to financial services for farmers and in-adequate knowledge base of farmers in mechanised farming. Mechanised agriculture has the following benefits:

- Enhance labour use and efficiency
- Provide greater precision in farm operations
- Reduce agricultural losses
- Contribute to value- addition to products with processing and packaging

FOOD PROCESSING

The agro-industrial sub-sector in Uganda consists of two broad categories, namely food processing and industries producing other agro-based products. The food processing industries mainly include the production of maize flour, vegetable oils, meat and dairy products, coffee and fish. In addition, Uganda produces and processes large quantities and varieties of fruits, including pineapples, mangoes, passion fruit, and tomatoes. Fishery is also a thriving activity and fish processing into fillet and other fish meat are produced for the domestic, regional, and international markets. Finally there is the beverages and tobacco industrial sub-sector. The industries producing other agro-based products include textiles, garments, leather products, and footwear although these sub-sectors have been shrinking in size in recent years.

Production in the food-processing sub-sector has been increasing since the year 2000, although declines in production were registered in early 2003 and mid 2004. However, the sub-sector grew by about 88 percent in 2003. The main food processing units

are those producing coffee, tea, fish, vanilla, maize, meat and meat products, dairy products, vegetable oils, etc.

Uganda produces large quantities of a variety of fruits and vegetables, including pineapples, mangoes, passion fruit, maize, beans, tomatoes, etc. Fishery is also a huge industry and fish processing into fillet and other fish meat are produced on large scale. Production in the food-processing sub-sector increased since the year 2000, although declines in production were registered in early 2003 and mid 2004. However, the sub-sector grew by about 88 percent in 2003.

The country produces over 500 million tones of agricultural, horticultural and dairy produce annually, thus making it one of the world's largest food producers. However, the country‘s food processing industry is in a nascent stage. Only around 2% of fruits and vegetables are processed, and the figure stands at 15 % for milk, 26% for marine, 6% for poultry and 20% for buffalo meat, as against 60-70% of the overall food production in developed countries. Milk and milk products contribute to nearly 17% of the country‘s total expenditure on food.

INFRASTRUCTURE

Infrastructure is actually the most important constraint to agricultural commercialization in Uganda, and infrastructure investments are required not only to connect spaces to overcome density problems but also to solve basic profitability issues of farmers and agribusinesses. For example, to increase the relative profitability of cotton in Uganda the government priority should be to invest especially on infrastructure.

The competitiveness of Ugandan floriculture was eroded by attractive incentives and rapid expansion in other countries, on the one hand and the poor infrastructure in Uganda, on the other. Basic infrastructure, including roads, airfreight, electricity hookups, and water availability, proved to be binding constraint and the initiatives were short-lived. The high infrastructure costs in Uganda negatively affect its floriculture exports.

The access to transport infrastructure has a significant positive effect (2.5 percent) on output commercialization and it also increases diversification (or reduce specialization). The access to transport infrastructure and the distance to the market, two infrastructure-

proxy variables are more important for agricultural commercialization than the size of the urban markets in Uganda.

Inadequate infrastructure, especially transport and energy, and weak human development are Uganda's binding constraints for growth, agricultural commercialization, and economic transformation. The public expenditure for agriculture, infrastructure and human development (education and health) is projected to increase from 51 percent of total expenditure in 2007/08 to 71 percent in 2014/15. The sharp increases in expenditure are especially projected for construction of roads and energy development, which will benefit agriculture and agro-processing in Uganda.

Infrastructure and communication lag behind the rest of the country, contributing to very high transaction costs, while the private distribution mechanisms for agricultural inputs and the systems for value addition and agricultural processing are less developed.

Infrastructure bottlenecks are actually the most important constraints for agricultural commercialization in Uganda. Roads are being built to connect administrative centers rather than connect areas with high agricultural potential with consumers, including across the border. Maintenance allocations are not even and are not related to agricultural potential. In most cases, farmers pay too much for inputs and receive too little for their outputs. Traders pay high transport prices to collect few bags from too many farmers to achieve profitable loads, and agro-processors are taxed by high costs of electricity and poor roads. All these costs make farm profits too low to attract investments in agriculture. Thus, infrastructure investments in Uganda are required not only to connect spaces to overcome density problems but also to solve basic profitability issues of farmers and agribusinesses.

Chapter - V

STATUS OF AGRICULTURAL EXTENSION AND RESEARCH SYSTEM

AGRICULTURAL EXTENSION

Great strides have been made in the recovery of Ugandan agriculture over the past 15 years, driven largely by expansion in cultivated areas and liberalisation of the economy. The country has regained its position as the largest coffee producer on the continent, the tea industry has been revitalised, a small export-oriented horticulture industry is emerging, and maize exports to Kenya continue to grow.

Concerned with sources of agricultural growth for the future, the government has developed a new plan based upon two strategic pillars—raising overall agricultural yields and productivity and diversifying smallholder production patterns into a mix of higher-value, export-oriented commodities, along with lower-value food staples.

Developed by a broad constituency of stakeholders—officials and politicians, farmers, NGOs, civil society, and the community of donors—the new plan places a high priority on agricultural research and extension, and especially on improving the process of technology generation and transfer through the decentralisation of activities, greater participation of potential users, and improved utilisation of knowledge found in local communities.

The NAADS programme (National Agricultural Advisory Services) Programme is designed to make extension advisory services more responsive to farmers' needs. A central component in this strategy is the new National Agricultural Advisory Services Programme (NAADS), launched in early 2001. The first phase will run for seven years, with an estimated cost of US$107 million.

The World Bank (IDA) and the International Fund for Agricultural Development (IFAD) will finance $62.5 million and ten other donors will finance $28.5 million, with the government (national, district and sub-country levels) and farmers financing roughly $16 million. The programme is to be implemented by a newly created NAADS Secretariat.

Decentralization

Major reforms of agricultural extension are planned under NAADS. These include further decentralisation of extension responsibilities, from the district to the sub-county level; contracting extension services from a range of providers; involving farmers in programme planning, evaluation, and decisions about extension providers; establishing cost-sharing between national and local governments and farmers; and the creation of more effective operational links between farmers, markets, extension workers, and agricultural researchers.

Approximately 65 percent of the NAADS resources will finance the contracting of extension services. Opportunities will be created for a range of players (including private sector, the National Agricultural Research Organisation (NARO), universities and technical training institutes, NGOs, and farmer associations) to bid for providing such services.

