

Executive Summary - Uganda Veterinary Response Capabilities (VetCap)

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Produced by the National Agricultural Biosecurity Center (NABC), Kansas State University

This document characterizes the agricultural and veterinary capabilities existing within the country of Uganda in reference to its planning and response to a high consequence animal/zoonotic disease outbreak or event. All information for this report was gathered from open-source documentation and personal interviews with professionals involved in the Ugandan animal health industry.

General background



The Republic of Uganda is a landlocked country located on the East African plateau almost completely within the Nile basin. It is bordered on the east by Kenya, on the north by South Sudan, on the west by the Democratic Republic of the Congo (DRC) and on the southwest by Rwanda, and on the south by Tanzania. The southern part of the country includes a substantial portion of Lake Victoria. The center of the country is dominated by Lake Kyoga, which is surrounded by extensive marshy areas. Modified by altitude, the country's climate is generally equatorial. Southern Uganda is wetter than the other regions with rain generally spread throughout the year.

Comprised of about 36 million people,¹ the country is home to many different ethnic groups, none of whom forms a majority of the population. The country's official languages are English and Swahili, although forty other languages are spoken.² Uganda is divided into over one hundred districts across four administrative regions: Northern, Eastern, Central (Kingdom of Buganda) and Western.³

The agricultural sector is one of the most important sectors in the Ugandan economy, generally contributing over twenty percent of the total Gross Domestic Product (GDP) and over ninety percent to total export earnings. Agriculture provides about eighty percent of employment with most industries and services in the country based on it.⁴ Approximately eighty five percent of the population lives in the rural areas and derive their livelihood from agriculture.

Livestock background, distribution, and demographics

Uganda's populations of cattle, goats, and poultry are among the highest for African countries—ranking in the top one-fifth. Nomadic pastoralism constitutes the principal livelihood for many households in the northeastern part of Uganda. The landscape of the so-called cattle belt, stretching across the middle of Uganda from the base of the

¹ <https://www.cia.gov/library/publications/the-world-factbook/geos/ug.html>

² <http://www.britannica.com/bps/search?query=uganda>

³ "Can Uganda's economy support more districts?", *New Vision*, 8 August 2005

⁴ http://typo3.fao.org/fileadmin/templates/ess/documents/meetings_and_workshops/ICAS5/PDF/ICASV_3.3_126_Paper_Mayinza.pdf

highlands in southwestern Uganda through the area around Lake Kyoga to northeastern Uganda, is characterized by extensive cattle-dominated farming systems. Seventy percent of Ugandan households are engaged in some form of livestock rearing.⁵ Beef, dairy cattle, and poultry are strategic agricultural commodities for the country. Since Uganda's independence, considerable public investments have been made in ranching, veterinary disease control, and livestock markets. However, many of these investments were planned without sufficient understanding of the opportunities for and constraints to national livestock development.⁶

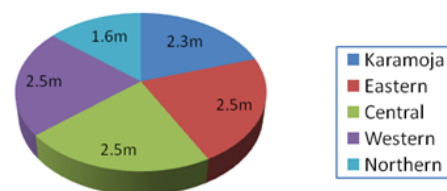
Uganda's Livestock Industries

Beef Industry

According to the 2008 National Livestock census there were 11.4 million cattle in Uganda.⁷ About ninety one percent of the cattle are held by pastoral communal grazers, nomadic pastoralists and small hold farmers, who contribute about eighty nine percent of the cattle slaughtered.⁸ Livestock are mainly concentrated in the southern and western areas of the country, accounting for about eighty percent of all cattle in Uganda. Overall, beef production contributes on average eighteen percent to the agricultural GDP and about eight percent of the National GDP. The beef sector is becoming increasingly export oriented, spearheaded by the rapid growth in the export of hides and skins. In 2007, Uganda partnered with the Norwegian government for the purpose of developing its meat export industry by venturing into the lucrative overseas market.⁹ Uganda's hopes of developing the country's meat industry today are uncertain as a result of misunderstandings within the ministry regarding the establishment of disease control centers and the breach of a key export deadline.¹⁰ Beef production in Uganda is mostly of a subsistence nature. There is a lack of an orderly marketing system in the beef sub-sector with most activity going unrecorded. In rural areas, there are no abattoirs. Instead, there exist large numbers of slaughter areas (*rufuras*) under the supervision of local governments. Meat is either sold by the roadside or in semi-permanent structures, taken to butcheries for direct public sale, or live animals are transported to metropolitan areas where they are slaughtered and the meat is offered for sale.¹¹

Uganda Domestic Livestock - 2008	
Species/type	Country Population
Poultry	37,400,000
Goat	12,500,000
Cattle	11,400,000
Sheep	3,400,000
Pigs	3,200,000
Rabbits	370,000
Camels	32,870
Horse & Donkey	1,590
All Animals	68,304,460

Cattle population by region (11.4 million total)



Dairy Industry

The Dairy industry accounts for approximately nine percent of the national GDP. Eighteen percent of the agricultural GDP is attributed to the livestock sub sector and the dairy sector is estimated to contribute up to forty five percent of that, playing an important role as a source of food, income, and employment.¹² Massive plundering of the fisheries sector has left Ugandans with fewer animal protein alternative sources and thus opened up opportunities for the dairy sector.¹³ A substantial amount of milk and milk products are imported indicating that domestic production is not sufficient to meet market demands. Uganda's dairy products were endorsed for export to the Common Market for Eastern and Southern Africa (COMESA) in 2008, giving the sector wider access to a market of over 119 million people in nineteen countries. There are fifteen dairy processing plants in Uganda, with a capacity of 810,000 liters. The processing plants produce below installed capacity due to an unavailability of raw milk.¹⁴ Alternatively, at the farm level hygiene and handling practices are generally poor.¹⁵ Despite the fact that Uganda has an elaborate regulatory framework, the private sector in the industry is not effectively organized to respond to the challenges presented and has been unable to take advantage of many available market opportunities. Moreover, despite various initiatives to enhance quality at various stages of the dairy chain, many weaknesses still exist.¹⁶ Through its regulatory departments like the Dairy Development Authority (DDA), the Government of

⁵ Ministry of Animal Agriculture, Animal Industries and Fishing (MAAIF) and Uganda Bureau of Statistics (UBOS), 2009

⁶ <http://www.ifpri.org/sites/default/files/publications/ifpridp01008.pdf>

⁷ http://www.meatradenewsdaily.co.uk/news/210911/uganda_concerns_over_live_cattle_exports_.aspx

⁸ Ibid

⁹ <http://www.monitor.co.ug/Business/Prosper/-/688616/1369280/-/bomksp/-/>

¹⁰ Ibid

¹¹ <http://www.fituganda.com/manage/download/atm/marketreports/subsectorstudybeef.pdf>

¹² <http://www.snvworl.org/en/Documents/Report%20on%20Dairy%20Investment%20Opportunities%20in%20Uganda.pdf>

¹³ <http://allafrica.com/stories/201111050074.html>

¹⁴ Ibid

¹⁵ <http://www.snvworl.org/en/Documents/Report%20on%20Dairy%20Investment%20Opportunities%20in%20Uganda.pdf>

¹⁶ http://www.snvworl.org/sites/www.snvworl.org/files/publications/report_on_dairy_investment_opportunities_in_uganda.pdf

Uganda aims at stimulating dairy sector areas that show potential for growth. The dairy sector has undergone a number of reforms to include:

- **The Dairy Master Plan (1993)** - Describes guidelines for transforming the sector, particularly in liberalizing the industry, establishing a regulatory body, and restructuring and privatizing the state owned dairy processing company.
- **The Dairy Industry Act (1998)** - The main law under which the new institutional and policy reforms in the dairy sector have been implemented.¹⁷

Dairy production takes place under any of the following four categories of farming systems:¹⁸

- **Zero grazing** (i.e. the cow is fed exclusively on concentrates; no grazing). This widely practiced system involves confinement of a few animals in a small enclosure where feeds or fodder and water are brought to the animals. This is a common farming practice in areas where the land holdings are small.¹⁹
- **Free range grazing** (i.e. grazing cattle by moving them all over the farm). A traditional practice carried out especially in the extensive grasslands in the Southern part of Uganda. This system is being phased out because of the sensitive nature of land encroachment.²⁰
- **Communal grazing** (i.e. pastoral grazing on communal land owned by clan). This is still practiced in the Northeastern part of Uganda.