The Ministry of Agriculture, Animal Industries and Fisheries (MAAIF) will ensure that NAADS operates within well-defined policy guidelines and a regulatory framework. The NAADS Secretariat will help districts and sub-counties develop the capacity to participate in the programme.

Farmers (through farmers' forums) together with sub-county administrations will manage the processes of planning, financing and contracting the service providers. The new approach in Uganda stands in sharp contrast to past extension programmes in a number of ways. It moves away from monolithic and civil service heavy structures by explicitly encouraging plurality in extension providers and methodology.

Perhaps most importantly, the NAADS design is an attempt to make extension advisory services much more directly responsive to farmers' self-identified needs.

Private sector role

NAADS is one component of a broader strategy (the Plan for the Modernisation of Agriculture—or the PMA) by the Ugandan government to stimulate development in the agricultural and rural economy. A policy and regulatory environment is being designed to encourage development of private sector marketing and distribution chains for modern inputs (including credit, fertiliser, seeds and equipment) and for farm products.

Complementary investments have already been made to give free universal primary education. More specific measures are planned to improve rural and agricultural education. The landmark legislation provides for more secure property rights to land for men and women. Finally the government is reinforcing its commitment to improve rural infrastructure—especially roads, transport, potable water, and electricity systems.

Status of Agricultural Extension activities in Uganda

"Feed the Future" in Uganda focuses its work on three value chains: coffee, maize, and beans. The Feed the Future ZoI covers 38 districts with 34% of farming households and 48% of children ages 0-5. Key objectives include increased agricultural productivity and market access, improved nutritional status, and integration of nutrition and agriculture at the household level. Climate change adaptation and public-private collaboration are overarching themes.

There are currently eight Feed the Future activities, with one more under procurement. Half of these include a strong emphasis on nutrition, distinguishing USAID/Uganda as a worldwide leader in establishing linkages between health, agriculture, and nutrition. In addition to increasing yields, programs seek to improve the numbers of children receiving the minimally acceptable diet, reduce stunting, and promote the production and consumption of biofortified crops. Feed the Future also supports the production and distribution of Ready to Use Therapeutic Foods (RUTF) for nutrition rehabilitation and PLWAs and promotes the use of indigenous ingredients.

The Ministry of Agriculture and Livestock in Uganda is in the process of significantly recasting and re-staffing its extension services branch, and Feed the Future activities are not linked into the public extension service at this time. As is the case with other Feed the Future programs in East Africa, much of the Mission-supported EAS activity flows through USAID funded contractors and grantees. Extension services are also provided through other donor organizations. These include the World Food Program's (WFP) Purchase for Progress (P4P), DANIDA (the Danish government's foreign assistance agency), and the US PeaceCorps. USAID Food for Peace supports extension in Uganda through its PL 480 Title II activity, which combines a comprehensive health and nutrition education with small-scale agricultural extension services. This "Community Connector"

activity has been recognized as a Feed the Future model program on integration of agriculture and nutrition.

The MEAS portfolio in Uganda consists of two activities, both funded from MEAS' core budget: an evaluation of Farmer to Farmer (F2F) videos completed in July 2013 and an ongoing evaluation of the Grameen Foundation's cellular technology-based Community Knowledge Worker (CKW) program. The total cost of these activities, borne from the MEAS core budget, is approximately $164,000.

The Grameen Foundation activity, which began in 2009, aims to reach the "last kilometer" (i.e. most marginalized) farmers. CKWs are selected by their peers to participate in a six-week comprehensive training session where they receive basic information on the agronometrics of crop and livestock production, methods to educate other farmers to facilitate new technology uptake, how to connect farmers with service and input providers, how to advise to farmers on market and weather conditions, and rapid response troubleshooting. Grameen initially identified several critical barriers to the success of using cellular technologies as extension tools:

- Although the penetration of cellular phones throughout many rural communities is generally high, it is neither complete nor reliable;
- The delivery of information without providing farmers an informed dialogue with a trained extension agent is often ineffective;
- Literacy rates within the most disadvantaged communities are low, creating barriers to accessing, understanding, and applying information in isolation;
- Farmers need real time responses as problems occur and cannot wait for the next rotation of an infrequently appearing extension agent.

CKWs are given a smart phone which from which they can access databases, managed by Grameen, with relevant and timely information. The use of the CKW as a go-between addresses many of the problems that the Foundation identifies as barriers to serving the poorest and most remote farming communities in Uganda and elsewhere. Over time, and based on experience, the CKWs have narrowed their focus to specific value chains, primarily coffee, dairy, bananas, and maize. Their target audience is now approximately fifty fellow producers each. Under this new model, Grameen estimates that they are able to

reach into the “last kilometer” villages at a cost of up to fifteen times less than the relatively more expensive face-to-face farmer field schools run by other NGOs and donor-funded extension providers. To address sustainability as grant funding support ends, Grameen has trained the CKWs as data collectors and enumerators for other studies and projects. Revenues generated from these exercises now support 57% of the recurrent cost of the project.

In 2012, the Foundation invited MEAS to conduct an impact assessment of the CKW. To date, MEAS has established the baseline consisting of 1,200 farmers in twelve different areas comprising 100 dairy hubs, and collected four rounds of data, providing a valuable information resource.

Mud on Their Legs: Evaluating Farmer-to-Farmer Videos in Uganda: In 2011, 7,500 copies of the video series “Rice Advice” were translated into five Ugandan local languages under a small grant from the UK-supported Kilimo Trust.23 These were subsequently distributed to 18 different organizations, including the national agricultural research stations, the WFP, the FAO, farmers’ associations, private sector input vendors, and several NGOs for showing to farmers around the country.

In November 2012, a MEAS team undertook an assessment of the impact of these videos. They found, to their surprise, that a majority of the farmers interviewed, based only on watching the video, had increased their yields and applied new natural resource management practices. Further, farmers indicated that they actually enjoyed seeing fellow farmers from other countries who were facing similar challenges.

Principal findings:

- Farmers learned from the video and were able to put the new information into practice;
- Ugandan farmers related to farmers in the videos because they were smallholders who were also producing under similar non-mechanized conditions;
- Translation into local languages proved to be most important for women producers who had not benefited from learning English in school;
- More research is needed on the best settings in which to show the videos;

- The inclusion of value chain actors, such as millers and input vendors, helped to widen distribution.
- Most importantly, the evaluation dispels some of the conventional wisdom about video and extension, which may be helpful as the use of ICTs expands as an extension tool.

AGRICULTURAL RESEARCH SYSTEM

The National Agricultural Research Organisation (NARO) is the apex body for guidance and coordination of all agricultural research activities in the national agricultural research system in Uganda. NARO is a Public Institution established by an act of Parliament, which was enacted on 21st November 2005.

NARO is a body corporate with perpetual succession and a common seal. NARO comprises of the council as its governing body, committees of the council as its specialised organs, a secretariat for its day-to-day operations with the semi-autonomous public agricultural research institutes under its policy guidance.

The mandate, vision, the mission, the goal and the values that guide the National Agricultural Research Organisation are derived from the Plan for Modernisation of Agriculture (PMA). NARO's mandate is “coordinating, overseeing and guiding agricultural research in Uganda”. NARO Vision is “a market responsive, client oriented and demand driven national agricultural research system”. NARO mission is “to generate and disseminate appropriate, safe and cost effective technologies”. NARO goal is “to enhance the contribution of agricultural research to sustainable agricultural productivity, sustained competitiveness, economic growth, food security and poverty eradication and NARO's core values are inclusivity, transparency, integrity, accountability and excellence.

The National Agricultural Research ACT, 2005 provides for the development of an agricultural research system for Uganda, hereby referred to as the National Agricultural Research System (NARS), for the purpose of improving agricultural research services delivery, financing and management. The NARS means a cross section of stakeholders whether in public or private sector; and comprises of the organisation, public agricultural research institutes, universities and other tertiary institutions, farmer groups, civil society

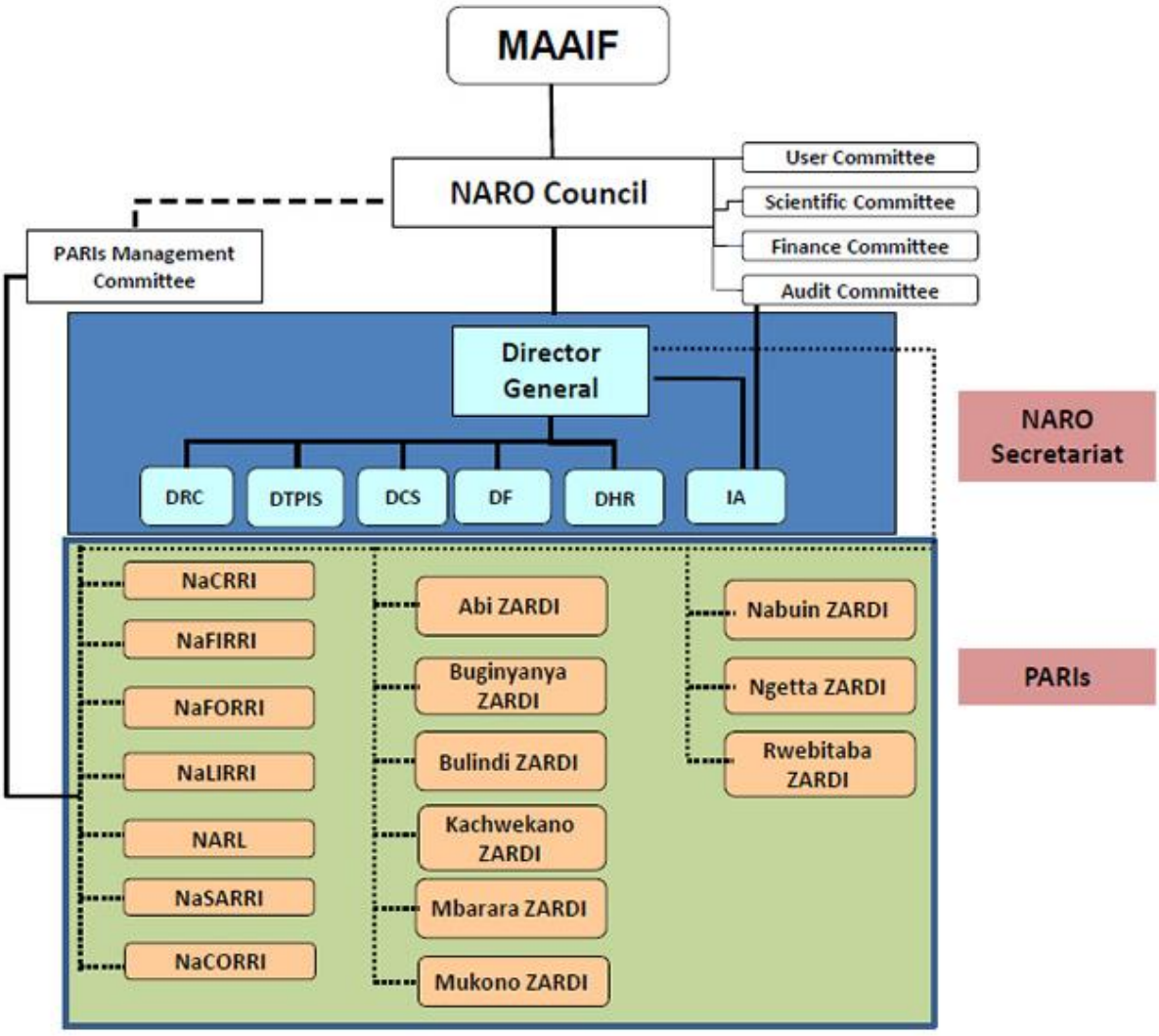
organisation, private sector and any other entity engaged in the provision of agricultural research services.

The NARS institutional framework encompass Public as well as Private sector institutions in implementing agricultural research, and promoting vertical and horizontal linkages with other national, regional and international institutions.

The National Agricultural Research Organisation comprises of the Council as its governing body, committees of the council as its specialized organs, a secretariat for its day-to-day operations, with the fifteen (15) semi-autonomous public agricultural research institutes under policy guidance of the secretariat. The Research capacity and reputations of the Public Agricultural Research institutes has been built over several decades, Since 1898.