The number of people employed in the dairy sector in general and on dairy farms in particular has been decreasing despite the increase in production. The work force includes over one hundred professionals in the field of food/dairy science and technology, and six hundred veterinarians and animal scientists.²¹

Goat Production

The most important role of goats is the sale of their meat and skins.²² Goats from villages are normally bought by traders who subsequently send them to large urban centers where the demand is higher.²³

Fishing (Aquaculture)

Over the years, fish have been Uganda's second major non-agricultural foreign exchange earner. Production comes from small-scale fish farmers, emerging commercial fish farmers, and stocked community water reservoirs and minor lakes. In 2008 total exports were over US \$122M annually. In 2009 the sector employed 400,000 people and contributed to the livelihood of nearly 1.5 million people.²⁴ In recent years corruption and illegal fishing has led to a drastic drop of fish stock and more than ten fishing factories going out of business. Uganda estimates losses of US \$250M annually due to the illegal fish trade.²⁵

Poultry

In 2010 Uganda's domestic poultry population was estimated to be forty million birds. Although turkeys, guinea fowl, ducks, pigeons, geese, and ostriches are produced, chickens are the major poultry product in Uganda. In addition to eggs, chickens are on high demand in neighbouring countries like South Sudan, the DRC, and Rwanda.²⁶

¹⁷ <http://siteresources.worldbank.org/EXTSOCIALDEVELOPMENT/Resources/244362-1170428243464/3408356-1170428261889/3408359-1170428299570/Uganda-En.pdf?resourceurlname=Uganda-En.pdf>

¹⁸ <http://www.snvworl.org/en/Documents/Report%20on%20Dairy%20Investment%20Opportunities%20in%20Uganda.pdf>

¹⁹ Ibid

²⁰ Ibid

²¹ http://www.igad-data.org/index.php?option=com_docman&task=doc_details&gid=1385&Itemid=42

²² <http://www.fao.org/Wairdocs/ILRI/x5473B/x5473b02.htmroduction>

²³ Ibid

²⁴ <http://www.thefishsite.com/fishnews/10844/uganda-seeks-to-boost-fish-output-again>

²⁵ <http://allafrica.com/stories/201112191747.html>

²⁶ <ftp://ftp.fao.org/docrep/fao/011/ai378e/ai378e00.pdf>

Characteristics of poultry production in Uganda

Characteristic	Commercial		Free-range (extensive)
	Intensive	Semi-intensive	
Breed & flock size	Specialized breeds (exotic or indigenous): 500-5000	Specialized & dual-purpose breeds: 50-500 or more	Local indigenous type: <50
Housing	Modern housing, generally with concrete walls and regulated internal environment	Varies from modern houses to simple housing made from locally available materials	Varies from bespoke houses, owner houses, trees, to nothing at all
Feed resources	Commercially compounded feeds either by self or by millers	Commercially compounded, home-made mixtures and free-range	Scavenging and occasional feeding with home grains and household refuse
Health program	Standard and regular poultry health program	Disease control and health program at varying levels	No regular health program of disease control measures in place
Markets	Varying from organized cold chain system for input-output distribution	Input and output distribution is based on existing trading centers	No formal marketing channels
Infrastructure	Water, electricity, and communication available	Modest infrastructure depending on proximity to urban centers	Under-developed infrastructure
Product storage & processing	Varies from refrigerated facilities for dressed birds and table eggs to none	Occasional dressing of birds depending on marketing chains	No refrigeration, sales of live birds and eggs

Only one chicken farm, Ugachick, located near the capital city of Kampala, has the strict bio-security measures that qualify it to be classified at the highest level according to the Food and Agricultural Organization of the UN (FAO).²⁷ Only Ugachick has a slaughter plant. The remaining poultry slaughter in Uganda is carried out in makeshift small slabs, in households, or restaurants. The products therefore may not be professionally handled, resulting in a lack of grades and standards, inadequate market information and un-standardized products.²⁸

Government and other Programs Supporting the Ugandan Poultry Industry are:

- *National Livestock Productivity Improvement Program (NALPIP)* - funded by the African Development Bank. Provides vaccines for the control of Newcastle disease (ND) and supports a comprehensive livestock census that includes poultry.²⁹
- *National Agricultural Research Organization (NARO)* - receives support from various development partners [such as the Danish International Development Agency (DANIDA), the UK Department for International Development (DFID), International Atomic Energy Agency (IAEA)] for research, especially on free-range poultry.³⁰
- *Northern Uganda Social Action Fund (NUSAF)* - a Ugandan government organization that receives US \$100 M funding by the World Bank. Its goal is to directly fund members of local communities in eighteen northern Ugandan conflict-affected districts and invest in infrastructure and training for long-term development.³¹
- *Non-Governmental Organization (NGO)* - e.g., "Send a Cow," a UK-based organization that provides chickens and training support to communities.³²

Pig Production

In 2008 at least forty one percent of the 3.2 million pigs in Uganda were predominately reared in the districts of Kampala, Mukono and Masaka.³³ Most of the pork sold in this region is produced by small-scale farmers who keep one to three animals in 'backyard systems.' Commercial pig keeping has the potential to become a high-income

²⁷ Ibid

²⁸ Ibid

²⁹ <http://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/UG-2002-126-EN-ADF-BD-WP-UGANDA-AR-LIVESTOCK-IMPROVEMENT.PDF>

³⁰ <http://www.naro.go.ug/>

³¹ <http://web.worldbank.org/external/projects/main?pagePK=104231&theSitePK=40941&menuPK=228424&Projectid=P002952>

³² <http://www.sendacow.org.uk/home>

³³ http://www.meatradenewsdaily.co.uk/news/071009/uganda___pig_farming.aspx

earner for Ugandans, as there is a high demand for pork and pork products. The number of pigs kept by Ugandans has been rising drastically over the last few years.³⁴ Uganda has more than seventeen percent of its households involved in pig rearing and trade in pork products. Despite the great potential offered to poor farmers from pig farming, the sector remains largely “invisible” and poorly regulated because the region’s governments have not focused on developing it. Dealing with diseases such as African swine fever and cysticercosis is critical.³⁵

Ugandan Slaughter And Processing Capabilities³⁶

Uganda has slaughter and processing facilities throughout the country. Generally, abattoirs, meat processing plants, milk processing plants, and chicken processing plants are located within commercial areas and operated either by the national government or by private companies. The government abattoir does most of the slaughtering for the local people under very minimal or poor standards of operation. The private abattoir also has minimal standards for operation. The Uganda Modern Halal Abattoir is a new endeavor being built in 2012 at Nakirebe by Iran-registered Halal Meat Co. Ltd., which is a joint venture of the governments of Uganda and Iran.³⁷

Ugandan Livestock Slaughtering And Processing Methods³⁸

Animal transportation to slaughterhouses includes trucks (lorries), motorcycles, bicycles, or walking them. Animals are housed in holding areas at the slaughterhouse while awaiting slaughter. National industry standards for meat packaging exist but are not enforced within abattoirs. Little attention is paid to disinfecting slaughtering instruments after each use and when they are disinfected, they are washed with cold water and soap. Most meat processing methods employ electrically powered commercial equipment. However, animals are slaughtered differently in small private and government abattoirs using manual or mechanical methods. Pigs are slaughtered informally and therefore do not undergo veterinary inspection. In spite of the availability of on-site incineration methods for destroying pathological waste and contaminated products, which include high-risk materials, tissues or materials that may contain bovine spongiform encephalopathy or other transmittable diseases, there is no special attention given to them. Incineration sites and facilities may be fenced, but they have minimal security and are usually unguarded. Moreover, onsite disposal for an animal that perished during transport may still include slaughter.³⁹

Live Animal Markets Regulations & Enforcement Capabilities⁴⁰

Live animal markets in Uganda are small scale, controlled by local governments, and are located in or around commercial areas. Veterinary services are not generally found at these markets, which are mostly located in open spaces or possibly in temporary buildings or structures. Moreover, stagnant bodies of water and wild animals may be present. Typically, animals are minimally constrained within the markets. For example, ruminants are constrained with ropes around them and poultry are kept in wooden and metallic cages.

Uganda Food Safety

Food-borne illness is a significant public health problem in Uganda with much of the burden of illness resulting from basic sanitation failures that occur in food production, processing, retailing, and handling in the home. Basic food hygiene is made difficult through the lack of a necessary sanitation infrastructure in many areas of the country and within segments of the food system. The Ugandan Ministry of Health has developed implementation strategies to address the nation’s food safety concerns. These include:⁴¹

- National Health Policy (2000) - Seeks to review and develop laws that govern health services and health related activities.
- Health Sector Strategic Plan (2005-2010) – Highlights issues of food safety and food hygiene.
- The Food and Drug Act (1964) – This law remains in effect, however, the Ministry has worked to revise it to develop a modern and unified National Food Safety Law. This Act empowers the Minister of Health to establish a Food Hygiene Advisory Committee with a mandate to advise the Minister to regulate any matters of food hygiene and safety in Uganda.

³⁴ <http://chrismulindwa.blogspot.com/2011/12/some-important-pig-production-news.html>

³⁵ <http://www.ilri.org/ilri/news/index.php/archives/category/countries/uganda>

³⁶ Information was derived by private industry research analysts in the course of their normal research projects through discussions with knowledgeable individuals with good access to the information. The individuals providing information included Doctor’s of Veterinary Medicine (DVM) serving as local and district veterinary officers, DVM faculty at Makerere University and private veterinary practitioners in Uganda.

³⁷ <http://www.monitor.co.ug/Business/Prosper/-/688616/1369280/-/bomksp/-/>

³⁸ Information was derived by private industry research analysts in the course of their normal research projects through discussions with knowledgeable individuals with good access to the information. The individuals providing information included Doctor’s of Veterinary Medicine (DVM) serving as local and district veterinary officers, DVM faculty at Makerere University and private veterinary practitioners in Uganda.

³⁹ Ibid

⁴⁰ Ibid

⁴¹ <http://www.fao.org/docrep/meeting/008/ae191e.htm>

- National Codex Committee - A multi–sectoral National Codex Committee (NCC) responsible for setting international food standards.
- National Food Safety Strategic Plan - The Ministry of Health in consultation with key stakeholders in the food industry is attempting to develop a plan to guide the implementation of the food safety laws, programs, activities, and other food safety control systems in the country.
- The Public Health Act (1964) - This law empowers health worker inspections of public eating-houses.

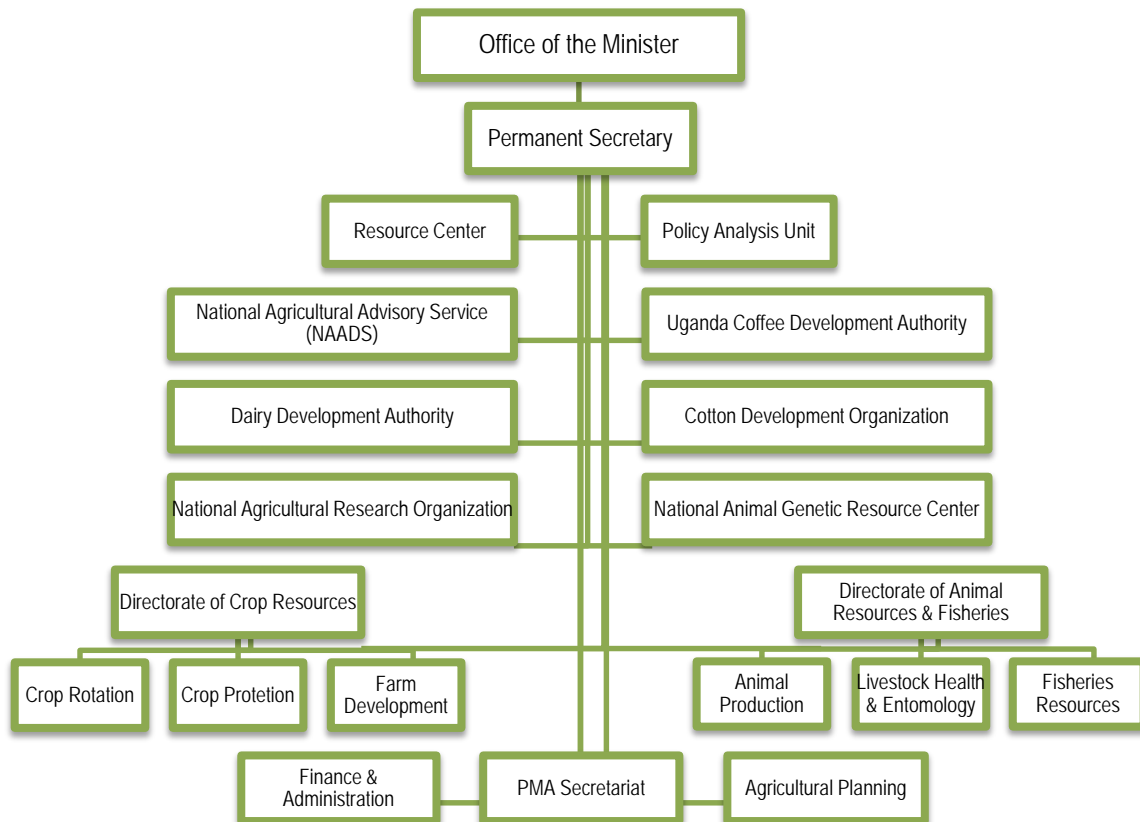
Livestock Identification

In 1964 Uganda enacted several acts that dealt with animal identification; These included: The Animal Branding Act; The Animal (Straying) Act; The Cattle Grazing Act; The Cattle Traders Act; and The Animal Diseases Act. Livestock keeping communities in Uganda employ various identification methods or systems for their livestock including naming according to color, patterns, the shape of (or lack of) horns, ear notching, hot iron branding, and use of ear tags (plastic and or metallic), Radio Frequency Identification (RFID) or any other electronic systems, ear tags, and tattooing, which is used more as decoration rather than identification.

National Livestock Government Structure and Authorities⁴²

The national government’s organizational infrastructure is lacking in key functional areas supporting Veterinary Services to include operability, stability, dedicated lines of authority, responsibility, and leadership. Poor design and political instability resulting in frequent political changes and ambiguous communication pathways serve as impediments for dealing with animal and/or zoonotic disease preparation, response, and control. Although some planning and standards have been developed at the national level for incident control, these standards and policies are not fully effective, as they are not specifically targeted to health or agricultural matters.

Structure of the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) ⁴³



⁴² Information was derived by private industry research analysts in the course of their normal research projects through discussions with knowledgeable individuals with good access to the information. The individuals providing information included Doctor’s of Veterinary Medicine (DVM) serving as local and district veterinary officers, DVM faculty at Makerere University and private veterinary practitioners in Uganda.

⁴³ Ugandan Ministry of Agriculture - <http://www.agriculture.go.ug/>

The Ministry acts to formulate, review, and implement national policies, plans, strategies, regulations, and standards; and enforce laws, regulations, and standards along the value chain of crops, livestock, and fisheries.⁴⁴

Key Functions

1. Control and manage epidemics and disasters;
2. Regulate the use of agricultural chemicals, veterinary drugs, biological, planting, and stocking materials;
3. Support the development of infrastructure and use of water for agricultural production;
4. Establish systems to collect, process, maintain, and disseminate agricultural statistics, and information;
5. Support inputs to increase production and commercialization of agriculture for food security and household income;
6. Develop public infrastructure to support production, quality/safety assurance and value-addition along the livestock, crop, and fisheries commodity chains;
7. Monitor, inspect, evaluate, and harmonize activities in the agricultural sector;
8. Strengthen human and institutional capacity and mobilize financial and technical resources for delivery of agricultural services;
9. Develop and promote collaborative mechanisms nationally, regionally, and internationally on issues pertaining to the sector.

In addition, MAAIF has the following eight agencies responsible for the following delegated functions⁴⁵

1. National Agricultural Research Organization⁴⁶ (NARO) - generation and dissemination of research technologies;
2. National Agricultural Advisory Services⁴⁷ (NAADS) - delivery of advisory services;
3. National Animal Genetic Resource Center and Data Bank⁴⁸ (NAGRC&DB) - animal genetic development;
4. Coordinating Office for the Control of Trypanosomiasis in Uganda⁴⁹ (COCTU);
5. Dairy Development Authority (DDA)⁵⁰ - promotion of dairy development;
6. Uganda Coffee Development Authority⁵¹ (UCDA) - promotion of coffee development;
7. Cotton Development Organization⁵² (CDO) - promotion of cotton development;
8. Plan for Modernization of Agriculture Secretariat⁵³ - implementing the Prosperity for All (PFA) Strategy.

Directorate of Animal Resources & Fisheries

The Animal Resource subsector is managed under a joint directorate arrangement combining Livestock and Fisheries. The Directorate of Animal Resources & Fisheries is composed of three departments:

1. Animal Production and Marketing⁵⁴
2. Livestock Health and Entomology⁵⁵
3. Fisheries Resources⁵⁶

The objective of the Directorate is to support animal disease and vector control, market oriented animal production, and food quality and safety.⁵⁷ Its key functions are to provide technical guidance for formulation, review and implementation of policies, legislation, standards, plans and strategies in the areas of animal production, animal health, veterinary regulation, inspection and enforcement.

Department of Animal Production & Marketing⁵⁸

Comprised of three divisions, this department within the MAAIF provides oversight for animal production programs and has the responsibility for good animal husbandry practices. The three divisions are: the Dairy and Meat Division; the Animal Nutrition Division; and the Public Health and Marketing Division

⁴⁴ <http://www.agriculture.go.ug/index.php?page=aboutus&id=77>

⁴⁵ Ibid

⁴⁶ <http://www.agriculture.go.ug/index.php?page=bodies&id=42>

⁴⁷ <http://www.agriculture.go.ug/index.php?page=bodies&id=41>

⁴⁸ <http://www.agriculture.go.ug/index.php?page=bodies&id=45>

⁴⁹ <http://www.agriculture.go.ug/index.php?page=bodies&id=104>

⁵⁰ <http://www.agriculture.go.ug/index.php?page=bodies&id=46>

⁵¹ <http://www.agriculture.go.ug/index.php?page=bodies&id=43>

⁵² <http://www.agriculture.go.ug/index.php?page=bodies&id=44>

⁵³ <http://www.agriculture.go.ug/index.php?page=bodies&id=119>

⁵⁴ <http://www.agriculture.go.ug/index.php?page=departments&id=89>

⁵⁵ <http://www.agriculture.go.ug/index.php?page=departments&id=88>

⁵⁶ <http://www.agriculture.go.ug/index.php?page=departments&id=87>

⁵⁷ <http://www.agriculture.go.ug/index.php?page=sectors&id=81>

⁵⁸ <http://www.agriculture.go.ug/index.php?page=departments&id=89>

Department of Livestock Health and Entomology⁵⁹

The Department of Livestock Health and Entomology is responsible for all areas of animal health, including national animal disease prevention and eradication programs. The Department has three divisions, which include:

National Disease Control Division

- Formulates strategies for controlling the spread of animal disease and disease epidemics.
- Monitors outbreaks and prevalence of disease in the country as well as in neighboring countries.
- Examines laboratory samples from the districts as a backup for disease control programs.
- Prompts collection, collation, and dissemination of epidemiological data.
- Advises district authorities and decision makers on disease control strategy.
- Collaborates with research and international organizations on disease control matters.
- Ensures availability of ND vaccine, Contagious Bovine Pleuropneumonia (CBPP) vaccine, as well as other animal vaccines and vital drugs.

The Inspection and Regulation Division

- Formulation and enforcement of regulations pertaining to animal health.
- Advises on importation, distribution, and marketing of drugs and chemicals for use on livestock.
- Enforces laws and regulations to prevent spread of disease from animals to humans.
- Registers and supervises veterinary practitioners in accordance with laws, regulations, and codes of professional conduct.
- Enforces laws and regulations pertaining to animal welfare.
- Monitors and inspects importation of animals and animal products, including inspections at border entry points, to prevent the introduction of disease from other countries.
- Monitors and inspects to ensure that exported animals/animal products meet international health standards.
- Inspects and monitors livestock health activities of the local government to ensure that they are in conformity with national policies, standards, legislation, and plans.
- Coordinates and harmonizes livestock health control activities of the various local governments.
- Provides technical advice/assistance, support supervision, and training to the local government personnel engaged in livestock health control.

Entomology Division

- Formulates policies on the control of tsetse and nuisance biting flies of economic importance.
- Provides technical guidance and advice to local governments and district technical staff on all aspects relating to the control of tsetse and nuisance biting flies.
- Updates and maintains national data on tsetse and nuisance biting flies distribution, population density, species composition, and control.
- Manages national tsetse control pesticide residue monitoring laboratory, museum, and cartographic unit.
- Advises on importation and usage of chemicals for tsetse control.
- Monitors and evaluates performance of national tsetse control regulations and programs.
- Plans, mobilizes, and manages tsetse control operations in epidemic outbreaks of human sleeping sickness and animal trypanosomiasis.
- Collaborates with international agencies and institutions associated with the control of tsetse.