A) In the governance of NARO, the Council is responsible for carrying-out the following

NARO governance structure

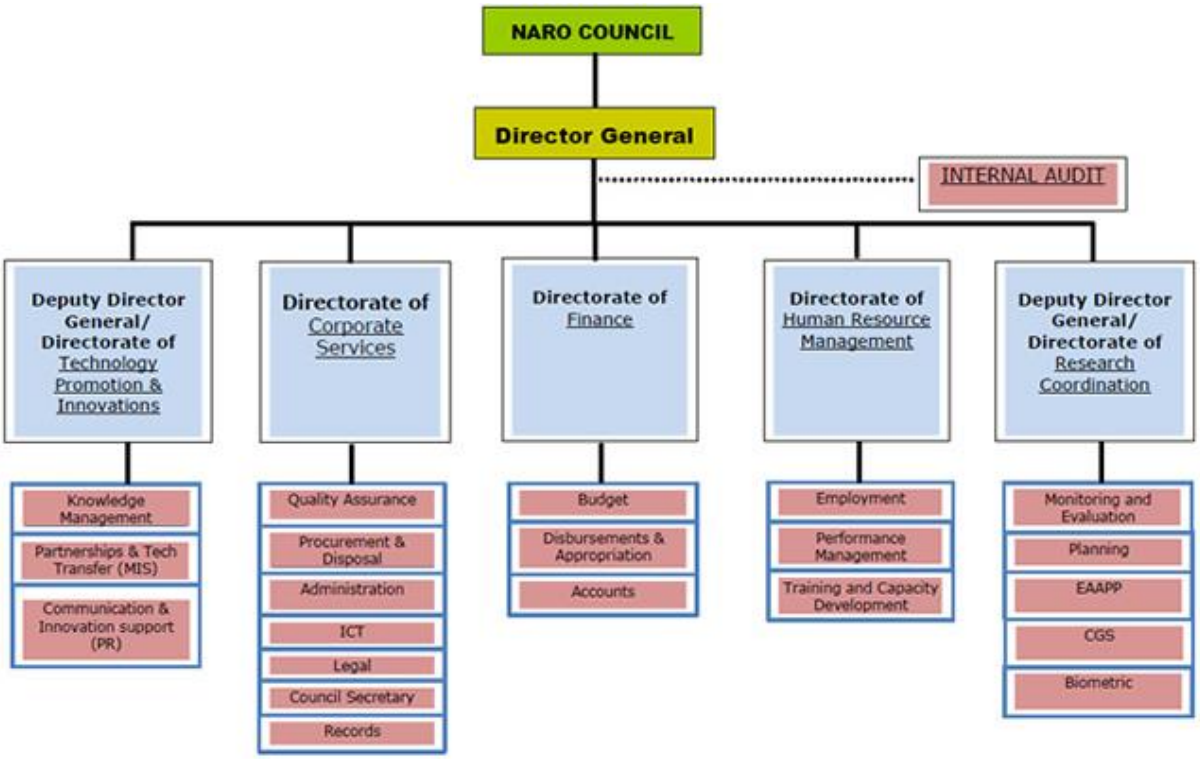


1. Formulate the policies and strategies of the organisation;
2. Ensure that the objects and functions of the organisation are carried out;
3. Manage the property, business, income, funds and other affairs of the organisation;
4. Set targets and approve work plans and budgets for the organisation;
5. Establish with the approval of the Minister the terms and conditions of service and approve rules and procedures for appointment, termination and discipline of staff of the organization's secretariat and employees of public agricultural research institutes;
6. Appoint and discipline members of staff of the organization's secretariat;

7. Appoint the directors and research scientists of the public agricultural research institutes, but in exercising this function, the council shall ensure full participation of the management committee of the respective public agricultural research institute in the entire process and the interviewing panel for this purpose shall be constituted in accordance with the fifth schedule; and
8. Perform any other functions relating to the above as the Minister may direct.

B) Secretariat

NARO Secretariat



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c) Public Agricultural Research institutes

The Public Agricultural Research institutes are semi-autonomous research management Entities under the policy guidance of the National Agricultural Research

Organisation for the purpose of providing agricultural research services. Public agricultural research institute are autonomous in their operations relating to the implementation of its programmes, allocation and management of its resources in accordance with its approved annual programmes and budget as approved by the council. The public agricultural research institutes are of two categories

1. National Agricultural Research Institutes, which manage and carry out agricultural research of a strategic nature and of national importance.
2. Zonal Agricultural Research and Development Institutes which manage and carry out agricultural research whether applied or adaptive for a specific agro-ecological zone.

Following are the different research institutes coming under the control ofNARS:

1. National Agricultural Research Laboratories-Kawanda, Kampala
2. National Crops Resources Research Institute, Kampala
3. National Fisheries Resources Research Institute, Jinja
4. National Forestry Resources Research Institute , Kampala
5. National Livestock Resources Research Institute , Tororo
6. National Semi Arid Agricultural Research Institute, Soroti
7. National Coffee Research Institute, Mukono
8. Abi Zonal Agricultural Research and Development Institute, Arua
9. Ngetta Zonal Agricultural Research and Development Institute, Lira
10. Buginyanya Zonal Agricultural Research and Development Institute, Mbale
11. Bulindi Zonal Agricultural Research and Development Institute , Hoima
12. Kachwekano Zonal Agricultural Research and Development Institute , Kabale
13. Mbarara Zonal Agricultural Research and Development Institute , Mbarara
14. Mukono Zonal Agricultural Research and Development Institute , Mukono
15. Nabuin Agricultural Research and Development Institute , Soroti
16. Rwebitaba Zonal Agricultural Research and Development Institute, FORT PORTAL

The NARS Objectives

The Objectives of agricultural research in Uganda are to:

1. Transform agricultural production into a modern science-based market oriented agriculture capable of greater efficiency, profitability and of sustaining growth in the agricultural sector while contributing to poverty eradication;

2. Promote agriculture and related industry for the purposes of contributing to the improvement of the quality of life and livelihoods of the people, having regard to the protection of the environment; and
3. Support the development and implementation of national policy with relevant information and knowledge.

Goal of the NARS

The overall goal of the NARS is to address challenges presented in the Plan for Modernisation of Agriculture (PMA) strategy and National Agricultural Research Policy (NARP) principles to provide research services that address in a sustainable manner, the needs and opportunities of the majority poor.

Sub-Systems of NARS

1. Public Research Institutes,
2. Universities and other tertiary institutions,
3. Private companies/private sector,
4. Farmer organizations,
5. Civil Society Organisations,
6. Advisory Service Organizations,
7. NARS Linkage Institutions – the regional and international organizations,
8. Individuals.