Department of Fisheries Resources⁶⁰

This department within the MAAIF is responsible for supporting sustainable, market oriented fish production along with management, development, quality control, and safety of fisheries products for improved food security and household income.

Ugandan laws, acts and policies governing food safety related to livestock and related products

Strategies and Plans

1. ***National Development Plan (NDP)*** of 2010/11-2014/15⁶¹ - creates employment, raising per capita income levels, improving labor force distribution, raising human, country and gender equality indicators, and improving the countries competitiveness to levels associated with middle income countries.

⁵⁹<http://www.agriculture.go.ug/index.php?page=departments&id=88>

⁶⁰ <http://www.agriculture.go.ug/index.php?page=departments&id=87>

⁶¹ http://www.unpei.org/PDF/uganda-NDP_April_2010.pdf

2. **The Plan for Modernization of Agriculture (PMA)**⁶²- Government plan for fighting and eradicating poverty from Uganda by changing the current subsistence agriculture to doing farming as a business.
3. **The Rural Development Strategy**⁶³ - reforms aimed at improving the welfare of the rural Ugandan people in terms of income, food security, and socio-cultural welfare.
4. **Livestock Development Strategy**⁶⁴ - identifies beef, dairy cattle, and poultry as strategic agricultural commodities for Uganda to receive increased investment levels for accelerated production.
5. **Animal Disease Control Strategy**⁶⁵ - comprehensive disease control strategy formulated by the Directorate of Animal Resources (DAR) to address key constraints to animal diseases in the country.
6. **Uganda Apiculture Export Strategy**⁶⁶ - primary aim of promoting trade in apiculture products, giving priority to the export markets, especially the EU, one of Uganda's leading export markets.

Policies

1. **The National Policy for Delivery of Veterinary Services**⁶⁷ - areas covered include clinical services, tick and tsetse control, veterinary pharmaceuticals and diagnosis, trade, veterinary public health, and animal welfare. The private sector is responsible for most services and the state for most regulation and policy formulation.
2. **The National Veterinary Drug Policy**⁶⁸ - ensures that the provisions concerning veterinary services are adequately addressed.

Acts

1. **Animal Diseases Act**⁶⁹ - relates to diseases of animals
 - Isolation and reporting of diseased animals
 - Public notification of animal disease outbreaks
 - Slaughter of diseased animals
 - Diseased animal ownership and carcass disposal
 - Power to examine, inoculate, disinfect, quarantine, and perform diagnostic testing on diseased animals
 - Power to enter, inspect, restrict slaughter, or prevent exhibitions
 - Compensation for disposal of diseased animals
 - Declaration of diseased areas
 - Improperly altering permits
 - Government seizure of diseased animals
2. **Animal Breeding Act**⁷⁰ - establishes the National Animal Genetic Resources Center and Data Bank, to provide for the promotion, regulation, control, marketing, import, export, and quality assurance of animal and fish genetic materials. Also repeals and replaces the Branding of Stock Act.
3. **Dairy Industry Act, 1998**⁷¹ - provides for the structure and functions of the Dairy Development Authority to provide for the promotion and control of the production, processing and marketing of milk and dairy products.
4. **Food and Drugs Act Chapter 278**⁷² - establishes provision for prevention of adulteration of food and drugs.
5. **Veterinary Surgeons Act**⁷³ - makes provision for registration of practitioners of veterinary surgery and for other matters connected with and incidental to the practice of veterinary surgery.
6. **Fish (Aquaculture) Rules, 2003**⁷⁴ - sets forth different permits that are required to engage in aquaculture, the prescribed offenses, and penalties under the Rules. Also, specifies aquaculture inspectors' powers.
7. **The Cattle Traders Act**⁷⁵ - makes provision for the licensing of cattle traders, i.e. any person engaged in the business of purchasing cattle for the purposes of resale or slaughter.

Dairy Development Authority (DDA)⁷⁶

This is a statutory body under the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), created under the Dairy Industry Act of 1998 with the mandate to develop and regulate the dairy industry in a sustainable manner.

⁶² http://www.wougnnet.org/Documents/FAO_IP/pma_ug.html

⁶³ www.naads.or.ug/wordpress/wp-content/uploads/75docRDS.pdf

⁶⁴ <http://www.ifpri.org/sites/default/files/publications/ifpridp01008.pdf>

⁶⁵ ftp://ftp.oie.int/SAM/2004/UGA_A.pdf

⁶⁶ <http://www.ugandaexportsonline.com/strategies/apiculture.pdf>

⁶⁷ http://www.eldis.org/fulltext/cape_new/Makerere_University_Workshop.pdf

⁶⁸ www.igad-data.org/index.php?option=com_docman..gid

⁶⁹ http://www.ulii.org/ug/legis/consol_act/ada1918138/

⁷⁰ <http://agriculture.go.ug/userfiles/Animal%20Breeding%20Act%202001.pdf>

⁷¹ http://www.ulii.org/ug/legis/consol_act/dia2000195/

⁷² http://www.ulii.org/ug/legis/consol_act/fada1959137/

⁷³ http://www.ulii.org/ug/legis/consol_act/vsa1958258/

⁷⁴ http://www.fao.org/fishery/legalframework/nalo_uganda/en

⁷⁵ http://faolex.fao.org/cgi-bin/faolex.exe?rec_id=079633&database=FAOLEX&search_type=link&table=result&lang=eng&format_name=@ERALL

⁷⁶ <http://www.dda.or.ug/index.php/about-us.html>

Dairy Development Department (within the DDA)⁷⁷

Registers dairy farmer's groups, supports dairy farmer's marketing organizations and dairy development activities such as dairy extension, dairy breeding research, dairy training, dairy products development, and general market promotion. The Dairy Development Department is also responsible for pooling dairy processing and marketing data.

Uganda Veterinary Response⁷⁸

Hampered by unavailable resources and lack of policy, Uganda's National Veterinary Services (NVS) infrastructure has limited authority to regulate matters relating to the outbreak of animal and/or zoonotic diseases. This extends to all levels of government as well as the relationship that the NVS maintains with private industry. In contrast, the military has full control and authority to deal with an outbreak of animal and/or zoonotic diseases. From a national perspective the lines of communication and relationships between veterinary services are vague related to food safety and security. Similarly, so are the relationships between the NVS and their interaction and span of control with all governmental levels. For example, although some information is disseminated from the national government concerning military and Veterinary Services, this information is more readily found at local government levels. At the state/regional/local levels Veterinary Service requirements are vague with respect to food safety and security services. They are also vague connecting to the private industry. From the vantage point at the state/regional/local levels, vague relationships exist to the military. More direct, strong, and well-defined relationships exist at the state/regional/local levels with NGOs.

Uganda Veterinary Board⁷⁹

The Uganda Veterinary Board was established within the provisions of the Veterinary Surgeons Act of 1958.⁸⁰ All members are appointed by the Minister of Agriculture and must be registered veterinary surgeons. In order to be qualified for registration as a veterinary surgeon an individual must hold a degree or diploma in veterinary science awarded by any university recognized by the Uganda Veterinary Board and must complete an internship of a type and for a period of time described by the bylaws of the Board.⁸¹ In addition to the qualification requirements, if the Board determines that it is in the public's best interest, it may grant a license to practice veterinary surgery to any individual who meets their requirements.

Uganda Veterinary Association

The Uganda Veterinary Association (UVA) promotes the veterinary profession by advocating for the highest professional standards of education, integrity, ethics, and service with focus on improving animal health, productivity, welfare, and the livelihood of the community. UVA is a voluntary organization composed of members of the veterinary profession granted full membership along with veterinary undergraduates who have associate membership. The Association has about 700 registered members working in public and private sectors.⁸²

Uganda Veterinary Services

Veterinary medicine in Uganda is carried out via open private practice supported by and in partnership with the national government.⁸³ The NAADS program allows farmers to hire private sector service providers of their choice.

The Ugandan Public Animal Health Service

This is managed by the Directorate of Animal Resources within MAAIF.⁸⁴ As of 2007 there were fifty veterinarians in the Ugandan central government; 322 in local government acting as veterinary officers in the districts; 129 private practitioners; 94 in the universities/colleges, laboratories, and research institutes; and 76 members of NGOs, or other businesses. There are 1,216 veterinary para-professionals and technical staff who work under the supervision of veterinarians and provide veterinary field services. Approximately twenty of its members operate as private veterinarians in the countryside.⁸⁵ Veterinarians, veterinary pathologists, and para-veterinarians (with diplomas) are

⁷⁷ <http://www.dda.or.ug/index.php/development-department.html>

⁷⁸ Information was derived by private industry research analysts in the course of their normal research projects through discussions with knowledgeable individuals with good access to the information. The individuals providing information included Doctor's of Veterinary Medicine (DVM) serving as local and district veterinary officers, DVM faculty at Makerere University and private veterinary practitioners in Uganda.

⁷⁹ http://www.ulii.org/ug/legis/consol_act/vsa1958258/

⁸⁰ Ibid

⁸¹ Ibid

⁸² <http://www.vetuganda.org/?act=gallery>

⁸³ http://www.eldis.org/fulltext/cape_new/mombasconference/Leonards_et_al_CAHWS&AfricanPrivatisation.pdf

⁸⁴ <http://www.agriskmanagementforum.org/farmd/sites/agriskmanagementforum.org/files/Documents/UgandaDairy10.pdf>

⁸⁵ World Organization for Animal Health (OIE) Performance of Veterinary Services (PVS) Appraisal (2007)

formally recognized at the national, state, and local levels of government.⁸⁶ Examination and licensing for practicing veterinary professionals and para-professionals is required and continuing professional education and development requirements exist.⁸⁷ Veterinary professions not recognized by the government include veterinary technicians, veterinary assistants, veterinary pharmacists, and veterinary nurses.

The veterinary practice is not up to international standards and animal welfare conditions are very low. The use and dissemination of veterinary drugs is not restricted to veterinarians, with private drug companies responsible for the general importation and distribution of veterinary products. The Ugandan government only imports and funds vaccination programs for veterinary products for use in its control programs for particular diseases and vectors such as tsetse flies and trypanosomiasis. Most farmers treat their animals with available drugs, which has led to drug misuse.⁸⁸ A World Animal Health Organization (OIE) evaluation of veterinary services delivery in Uganda found that it is under staffed, has minimum organizational structure, and offers relatively low services despite the high economic potential of the animal industry.⁸⁹ The veterinary under-staffing and technical infrastructure inadequacy contributes to a relatively high presence of animal and zoonotic diseases and their vectors such as tsetse flies.

Uganda Veterinary Training

The College of Veterinary Medicine, Animal Resources and Bio-Security (COVAB) at Makerere University offers a five-year program leading to a Bachelor of Veterinary Medicine degree (BVM) and has graduate training programs, research, and development outreach services.⁹⁰ Most Ugandan veterinarians do not have adequate “hands on” training in investigating and responding to outbreaks. As a result, the University now offers a new Master of Veterinary Preventive Medicine program that is supported by the African Field Epidemiology Network (AFENET). There is a new training program funded by USAID called the RESPOND Project to implement a partnership with Makerere University School of Veterinary Medicine, the African Institute for Strategic Animal Resource Services and Development, Uganda’s MAAIF, and AFENET.⁹¹

Community Animal Health Workers (CAHW)

Community Based Animal Health Workers and other veterinary workers are not veterinarians. They are comprised of Para-veterinary Professionals that include animal health assistants and livestock technicians.⁹² Over 2,500 Para-veterinarians work in a wide variety of services including public and private animal health, animal production, and food hygiene. Para-veterinarians, who possess an undergraduate degree, diploma, or certificate are supervised by veterinarians.⁹³ CAHWs may be licensed for specific geographical areas and the veterinary board can define acceptable CAHW activities as well as specify training and supervision requirements.⁹⁴ CAHWs are responsible to, and generally selected by their communities. They are identified from other government veterinary support personnel through their independence from formal veterinary supervision and lack of salary more than by a level of training and competence. In addition, they are key information sources on animal related conditions and provide the parish chiefs with information that is then transmitted to the sub-counties and districts. The Doctor of Veterinary Medicine (DVM) relies on the CAHWs and near professionals to provide routine, accessible, and affordable care to livestock producers, to build a local reputation for reliability, and to refer cases that are beyond their capability. In turn, the CAHW depends on the DVM for training and the wholesale supply of pharmaceuticals⁹⁵

Uganda Agricultural Colleges

Training for the Para-veterinary staff is the responsibility of the National Agricultural Colleges, which are semiautonomous under the Ministry of Education and Sports. Some include:

Locations and contact information for Agricultural Colleges	
The Bukalasa Agricultural College ⁹⁶	The Arapai Agriculture College ⁹⁷
50kms North of Kampala, off Wobulenzi town.	Soroti district.

⁸⁶ Information was derived by private industry research analysts in the course of their normal research projects through discussions with knowledgeable individuals with good access to the information. The individuals providing information included Doctor’s of Veterinary Medicine (DVM) serving as local and district veterinary officers, DVM faculty at Makerere University and private veterinary practitioners in Uganda.

⁸⁷ Ibid

⁸⁸ Ibid

⁸⁹ <http://www.enteruganda.com/brochures/vethome03.html>

⁹⁰ http://covab.mak.ac.ug/index.php?option=com_content&view=article&id=49&Itemid=48

⁹¹ http://www.afenet.net/new/index.php?option=com_content&view=article&id=46%3Asecurities-and-financial-reporting&catid=46%3Aold&Itemid=151&lang=en

⁹² http://www.eldis.org/fulltext/cape_new/leyland_and_catley_oie_tunis.pdf

⁹³ http://typo3.fao.org/fileadmin/user_upload/drought/docs/C&DPublicationLivestockDiseaseSurveillance2.pdf

⁹⁴ http://www.eldis.org/fulltext/cape_new/leyland_and_catley_oie_tunis.pdf

⁹⁵ http://www.eldis.org/fulltext/cape_new/mombasconference/Leonards_et_al_CAHWS&AfricanPrivatisation.pdf

⁹⁶ http://www.aet-africa.org/?p=institution&s=display_&institution_id=18

⁹⁷ <http://www.btvet-uganda.org/training-provider/homepages/apia-agricultural-college>

Address: PO Box 174 Wobulenzi
Telephone number: 041-620020

Address: PO Box 203 Soroti

Availability of information pertaining to the Ugandan governments activities in the livestock agriculture sector and animal/zoonotic diseases of concern to the sector

While the information transmitted is not always accurate or consistent, the national government does have programs in place for alerting the public concerning an animal and/or zoonotic/food-borne disease outbreak. At the national level alerts are transmitted and communications fostered between upper and lower level government entities and also into the private sector. Information transmissions extend across borders as well, with communications directed towards other countries, bordering neighbors and NGOs.⁹⁸ The major viral diseases for poultry in Uganda, in order of importance are: Newcastle disease (ND), infectious bursal disease, fowl pox, Marek's disease, avian leucosis, and epidemic tremor. The key bacterial diseases include fowl typhoid, colibacillosis, salmonellosis, infectious coryza and mycoplasmosis, which are common in all sectors. Coccidiosis is very common and parasitic infections affect all poultry.⁹⁹ Notifiable cattle diseases, which are required by law to be reported to government authorities, cause a major loss to farmers because of animal mortality, reduced milk production, abortions, and quarantine measures. FMD, CBPP, lumpy skin disease (LSD), rabies, and anthrax are the major notifiable cattle diseases in Uganda. An upcoming disease, Rift Valley Fever (RVF), is also zoonotic.¹⁰⁰

Uganda livestock disease laboratories carrying out research and development (R&D), diagnostics/disease identification, research, and production on vaccines, other biologics, medicinal products, and related research on livestock diseases

Despite the clear role of biotechnology for complementing efforts in agriculture, sparse knowledge among farmers and policy makers has limited a wide adoption of already developed biotech products. Also, there are few or no supporting laws for biotechnology R&D in Uganda.¹⁰¹ In addition, the Veterinary Services infrastructure is insufficient in providing state-of-the-art R&D facilities, necessary physical resources, and fully trained personnel.¹⁰²

The National Agricultural Research System¹⁰³

The National Agricultural Research ACT of 2005 provides for the development of the National Agricultural Research System (NARS), for the purpose of improving agricultural research services delivery, financing and management. The NARS engages a cross section of stakeholders; its makeup includes organizations, public agricultural research institutes, universities, their tertiary institutions, farmers groups, civil society organizations, the private sector, and other entities engaged in the provision of agricultural research services.

National Agricultural Research Organization (NARO)¹⁰⁴

The NARO is the apex body for guidance and coordination of all agricultural research activities in the NARS in Uganda. NARO is a public institution established by an act of Parliament in 2005. The objective of NARO is coordination and oversight of all aspects of agricultural research in Uganda

Public Agricultural Research Institutes¹⁰⁵

The Public Agricultural Research Institutes are semi-autonomous research management entities under the policy guidance of the overall NRO for the purpose of providing agricultural research services. They are autonomous in their operations relating to the implementation of programs, allocation, and management of their resources in accordance with its approved annual programs. The public agricultural research institutes are of two categories; National Agricultural Research Institutes and Zonal Agricultural R&D Institutes. Nationally based public agricultural research institutes manage and carry out agricultural research of a strategic nature and of national importance. Those with significance to the livestock sector include:

1. National Agricultural Research Institutes

a. National Fisheries Resources Research Institute¹⁰⁶

⁹⁸ Information was derived by private industry research analysts in the course of their normal research projects through discussions with knowledgeable individuals with good access to the information. The individuals providing information included Doctor's of Veterinary Medicine (DVM) serving as local and district veterinary officers, DVM faculty at Makerere University and private veterinary practitioners in Uganda.

⁹⁹ <ftp://ftp.fao.org/docrep/fao/011/ai379e/ai379e00.pdf>

¹⁰⁰ <http://www.agriskmanagementforum.org/farml/doc/uganda-dairy-supply-chain-risk-assessment-february-2011>

¹⁰¹ MFPED. 2008. National Biotechnology and Biosafety Policy. Ministry of Finance, Planning and Economic Development. 39pp

¹⁰² Information was derived by private industry research analysts in the course of their normal research projects through discussions with knowledgeable individuals with good access to the information. The individuals providing information included Doctor's of Veterinary Medicine (DVM) serving as local and district veterinary officers, DVM faculty at Makerere University and private veterinary practitioners in Uganda.

¹⁰³ <http://www.naro.go.ug/About%20NARO/aboutnars.html>

¹⁰⁴ <http://www.naro.go.ug/About%20NARO/aboutnaro.htm>

¹⁰⁵ Ibid

b. National Livestock Resources Research Institute (NALIRRI)¹⁰⁷

This is the only livestock resources research institute in the country mandated to carry out research on livestock diseases and technologies. It develops technologies for livestock management, which is then passed on to MAAIF for adoption and implementation. NALIRRI does not have the personnel or the expertise to develop vaccines for livestock disease strains prevalent in Uganda. It also lacks equipment and facilities necessary for vaccine development. The failure to develop some essential vaccines in Uganda results in MAAIF's continued reliance on the importation of vaccines and its failure to undertake routine vaccinations.¹⁰⁸

c. National Agricultural Research Laboratories are the administrative home for the following National Research Units¹⁰⁹

- Agricultural Research Information Service
- Agro-Meteorological Unit
- Appropriate Technology and Agricultural Engineering Center
- Biological Control Research Unit
- Food Bio-Science Research Center
- National Agricultural Biotechnology Center
- Plant Genetic Resources Centre
- Post-Harvest Research

1. National Agricultural Biotechnology Center (NABC)¹¹⁰

The Government of Uganda established a National Agricultural Biotechnology Center (NABC) at the National Agricultural Research Laboratories, Kawanda. The NABC is the hub whose purpose is in coordinating various institutional laboratory nodes located in major institutions, mostly Makerere University (i.e., Departments of Crop Science in the Faculty of Agriculture, Biochemistry in the Faculty of Science, Veterinary Parasitology and Microbiology), Institutes of Environment and Natural Resources, National Agricultural Research Organization (NARO); Biosciences Laboratory at the National Crop Resources Research Institute, National Livestock Resources Research Institute and National Fisheries Resources Research Institute, and Agro Genetic Laboratories Ltd.