Key attributes of NARS

1. The harnessing of knowledge and skills on what needs to be done;
2. Deciding who does the research, i.e. hiring research service providers (RSPs) and the direct accountability to them;
3. Agreeing on the research agenda;

4. The need for farmers to organize themselves in groups for collective action;
5. Facilitating farmer investment into research;
6. Recognition and utilization of farmers' own knowledge.

The Coordination Mechanism

1. Governing semi-autonomous Apex body = NARO Council
2. The Apex body with representatives from key Government departments & other stakeholder groups (farmers, concerned ministries & other PMA related sectors) Service provider agencies including NAADS
3. Various Coordination Committees at District and regional/Zonal level with legal status & regulatory functions
4. Secretariat for the Apex Body = NARO Council Secretariat Headed by the Director General.

The functions of the National Agricultural Research Organisation are to:

1. Provide strategic direction for publicly funded agricultural research in Uganda and act as a forum for agricultural researchers in Uganda;
2. Coordinate and oversee, in collaboration with the Uganda National Council for Science and Technology and other lead agencies, the development, consolidation and implementation of agricultural research policy and national research strategies, plans and budgets relating to publicly funded agricultural research;
3. Set national priorities and harmonize agricultural research activities of the national agricultural research system, constituent institutions and public agricultural research institutes, civil society organisation, private sectors and farmer organizations and promote delivery of quality and efficient agricultural research services;
4. Advise and coordinate formulation of policy and legislative proposals, research standards, codes of ethics, conduct and practice; and guidelines for delivery of agricultural research services;
5. Provide guidelines, guidance and ensure delivery of quality agricultural research by agricultural research service providers;
6. In collaboration with other relevant agencies, provide policy guidance to local governments on matters relating to agricultural research;

7. Carry out monitoring and evaluation of national agricultural research programmes, projects and activities to ensure adherence to the set work plans, standards and regulations;
8. Mobilize funds for agricultural research and manage the agricultural research trust fund including raising funds for research of national strategic interest;
9. Coordinate and promote cooperation and collaboration between Uganda and other countries, institutions, scientific or professional societies and other agricultural research service providers, with regard to agricultural research, development and technology transfer in the agricultural sector so as to optimally utilise agricultural resources and improve production capacity of such resources;
10. Provide leadership and advocacy for the promotion, protection and development of agricultural research in Uganda;
11. Make grants or provide funds to any institution or person for the advancement of agricultural research and development on both competitive and non-competitive basis; and
12. Perform such other functions as are conferred on the organisation by this Act or any other law for the purpose of promoting agricultural research and development.

In carrying out the above functions, NARO is a forum for agricultural researchers in Uganda. NARO is therefore mandated to convene a meeting at least once a year of representatives of agricultural research service providers, farmers, private sector and civil society and other stakeholders for the purpose of discussing issues relevant to agricultural research and setting agricultural research priorities.

Other functions of NARO

NARO in addition to above functions, performs other such functions such as

1. Advise the Minister of Agriculture, Animal Industry and Fisheries on research, development and technology transfer in the field of agriculture, Animal Industry and Fisheries;
2. Co-ordinate, collect, collate and analyse data and information on agricultural research and ensure their publication and dissemination, and take inventory of all agricultural research in Uganda;
3. Inspect facilities and any area where agricultural research is being carried out or intended to be carried out in Uganda;

4. Register potential agricultural research service providers in the public and private sectors in Uganda; and
5. Maintain a central register of agricultural research and development in Uganda.

Chapter - VI

PUBIC AND PRIVATE INSTITUTIONS AND THEIR RELEVANCE IN AGRICULTURAL DEVELOPMENT

- **Agribusiness Management Associates (U) Ltd (AMA) - Kampala**
- **Agricultural Engineering and Appropriate Technology Research Institute - Kampala**
- **Agricultural Production and Extension Project. Agribusiness Development Centre - Kampala**
- **Amfri Farms Limited - Kampala**

  AMFRI FARMS LTD also known as AFRICAN ORGANIC, located in Kampala, Uganda is the largest exporter of organic fruits and vegetables from Uganda. We are certified by IMO-Institut of Marketeclogy out of Switzerland. Besides a 1500 acre company farm,400 of which are certified, we have over 100 outgrowers. We are also subscribers to FAIR TRADE and pay our outgrowers premimun prices for their products like pineapple, apple bananas, ginger and passion fruit. We also grow VANILLA and scotch bonnet pepper for the export market.
- **Arapai College of Agriculture - Soroti**
- **Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) - Entebbe**

  The Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) is a non-political organization of the National Agricultural Research Institutes (NARIs) of ten countries: Burundi, D. R. Congo, Eritrea, Ethiopia, Kenya, Madagascar, Rwanda, Sudan, Tanzania and Uganda. It aims at increasing the efficiency of agricultural research in the region so as to facilitate economic growth, food security and export competitiveness through productive and sustainable agriculture.
- **AT (Appropriate Technology) Uganda Ltd - Kampala**
- **Bukalasa Agricultural College - Wobulenzi**
- **CIAT, Kwanada Agricultural Research Institute, Uganda (CIAT) - Kampala**

  CIAT in Africa pursues a progressive programme of research on technology and processes important for development that helps rural communities build sustainable

livelihoods, through competitive agriculture, healthy agroecosystems, and rural innovation. In pursuit of these goals, we work closely with national institutions, NGOs, and the private sector, and we use participatory methods that offer rural people an active role in devising better ways to improve crops, build rural agroenterprises, and manage soil fertility, pests, and plant diseases.

- **Crop Protection Association of Uganda - Kampala**
- **Department of Agricultural Economics & Agribusiness - Kampala**

  The mission of the Department of Agricultural Economics is to conduct research and train high level manpower in analytical skills that enable them to handle training, research and development issues in the areas of Agricultural Policy, Rural Development, Agricultural Economics, Agribusiness and Environmental Economics. In pursuit of this mission, the Department trains manpower at both undergraduate and postgraduate levels. In addition, staff members carry out research activities, attend workshops/conferences/seminars with the main purpose of updating their knowledge and providing empirical findings for policy makers.