Locations and contact information for Key National R&D Institutes		
National Fisheries Resources Research Institute	National Livestock Resources Research Institute	National Agricultural Research Laboratories-Kawand
PO Box 343, Jinja Email: director@firi.go.ug Tel: 256-43-121369 Fax: 256-43-120192 Website: http://www.firi.go.ug	PO Box 96, Tororo Tel: 0454448360 E-mail - nalirri@gmail.com	PO Box 7065, Kampala Office Tel.: 0414567649 Office Fax: 0414567649 Official E-mail: karidir@imul.com Website: http://www.narl.go.ug/

2. **Zonal Agricultural Research and Development Institutes**

Zonal Agricultural R&D Institutes (ZARDI's) manage and carry out agricultural research for specific agro-ecological zones. Operational ZARDIs include:

Locations and contact information for Zonal Agricultural R&D Institutes		
Abi Zonal Agricultural Research and Development Institute	Buginyanya Zonal Agricultural Research and Development Institute	Bulindi Zonal Agricultural Research and Development Institute
PO Box 219, Arua E-mail: naraobizardi@yahoo.co.uk Tel: 256 476 421749/421734	PO Box 1356, Mbale E-mail: directorbugizardi@rocketmail.com	PO Box 101, Hoima
Kachwekano Zonal Agricultural Research and Development Institute	Mbarara Zonal Agricultural Research and Development Institute	Mukono Zonal Agricultural Research and Development Institute
PO Box 421, Kabale E-mail: bulindiardc@yahoo.com Tel: 0486-426492 / 426495/6 Fax: 0486 426492 E-mail: kazardi.director@gmail.com	PO Box 389, Mbarara Tel: 0485-20047/0485-20047/077-727412 Fax: 077-251413 E-mail: nara-mbr@utlonline.co.ug	PO Box 164, Mukono Tel: 041-290232 Fax: 041-290211 E-mail: mknardc@africaonline.co.ug

¹⁰⁶ <http://www.firi.go.ug/>

¹⁰⁷ <http://www.naro.go.ug/About%20NARO/About%20nalirri.html>

¹⁰⁸ <http://www.performanceaudit.afrosai-e.org.za/sites/performanceaudit.afrosai-e.org.za/files/Uganda%20%20-%20Prevention%20and%20Control%20of%20Livestock%20Diseases,%202009.pdf>

¹⁰⁹ <http://www.narl.go.ug/>

¹¹⁰ <http://www.biovisioneastfrica.com/publications/Status%20of%20biotech.pdf>

Website: http://www.kazardi.go.ug	
Nabuin Agricultural Research and Development Institute	Ngetta Zonal Agricultural Research and Development Institute
PO Box 569, Soroti PO Box 132, Moroto	PO Box 52, Lira Office Tel: 256 -045 4463507 Tel: 256-0473-690335 E-mail: narongetta_ardc@yahoo.com

3. **Makerere University Walter Reed Project**¹¹¹

Makerere University Walter Reed Project (MUWRP) is a non-profit partnership between Makerere University and the U.S. Military HIV Research Program. Recently, MUWRP expanded into the research of other communicable diseases of public health concern in Uganda. Until recently, most research involved HIV and other significant human public health diseases. Two Biosafety Level 2 Laboratories were renovated, one to process animal samples at the Makerere University Faculty of Veterinary Medicine and the other to process human samples at the Uganda Virus Research Institute in Entebbe for the AI Surveillance program. MUWRP recently expanded to include active surveillance of influenza and influenza-like viruses in humans, animals, and migratory birds. The program developed an infrastructure and capacity in clinical and immunological laboratory testing, data management, conducting clinical trials, and other related activities. This site was recently selected by the Vaccine Research Center at NIH to conduct a clinical trial on candidate vaccines for Ebola/Marburg.

4. **Brentec vaccine lab Uganda**¹¹²

Controlling ND at the household level has been documented as the most cost-effective strategy for uplifting household income and livelihoods for rural households in Uganda. The currently available commercial vaccines require a cold chain for transportation, which makes them unsuitable for delivery to rural households and communities. Brentec Vaccines Limited, which is one of the business incubators at the Uganda Industrial Research Institute (UIRI), set up a vaccine production facility that has been certified by the National Drug Authority to be compliant for current Good Manufacturing Practice. This facility has the installed capacity to produce between 100 and 150 million doses of I-2 Thermostable ND Vaccine.

Professional and technical competencies regarding laboratory testing, identification, and field diagnosis of animal and/or zoonotic diseases

Uganda has a national animal health laboratory network that is able to test, identify, and field products for diagnosis of animal and/or zoonotic diseases and their causative agents but only possess some of the necessary technologies, equipment, materials, and reagents. National laboratories are able to provide partial levels of timely and quality interpretable results. A mandatory accreditation/certification system is in place with minimum standards but compliance is only partially enforced. So too is partial enforcement true for transporting disease-causative agents. Field competencies among veterinary personnel only exist at moderate or limited capacities.¹¹³ In Uganda there is a generalized lack of capacity to diagnose livestock diseases at the district level, requiring most samples to be sent to the National Animal Disease Diagnostic and Epidemiological Center (NADDEC) at MAAIF causing delayed confirmation of diseases, determination of causative agents and required vaccinations resulting in disease spread and increased loss of livestock.¹¹⁴ In situations where districts are incapable of performing the necessary tests, MAAIF is informed within twenty-four hours and a team is dispatched from MAAIF to collect samples and send them back to the NADDEC who should have diagnostic capabilities for all notifiable livestock diseases in the country. Tests that cannot be performed at NADDEC (due to lack of technical and logistical capacity) are referred to laboratories outside the country. The ability to carry out diagnostic tests of the notifiable diseases like LSD, RVF, ND, rabies, CCPP, and infectious Bursal Disease (Gumboro) is limited due to a lack of diagnostic kits.¹¹⁵

Diagnostic Capacity at Districts¹¹⁶

Districts	Mini Laboratories	Centrifuges	Fridge	Reagents	LightMicroscope	Glassware
Mukono	No Lab	None	Available	No reagents	None	None
Rakai	Lab exists	Available	Available	Adequate reagents	Available	Adequate
Mbarara	Lab exists	Available	Available	Adequate reagents	Available	Adequate

¹¹¹ <http://www.hivresearch.org/network.php?place=uganda>

¹¹² http://www.uiri.org/index.php?option=com_content&view=article&id=127&Itemid=196

¹¹³ Information was derived by private industry research analysts in the course of their normal research projects through discussions with knowledgeable individuals with good access to the information. The individuals providing information included Doctor's of Veterinary Medicine (DVM) serving as local and district veterinary officers, DVM faculty at Makerere University and private veterinary practitioners in Uganda.

¹¹⁴ <http://www.performanceaudit.afrosai-e.org.za/sites/performanceaudit.afrosai-e.org.za/files/Uganda%20%20Prevention%20and%20Control%20of%20Livestock%20Diseases,%202009.pdf>

¹¹⁵ Ibid

¹¹⁶ Ibid

Tororo	Lab exists	Available	Available	Adequate reagents	Available	Adequate
Soroti	Lab exists	Available	Available	Adequate reagents	Available	Adequate
Kasese	No Lab	None	Available	No reagents	Available	Adequate
Ntungamo	Lab exists*		Available	Adequate reagents	Available	Adequate
Arua	No Lab	None	Available	Adequate reagents**	Available***	Adequate
Kotido	No Lab	None	Available	No reagents	Available	None
Nakapiripiriti	No Lab	No Information	No Information	No Information	No Information	No Information
Nakasongola	No Lab	No Information	No Information	No Information	No Information	No Information
Gulu	No Lab	No Information	No Information	No Information	No Information	No Information
Lira	No Information	No Information	No Information	No Information	No Information	No Information

Source: OAG analysis of epidemiological reports and district data and interviews

- * Lab exists but not functional
- ** Assorted reagents provided by LGDP to start laboratory activities but not yet in place
- *** Light microscopes available but not in use

The National Animal Disease Diagnostic and Epidemiology Center (NADDEC)

Based at the Ministry of Agriculture in Entebbe, the NADDEC provides disease diagnosis and quality assurance services as well as to undertake, recommend and guide livestock farmers on disease control measures. It also supports district laboratories and acts as a referral point.¹¹⁷ It works closely with national and international development partners who have an interest in livestock disease control management. One of them is Makerere University, which sends students for practical externships in the laboratory. Development partners include the Japanese International Corporation Agency (JICA), which contributes in establishing laboratories in Kumi, Kiboga, Mpigi and Mbale districts, among others. The International Atomic Energy Agency (IAEA) based in Vienna, Austria, provides equipment to store reagents that are used in the diagnosis of diseases, while the US government supplies tamper-proof coded locks to enhance security for the laboratories. One of the major tasks for NADDEC is to advise farmers on how to use vaccines and drugs on their livestock.¹¹⁸

NAADDEC Diagnostic test capabilities for diseases important to international trade, August 2007¹¹⁹

Disease	Recommended Test	Alternative Test	Capacity	Capacity Level
Foot & Mouth Disease (FMD)	ELISA, VNT	CFT	3ABC ELISA Antigen detection blocking ELISA	Adequate (logistical & technical)
Rinderpest	ELISA	VNT	Capture ELISA, CELISA, IELISA	Adequate (logistical & technical)
Peste des Petits Ruminants (PPR)	VNT	ELISA	Immuno-capture	Adequate (logistical & technical)
Contagious Bovine Pleuropneumonia (CBPP)	CFT	ELISA	CFT, CELISA	Adequate (logistical & technical)
Lumpy skin disease	-	VNT	Lacking kit	Technical only
Rift Valley Fever	-	HI, ELISA, PRN	ELISA (Kit lacking)	Technical only
Blue Tongue	Agent ID, AGID, ELISA, PCR	VNT	Kit lacking	Technical only
African Swine Fever	ELISA	IFAT	IELISA (Kit lacking)	Technical only
Newcastle Disease	-	HI	Kit lacking	Technical only
Anthrax	-	-	Slide	Adequate
Echinococcosis Hydatidosis	-	-	PM	Adequate
Leptospirosis	-	MAT	Kit lacking	Technical only
Rabies	VNT	-	IFAT	Kits not available
Heartwater	-	ELISA, IFAT	Slide	Adequate
Trichinellosis	Agent ID	ELISA	ELISA (Kit lacking)	Technical only
Bovine Brucellosis	BBAT, CFT, ELISA	FPA	SAT	Adequate
Bovine genital campylobacteriosis	Agent ID		Agent ID	Adequate
Bovine Tuberculosis	Tuberculin test	-	Kits now available through JICA	Adequate
Enzootic bovine Leukosis	AGID, ELISA	-	ELISA (Kit lacking)	Technical only

¹¹⁷ <http://allafrica.com/stories/201108310803.html>

¹¹⁸ Ibid

¹¹⁹ Ibid

Infectious Bovine Rhinotrachitis/Infectious Pustular Vulvovaginitis	VNT, ELISA, Agent ID (semen only)	-	ELISA (Kit lacking)	Technical only
Trichomoniasis	Agent ID	Mucua Agg, Agent ID	Dark field microscopy	Adequate
Disease	Recommended Test	Alternative Test	Capacity	Capacity Level
Bovine Anaplasmosis	-	CFT, Agg Card	Slide/microscopy	Adequate but requires new techniques
Bovine Babesiosis	-	ELISA, IFAT/PCR	Slide/microscopy	Adequate (but requires new techniques)
Cysticercosis	-	Agent ID	Meat inspection	Adequate
Dermatophilosis	-	-	Slide/microscopy	Adequate
Theileriosis	Agent ID, IFAT	-	Slide/microscopy	Adequate but requires new techniques
Hemorrhagic Septicemia	-	Agent ID	Agent ID	Low
Bovine Spongiform Encephalopathy	-	-	ELISA – No kits available	Technical only
Ovine Epididymitis	CFT	ELISA	ELISA (Kit lacking)	Technical only
(Brucella ovis infection)			SAT	Adequate
Caprine & Ovine brucellosis (excluding Brucella ovis infection)	BBAT, CFT	Brucellin test	SAT	Adequate
Contagious Caprine Pleuropneumonia (CCPP)	CFT	-	CFT (Kit lacking)	Technical only
Porcine Brucellosis	BBAT	ELISA, FPA, VNT	ELISA (Kit lacking)	Technical only
Transmissible Gastroenteritis	-	VNT, ELISA	ELISA (Kit lacking)	Low
Infectious Bursal Disease (Gumboro disease)	-	AGID, ELISA	ELISA (Kit lacking)	
Marek's disease	-	AGID	No reagents	Low
Avian Mycoplasmosis (Mycoplasma gallisepticum)	-	Agg, HI	No reagents	Low
Fowl typhoid (Pullorum disease)	-	Agg, Agent ID	Agent ID	Technical only
Avian infectious bronchitis	-	VNT, HI, ELISA	ELISA (Kit lacking)	Technical only
Avian infectious Laryngotracheitis	-	AGID, VNT, ELISA	ELISA (Kit lacking)	Technical only
Avian tuberculosis	-	Tuberculin test, Agent ID	Agent ID	Technical only
Fowl cholera (avian pasteurellosis)	-	-	Agent ID	Technical only
Myxomatosis	-	AGID, CFT, IFAT	No	Low
Malignant Cattarrhal Fever	-	VNT, IFAT, PCR	No	Low
Salmonellosis	-	Agent ID	Agent ID	Technical only
Bovine Virus Diarrhea	Agent ID	-		Low
Trypanosomiasis (Tsetse transmitted)	-	IFAT	Agent ID (Hematocrit)	Adequate but requires new techniques
Nairobi Sheep Disease			No ELISA kit	Low
Scrapie	-	Agent ID	Histopathology	Low
Fowl Pox	-	-	RT PCR required	Low
Mange	-	Agent ID	Agent ID	Adequate
Highly Pathogenic Avian Influenza (HPAI)	Virological tests	RT PCR	AI virus type A antigen test kit	Only screening kits available. Requires RT-PCR

Legend:

PCR	Polymerase Chain Reaction
IFAT	Indirect Fluorescent Antibody Test
ELISA	Enzyme Linked Immunosorbent Assay
CFT	Complement Fixation Test
VNT	Virus Neutralization Test
CELISA	Competitive Enzyme Linked Immunosorbent Assay
I ELISA	Indirect Enzyme Linked Immunosorbent Assay
HI	Hemagglutination Inhibition test
AGID	Agar Gel Immunodiffusion Test
Agg	Agglutination
SAT	Serum Agglutination Test

Physical Security and safety measures for biological/medical R&D facilities

In Uganda, laboratories vary in complexity and quality from basic and poor quality to complex with work conducted in BSL-3 facilities. There are no BSL-4 laboratories in Uganda.¹²⁰ While some physical security features have been addressed, the biosafety level and physical structures used for biocontainment of biological agents within the R&D facilities are not always adequate and resources not always well-maintained. While no incidents, accidental releases, or loss of containment of biological agents at the R&D facilities have been cited; safety practices and procedures used by government R&D facilities would be considered unacceptable, not meeting world-class standards.¹²¹

Personnel reliability measures for biological / medical R&D facilities and programs

National professional standards of laboratory practice and research in Uganda are derived from international regulatory and accreditation standards. These standards are monitored by onsite inspection and include personnel standards, quality control and assurance standards, and proficiency testing stipulations. While policies and regulations exist, compliance is difficult to enforce.¹²² The Uganda National Council for Science and Technology (UNCST) has specific responsibilities for R&D oversight, registering and clearing research for all Ugandan scientific institutions, centers and other enterprises. This includes reviewing research protocols for ethical appropriateness, misconduct, fraud, projects that are potentially detrimental to human health and the environment, unauthorized collection/transfer of research material and/or information, and clandestine activities. Failure to register a project with the UNCST could result in legal consequences for non-compliance.¹²³ However, the system which regulates Ugandan laboratory standards and personnel reliability is weak as many labs and personnel within the country operate without proper registration and licensing.¹²⁴ Many laboratories are understaffed in personnel and expertise. Also, staffing is not equitably distributed throughout the country, training and supervision is not up to required levels, under-funding of lab development and improvement due to the lack of a dedicated government budget contributes to the problem and equipment lies dormant in laboratories because there are no skilled personnel trained to use them.¹²⁵

Plans and strategies for acquisition, stockpiling, disposition and use of vaccines to prevent, respond to, control, and recover from high consequence animal or zoonotic disease events or outbreaks

The government has the capacity for administering vaccines, other biologics, and medical products for preventing animal and/or zoonotic diseases at all government levels. However, Uganda's ability for maintaining and distributing a supply of key vaccines in the prevention and/or control of foreign and domestic animal and/or zoonotic disease outbreaks and its ability to comply with diagnostic test standards as defined by the OIE is uncertain. For example, during the 2008 FMD outbreak there was an inadequate vaccine supply.¹²⁶ The MAAIF is mandated to carry out nationwide animal vaccinations every year. It is also required to be prepared to access and provide vaccinations and drugs in the event of a disease epidemic. However, Uganda lacks sufficient financial resources to obtain many animal vaccines.¹²⁷ With support from internal funding sources, the FAO partnered with seven NGOs, the MAAIF, and the District Veterinary Offices to organize and carry out a three-year vaccination campaign against important livestock diseases of goats, sheep, and cattle in Uganda, which include Peste de petits ruminants (PPR) and CBPP.¹²⁸ Between 2010 and 2011, 16,000,000 chickens were vaccinated for ND, 600,000 cattle vaccinated against FMD, 500,000 cattle against LSD, and 400,000 cattle against Brucellosis. For further livestock disease control, 500,000 doses of FMD, 300,000 doses of CBPP, 250,000 doses of rabies vaccine, and 30,000 doses of East Coast Fever vaccine (ECF) were procured and distributed to districts for vaccinations. The vaccination program goal for the two-year period from 2010 to 2012 was a countrywide vaccination of 1,000,000 head of cattle against FMD, 500,000 head of cattle against CBPP, 1,000,000 goats and sheep against PPR, 100,000 head of cattle against LSD, 25,000 cattle against ECF, and 13,000,000 chickens against ND.¹²⁹

¹²⁰ [http://ugandanationalacademy.org/downloads/LAB%20report\[1\].pdf](http://ugandanationalacademy.org/downloads/LAB%20report[1].pdf)

¹²¹ Information was derived by private industry research analysts in the course of their normal research projects through discussions with knowledgeable individuals with good access to the information. The individuals providing information included Doctor's of Veterinary Medicine (DVM) serving as local and district veterinary officers, DVM faculty at Makerere University and private veterinary practitioners in Uganda.