- **Department of Agricultural Engineering - Kampala**

  The Department of Agricultural Engineering is based in the Faculty of Agriculture at Makerere University. It has a proficient human resource to teach, undertake research and development and to support national and regional programmes related to Agricultural Engineering, Rural Technology support and development, renewable energy resources as well as private formal and informal manufacturing sector. Since the current government policies of Plan for Modernization of Agriculture and NAADS emphasize among others mechanized agriculture, added value processing, irrigation and conservation of natural resources the Department can be a key player with its degree programmes in Agricultural Engineering.

- **Department of Agricultural Extension/Education - Kampala**

  The Department of Agricultural Extension Education offers research and training especially in the dissemination of agricultural information. The undergraduate and postgraduate programmes have continued to run smoothly and an innovative programme Bachelor of Agricultural Extension Education for mid career staff was started. The

Department has an innovative undergraduate training programme for mid career in agriculture for Diploma holders in Agriculture, Animal Husbandry, Fisheries and Forestry. This demand driven programme is specifically designed for farmers farming skills. The Department continues to teach Agricultural Extension and Rural Sociology courses to students of Agriculture, Food Science & Technology, Agricultural Engineering, Forestry as well as B.A. Rural Economy. Construction of the facilities at MUARIK, Kabanyolo have now been completed and was financed by the World Bank/NARO. The Department continues to provide staffing and educational guidance to the center. The Department also conducts short courses for extension workers from public and private institutions through the center.

- **Department of Animal Science - Kampala**

  The Department of Animal Science has formulated a Department Strategic Plan and our challenge has been to put our plan into full operation. We appreciate that livestock not only makes contribution to high quality food supplies in Uganda but also indirectly contributes to the general agriculture of the country by providing draught power, manure and hides & skins for export. A large fraction of the agricultural land in Uganda is rangeland, devoted to a large extent to pastoral systems. The challenges to the department include becoming effective player in solving the problems of poverty in rural areas, declining productivity of both crop and livestock and participate in the Government of Uganda's efforts to modernise agriculture. Through its teaching and research programs, the Department is well equipped to meet these challenges.

- **Department of Continuing Agricultural Extension Education (CAEC) - Kampala**

  The Continuing Agricultural Education Center as an institution was conceived and established in 1993 as a project under the Agricultural Research and Training Project (ARTP) through the National Agricultural Research organization (NARO). The center embarked on joint training efforts between Makerere University (MU), NARO , public and private sector agricultural institutions using the Faculty of Agriculture facilities at the main campus. All the CAEC activities are aimed at strengthening capacity of organizations and individuals to deliver agricultural related services and improve productivity. The uniqueness of CAEC activities and training programs lies in the quick response to the

current and future needs in a way that is not satisfied by the conventional University training programs. The center is accordingly structuring its curricula in preparation to provide services on a demand driven basis to various clients. These demands are in form of short-term and mid-term training opportunities.

- **Department of crop science - Kampala**

  With an academic staff of 20, and 18 support staff, the department has continued to meet its mission as a focal center for quality training, research and technology development for improved and sustainable crop production. The department is playing a leading role in areas of training and research in the Faculty of Agriculture. It has maintained the largest share of research activities and graduate student enrolment. Plans are underway strengthen further research and training capacity through curricula and structural adjustments. It is eminent that to meet the ever-increasing clientele needs, and provide demand-driven and quality training, we need to expand the department. The vision is to split the current department into the Department of Agronomy and Horticulture, and the Department of crop Protection.

- **Department of Food Science & Technology - Kampala**

  The Department that begun with only 15 students, 4 staff members and one under equipped laboratory has experienced significant growth in its staff establishment, student numbers and physical infrastructure. The Department now boosts of 14 full time academic staff members, a well equipped food microbiology laboratory, a food chemistry/food analysis laboratory, 7 technicians and over 100 undergraduate students. Having built infrastructure and manpower for postgraduate training, the department admitted the first lot of postgraduate students in 1998. Graduates from the department have filled important positions in the food industry as well as in academic and regulatory organizations. A Post Graduate programme which offers M.Sc.s and Ph.D.s was started in the Department in 1998. The M.Sc. programme is by research and coursework while the Ph.D. is by research only.

- **Department of soil science - Kampala**

  In pursuit of the Department's mission, the Department has continued to excel in it's academic, training and research activities and in the creation of national and international

linkages. In the area of research, various department staff have continued to pursue research under the following programs: Rehabilitation of degraded soils, soil survey and resource inventorying, Bio-Fertilizer research, Soil fertility development, Soil and water management and Soil and environmental pollution.

- **Eastern Africa Root Research Network (EARRNET) - Kampala**

  EARRNET is a regional agricultural research and development network implementing a range of activities to strengthen the cassava sector in Eastern Africa. The network has six research themes, plays a catalytic role in the delivery of new technologies with a range of public and private sector partners and also provides research training and information about cassava.

- **Eastern African Fine Coffees Association (EAFCA) - Kampala**
- **Eastern and Centreal Africa Program for Agricultural Policy Analysis (ECAPAPA) - Entebbe**
- **Economic Policy Research Centre. Makerere University (EPRC) - Kampala**

  Mission Statement 'Fostering sustainable growth and equitable development of the Uganda economy through the advancement of knowledge and practice in applied policy analysis and research" Vision The Center's Vision is to make a positive contribution to the development of the Uganda economy through the advancement of fact based economic policy formulation and management.

- **Environmental Alert - Kampala**

http://envalert.org

- **Faculty of Agriculture, Makerere University - Kampala**

  Faculty of Agriculture, Makerere University started in 1924 teaching agricultural sciences leading to a Certificate in Agriculture. In 1933, science teaching and the length of training increased leading to the award of Diploma in Agriculture. The Faculty started awarding Degree in Agriculture in 1961. The Faculty of Agriculture now comprises of seven departments, namely; Animal Science, Agricultural Economics, Agricultural Engineering, Agricultural Extension Education, Crop Science, Food Science and Technology and Soil Science; a Makerere University Agricultural Institute; and a

Continuing Agricultural Extension Education Centre. There are now six undergraduate degrees offered in the Faculty of Agriculture as well as MSc., PhD and DSc. programs.

- **Fisheries Resources Research Institute of Uganda (FIRRI) - Jinja**
- **Food Science and Technology Research Institute (FOSRI) - Kampala**
- **Forestry Research Institute of Uganda (FORI) - Kampala**
- **Gulu University of Agriculture and Environmental Sciences - Kampala**
- **International Institute of Tropical Agriculture, Uganda (IITA) - Kampala**
- **International Network for the Improvement of Banana and Plantain, Uganda - Kampala**
- **Jaksons Farms Limited - Kampala**
- **Kawanda Agricultural Research Institute, Uganda - Kampala**
- **Kyoga Foundation - Kampala**
- **Lake Victoria Fisheries Organization (LVFO) - Jinja**

  The objectives of the Lake Victoria Project are to foster co-operation amongst the Contracting Parties, in matters regarding Lake Victoria; harmonise national measures for the sustainable utilisation of the living resources of the Lake; develop and adopt conservation and management measures to assure the Lake s ecosystem health and sustainability of the living resources.

- **Makerere University - Kampala**

  Makerere University is Uganda's premier institution of higher learning. With a student population of over 30,000, it ranks as one of the largest in East and Central Africa. It is located on Makerere hill, one of the many hills on which Kampala, the capital city of Uganda is built. The main campus is about 5km to the north of the city centre covering an area of 300 acres (two square kilometres). The location offers an excellent academic environment, because the University is free from all forms of disturbances associated with city locations.

- **Makerere University Agric. Research Inst. Kabanyolo (MUARIK) - Kampala**

  MUARIK, located 19 Km North of the University main campus was formally sanctioned in 1996. The original facility at Kabanyolo was Makerere University Farm acquired from a private entrepreneur in 1953 for teaching, research and demonstration for

the faculty of Agriculture. Since then, it has been a major source of vital information relevant to agricultural development in East Africa. Training is achieved through provision of land, housing, library and laboratory and workshop facilities to enable students acquire hands-on-farming experience. MUARIK staff participated at various stages and in various capacities, both directly and indirectly under specific departments mandated to oversee training in respective disciplines. Staff has indicated willingness to play a more active role in undergraduate training programmes.

- **Marketing and Postharvest Research in Eastern and Central Afrika (FOODNET) - Kampala**

  Overall Project Goal: Strengthening regional capacity in value added, agro-enterprise technologies for increased income, improved nutrition and sustainable food security in eastern and central Africa Project Purpose: To identify market opportunities for existing and novel, value added products, and optimise appropriate postharvest technologies to enhance the income generating capacity of small and medium scale entrepreneurs from the private sector and promote products to improve nutrition.
- **Ministry of Energy and MIneral Development - Kampala**
- **Namulonge Agricultural and Animal Production Research Institute (NAARI) - Kampala**
- **National Agricultural Advisory Development Service (NAADS) - Kampala**

  The National Agricultural Advisory Services (NAADS) is a new program of the government of Uganda put in place to increase the efficiency and effectiveness of agricultural extension service. It is a semi-autonomous body formed under NAADS Act of June 2001 with a mandate to develop a demand driven, farmer-led agricultural service delivery system targeting the poor subsistence farmers, with emphasis to women, youth and people with disabilities. Its development goal is to enhance rural livelihoods by increasing agricultural productivity and profitability in a sustainable manner.
- **National Agricultural Research Laboratories (NARL) - KAMPALA**
- **National Agricultural Research Organisation - Kampala**
- **National Agricultural Research Organization (NARO) - Entebbe**
- **National Agricultural Research Organization (NACRRI) - Kampala**

The National Crops Resources Research Institute (NACRRI) is one of the Public Agricultural Research Institutes under the Policy guidance of the National Agricultural Research Organisation (NARO). The headquarters are situated in Namulonge.

- **National Animal Genetic Resourcces Centre and Databank (NAGRC&DB) (NAGRC&DB) - Entebbe**
- **National Animal Genetic Resources Centre&Databenk (NAGRC&DB) (NAGRC&DB) - Entebbe**
- **National Forestry Authority, Uganda - Kampala**
- **Nkoola Institutional Development Associates Ltd - Kampala**
- **Nyabyeya Forestry College - Masindi**
- **Participatory Ecological Land Use Management Association (PELUM) - Kampala**

  PELUM Association is a regional network of civil society organisations working in eastern, central and southern Africa. It aims to enhance the capacity of member organisations in working towards sustainable local community livelihoods and empowered small scale farmers
- **PRAPACE (PRAPACE) - Kampala**

  PRAPACE is a French acronym for Regional Potato and Sweetpotato Improvement Network in Eastern and Central Africa. It developed out of PRAPAC, a network established in 1982 by the national research institutions of Burundi, Rwanda and DR Congo to link their potato programmes. Currently PRAPACE collaborates with potato and sweetpotato programs of ten ASARECA (Association for Strengthening Agricultural Research in Eastern and Central Africa) member countries in the region.
- **Regional Agricultural Information Network (RAIN) - P.O Box 765, Entebbe**

  RAIN is an EU funded network of the Association of Strengthening Agricultural Research in Eastern and Central Africa (ASARECA). RAIN's Mission is to promote sustainable management of client-oriented agricultural information throughout the Eastern and Central African region.

- **Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) - Kampala**

  The Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) is an association of 12 universities of agriculture and related sciences in East and Southern Africa that recognises the important and largely unfulfilled position that universities occupy in contributing to the wellbeing of small-scale farmers throughout the sub-region. RUFORUM plays the following roles: --an innovator that catalyses change within universities in terms of research training, outreach and related management aspects. --a catalyst and coordinator for partnerships and collaboration within the countries and across the region --an information & knowledge broker --a representor and advocate of universities and their stakeholders
- **Rural Empowerment Network (REN) - Kampala**
- **Serere Agricultural and Animal Production Research Institute (SAARI) - Soroti**
- **Uganda Martyrs University - Kampala**

  Uganda Martyrs University (UMU) whose main Campus is located at Nkozi 82 kms west of Kampala, the Capital of Uganda, on the Kampala-Masaka road, was started in October 1993 with 84 students and two academic departments, namely the Institute of Ethics and Development Studies and the Faculty of Business Administration and Management.
- **Uganda National Farmers Association (UNFA) - Kampala**
- **Ugandan National Banana Research Programme (UNBRP) - Kampala**

  The goal of the programme is to enhance banana productivity and utilization through development and promotion of technologies for integrated management of weevil, black Sigatoka and nematodes. Enhanced banana productivity will, in turn, contribute to the Uganda national goal of improving food security and household income of people living under severe poverty
- **Volunteer Efforts for Development Concerns (VEDECO) - Kampala**

  Volunteer Efforts for Development Concerns (VEDCO) is an indigenous Non Governmental Organization established in 1986 in response to the challenges of poverty that resulted from the social and economic disruptions caused by the military conflicts of

1980-1986 in Luweero. Twenty years now, VEDCO has maintained her critical contributions in addressing the distressing low levels of food security, agricultural productivity and low incomes among rural farmers in seven districts in Uganda, in addition to increasing farmer's participation in policy processes on issues that affect their agricultural productivity and marketing.

Chapter - VII

PRESENT CAPACITY BUILDING PROGRAMMES AND POTENTIAL AREAS

1. Vision 2040

Over the last 30 years, Uganda's planning frameworks have focused on short to medium term goals. However, experience shows that long term planning is a key factor in propelling socioeconomic development and equitable distribution of wealth in many countries all over the world. The Uganda Vision 2040 articulates clear strategies and policy directions to transform the country into a competitive upper middle income country. It seeks "A transformed Ugandan Society from a Peasant to a Modern and Prosperous Country within 30 years." The National Planning Authority (NPA) is mandated to ensure National Development Plans (NDPs), Sector Investment Plans (SIP) and Sector Strategic Plans (SSPs) are aligned to Vision 2040. Vision 2040 is a modification of the failed Vision 2025 (MFPED, 1999) and Vision 2035. It also incorporates emerging development prospects and associated challenges including the discovery of oil and gas reserves, E-revolution, globalization and regional economic integration among others

2. National Development Plan

The National Development Plan (NDP) of Uganda, a five-year development strategy, aims to address structural bottlenecks in the economy to accelerate socioeconomic transformation and bring a portion of the third of the population out of poverty. The NDP emerged from the Poverty Eradication Action Plan (PEAP) which had focused on poverty reduction since 1997. The plan outlines the development priorities and implementation strategies to help achieve this. Among these, climate change is acknowledged as an enabling sector that will require integration with other sectors of the economy for successful socioeconomic transformation.

3. MAAIF's Development Strategy and Investment Plan

The government has pursued previous policies and strategies under the Plan for Modernization of Agriculture (PMA) – a multi-sectoral framework aimed at transforming subsistence farming to commercial agriculture. Despite government efforts in the PMA, progress was made mainly in two of seven pillars of the PMA - research and agricultural advisory services, while limited progress was achieved in the other five pillars. As such,

government identified areas of weakness in the PMA framework and addressed them in the five year Agricultural Sector Development Strategy and Investment Plan. The DSIP aims to raise rural household incomes and improve food and nutrition security of all Ugandans.

4. The National Agriculture Policy

The National Agriculture Policy is meant to revolutionize farming, with the overall objective of achieving food and nutrition security and improving household incomes. Despite making a significant contribution to Uganda's socio-economic development through generation of household and national incomes, reduction of hunger, and supporting growth in trade, investments, and industrialization, agriculture had lacked a clear policy to guide regulation, planning and investment. The National Agriculture Policy was modelled on Uganda's Vision 2040, which calls for intra- and inter-sectoral coordination and approach in order to achieve the policy objective. To achieve this, the government shall pursue six interrelated objectives.

5. The National Agricultural Research Organization (NARO) Strategic Plan

This strategic plan is based on NARO's comparative advantage as a coordinating body of the National Agricultural Research Systems (NARS); development trends and challenges; commitment to mission, vision, mandate and core values; and National and sector development frameworks and aspirations of the Government of Uganda. The overall goal set out in the strategic plan is to enhance the contribution of agricultural sector research to agricultural productivity, sustained competitiveness, economic growth, food security and poverty eradication. The mission and vision to guide attainment of this goal are "to generate and disseminate appropriate, safe and cost effective technologies" and "a market-responsive, client-oriented, and demand-driven national agricultural research system", respectively.

6. Technical backstopping of the FAO Integrated Program on Sustainable Development, and of the project Strengthening Farmers' Organizations

7. Workshops and capacity building of agricultural extension and other rural development staff in creating awareness and educating the farming population in measures to prevent the spread of HIV/AIDS epidemic, based on several individual country studies on the subject

Chapter - VIII

TRAINING PRIORITIES IN AGRICULTURE AND ALLIED SECTORS

1. Training of trainers on "Mainstreaming gender and youth in agriculture and rural development"
2. Building trainers' skills on "Empowering farmers for agricultural entrepreneurial ventures"
3. Training of trainers on "Improved production and post-harvest processing, storage, handling, parboiling, threshing, winnowing, drying and milling methods of field crops".
4. Building trainers' skills on "Empowering those engaged in fishing and aquaculture"
5. Training of trainers on "Water resource development and management"
6. Training of trainers on "Empowering women in agribusiness services"
7. Training of trainers on "Capacity building of small holders to have access to domestic and international input and output markets using various ICTs tools and applications"
8. Training of trainers on "Capacity building of farmers through Farmer Field Schools (FFS)"
9. "Empowering the extension functionaries on training needs assessments, management training and mentoring programmes in agri-services planning and coordination"
10. "Empowering the extension personnel on participatory extension approaches, agribusiness / farm enterprise management, farmer groups and organizational development"
11. Training of trainers on "Empowering livestock farmers through improved livestock practices"
12. "Effective communication methods for extension functionaries"

13. Training of trainers on “Extension management approaches for promotion of sericulture industry”
14. “Empowering extension functionaries to address field level problems of animal husbandry”
15. Training of trainers on “Farm business management for horticulture sector”
16. Training of trainers on “Capacity building of farmer organizations”
17. “Capacity building of extension workers based on the lessons emerging from Farmers Field Schools and county adaptation plans”
18. Training of trainers on “Capacity building of small farm holders on modern farm mechanization technologies”
19. Training of trainers on “Capacity building of entrepreneurs on greenhouse design, manufacturing, installation, maintenance and overall greenhouse management using automated processes”
20. Training of trainers on “Building the capacity skills of resource poor farmers on post-harvest and food processing technologies of horticultural crops”
21. Training of trainers on “Capacity building of farmers on modern post-harvest technologies and management of food grains for improving market access and income”
22. Training of trainers on “Empowerment of farmers on commercial dairy farming and modern dairy technologies to improve market entry and sustainable income
23. “Capacity building of master trainers on public-private partnerships (PPP)”
24. “Empowering the managerial skills of extension personnel on the importance of good marketing practices in agricultural marketing”
25. Strengthening of agricultural extension management system and advisory services through new and emerging approaches in extension management