¹²² <http://ugandanationalacademy.org/downloads/LAB%20report%5B1%5D.pdf>

¹²³ <http://www.uncst.go.ug/dmdocuments/Guideline,%20Research%20Registration%20Guidelin.pdf>

¹²⁴ [http://ugandanationalacademy.org/downloads/LAB%20report\[1\].pdf](http://ugandanationalacademy.org/downloads/LAB%20report[1].pdf)

¹²⁵ Ibid

¹²⁶ Information was derived by private industry research analysts in the course of their normal research projects through discussions with knowledgeable individuals with good access to the information. The individuals providing information included Doctor's of Veterinary Medicine (DVM) serving as local and district veterinary officers, DVM faculty at Makerere University and private veterinary practitioners in Uganda.

¹²⁷ <http://ugandaradionetwork.com/a/story.php?s=25359>

¹²⁸ <http://www.cultura21.net/karamoja/docs/FocusKja-SpecRep3.pdf>

¹²⁹ <http://www.agriculture.go.ug/userfiles/MAAIF%20Policy%20Statement%202011-2012.pdf>

Epidemiological assessments, modeling, and surveillance of animal or zoonotic disease events and outbreaks

The government does not directly have targeted epidemiological surveillance programs, but does accomplish these efforts through the assistance of the National Task Force, PACE, FAO, and WHO.¹³⁰ These programs are moderately supported by the military, council of agriculture, Ministry of Health, regional and local governments, and private industry. This contrasts with the international community, which fully supports Uganda's epidemiological surveillance programs.¹³¹ The MAAIF is mandated to carry out cross border surveillance in districts at risk of livestock diseases for early detection of diseases originating from neighboring countries. This is carried out through funded initiatives like the Program for Accessible Health, Communication, and Education.¹³² However, delays in reporting livestock disease outbreaks have contributed to increased disease prevalence countrywide.¹³³

African Swine Fever (ASF) Surveillance

Standard diagnostic techniques for ASF are not in place. Suspected ASF cases are diagnosed principally by clinical signs and postmortem lesions. Therefore, the status of the disease in Ugandan pig populations is not known.¹³⁴

Insect Disease Vector Control¹³⁵

A national or state-equivalent vector control program is in place but its effectiveness is very low, as the government provides no assistance to farmers for vector control.¹³⁶

Risk Management

The government has the ability to implement multidisciplinary teams for conducting risk analysis. These teams use up-to-date information and include epidemiologists, disease agent experts, economists and other commodity experts. State-of-the-art methodologies are used for providing multi-level risk assessments concerning threats from animal and/or zoonotic diseases. Within 96 hours of identifying the index case, risk factors can be identified.¹³⁷

Risk Mitigation

With Notifiable cattle diseases, it takes too long to vaccinate. During a major outbreak there is usually no strategic stock of vaccine in the country and government procedures to obtain vaccines are too cumbersome and time-consuming. The purchase and distribution of vaccines are largely only found in the private sector.

Models and Systems projecting economic impact of high consequence animal or zoonotic disease events or outbreaks

As part of the Ugandan Agriculture Sector Development Strategy and Investment Plan for the period 2010-2015, MAAIF has stated that it will improve its economic evaluation on the costs of pest and disease occurrences and of the different control efforts.¹³⁸ In general, internationally accepted methods are used to develop valid predictions, models and systems for projecting the economic impact of animal and/or zoonotic disease outbreaks. However, model development falls short, as some only cover the economic impact of disease outbreaks to some sectors with regard to trade and meat demands.¹³⁹

Actions and issues at the ports and land borders including enforcement, policies, import/export permits, port inspections for live animals, animal products, and related goods.

In the event of an outbreak, Veterinary Services obtain support from the national government to include military, the MAAIF, other relevant ministries and from the regional and local levels with mixed success. Veterinary Services

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¹³¹ Ibid

¹³² Ibid

¹³³ <http://allafrica.com/stories/201005260530.html>

¹³⁴ http://roavs.com/pdf-files/vol_5_2011/313-317.pdf

¹³⁵ <http://www.performanceaudit.afrosai-e.org.za/sites/performanceaudit.afrosai-e.org.za/files/Uganda%202010-2015%20Prevention%20and%20Control%20of%20Livestock%20Diseases,%202009.pdf>

¹³⁶ Information was derived by private industry research analysts in the course of their normal research projects through discussions with knowledgeable individuals with good access to the information. The individuals providing information included Doctor's of Veterinary Medicine (DVM) serving as local and district veterinary officers, DVM faculty at Makerere University and private veterinary practitioners in Uganda.

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¹³⁸ <http://www.pma.go.ug/docs/Agriculture%20Development%20Plan.pdf>

¹³⁹ Information was derived by private industry research analysts in the course of their normal research projects through discussions with knowledgeable individuals with good access to the information. The individuals providing information included Doctor's of Veterinary Medicine (DVM) serving as local and district veterinary officers, DVM faculty at Makerere University and private veterinary practitioners in Uganda.

have access to the international community, but have difficulty in obtaining support from private industry.¹⁴⁰ At the national level, at times, inspection procedures are not followed, depending on who is importing. Also, there are many routes, which cannot be checked.¹⁴¹ Physical security at the ports, waterways, and borders for live animals, animal products, related goods, and commerce are weak and inspection procedures at the ports and borders are inconsistent. More care and consistency is found when inspecting imports of live animals or products from known or suspected countries with animal and/or zoonotic disease activity. Concerning live animal inspection, there is a moderate amount of enforcement for import/export permits and veterinary health certificates at the ports and borders. Inspection of animals and/or animal products subject to inspection at ports of entry by the Veterinary Services at the national level is spotty. In addition, at the border there is insufficient manpower or facilities to monitor all entry points.¹⁴² In contrast, during a food-borne, animal, or zoonotic disease outbreak the national government maintains very strong control over the border or at least with respect to legitimate entry points by employing the military. Animal movement is restricted and movement permits are issued through military intervention. Humans entering the country are required to fill out documentation citing their country of origin. Suspect animals showing clinical signs of disease are immediately quarantined. The same is true for those from countries with “suspected or confirmed” cases of animal and/or zoonotic disease.¹⁴³ Animals entering the country are isolated into an animal quarantine station in order to undergo observation for a specific length of time and if necessary, the animals are tested or treated.¹⁴⁴

Permits for imports and exports of animal and fisheries breeds

No imports or exports of animal breeds or genetic material are carried out in Uganda without first obtaining a permit from the Commissioner of Livestock Health and Entomology.¹⁴⁵ To streamline export operations and meet specific market regulatory requirements the following documentation is critical for export transactions in the country:¹⁴⁶

Documents	Sources & Postal/Location Address	Required by	Cost (Shs.)
Certificate of Registration	Registrar General’s office, Ministry of Justice, Plot 1 Parliament Avenue Queens Chambers PO Box 7183, Kampala Tel: 256-41- 233219 Fax: 256-41- 254829 E-mail: mojca@africaonline.co.ug, info@justice.go.ug	All Exporters	Varies depending on company startup share capital
Export Certificate	Ministry of Tourism, Trade and Industry, Plot 6/8 Parliament Avenue, PO Box 7102 Kampala Tel: 256 41 343947 /256395 Fax: 256 41 341247/340427 E-mail: mintrade@mintrade.org	All Exporters but optional	1,500
Export Registration Certificate	Uganda Export Promotion Board Plot 22 Conrad Plaza, Entebbe Road, PO Box 5045 Kampala Tel:- 256 41 230233/ 230250 /259779, Fax: 256 41 259779 Email: uepc@starcom.co.ug	All Exporters	30,000
Border Permits	Issued at Border Districts	Exports at borders not exceeding US \$ 2,000	
Phytosanitary Certificate	Plant Protection Department (MAAIF) Kawanda or Entebbe Airport, PO Box 7065 Kampala, Tel: 256 41 322458/ 320801 Fax: 256 41 567507 E-mail: maaif-uqis@infocom.co.ug	Exports of crops and plants on consignment basis	2,000
(i) Fish Export Permit	Department of Fisheries (MAAIF) PO Box 4, Entebbe Tel: 256 41 320656/ 320563/ 320578 Fax: 256 41 320496 Email: fishery@imul.com whc@imul.com figaunit@africaonline.co.ug Website: www.lakevictoriafish.com	Exporters of Fish and fish products (Annual license) Fish and products exports on consignment basis	20,000

¹⁴⁰ Ibid

¹⁴¹ Ibid

¹⁴² Ibid

¹⁴³ Ibid

¹⁴⁴ Ibid

¹⁴⁵ <http://agriculture.go.ug/userfiles/Animal%20Breeding%20Act%202001.pdf>

¹⁴⁶ <http://www.ugandaexportsonline.com/documentation.htm>

(ii) Health Certificate	Contact:- Principal Fisheries Inspector (QA)		
(i) Animal and Products Export License	Livestock Health and Entomology -MAAIF, PO Box 102 Entebbe	Exporters of Animals and products.	50,000 per yr.
(ii) Animal Health Cert.	Tel: 256 41 320627/ 320376/ 320825	Exports on consignment basis	25,000 per consignment
(iii) Live Animals & Animal Products	Fax: 256 41 321010/ 321047	Exports on consignment basis	10,000 per consignment
International Movement Permit.	E-mail: maarif-ugis@infocom.co.ug	Exports on consignment basis	20,000 per consignment
(iv) Dogs and Cats Movement Permit	Contact: Asst. Commissioner, Disease Control / Asst. Commissioner, Inspectorate and Regulations	Exports on consignment basis	

Quarantines, animal movement control and tracing animal movements

Quarantine standards are reviewed and updated on an ongoing basis and meet many OIE standards. However, areas that do not meet OIE standards include the lack of an animal identification (ID) system, a food distribution traceability system, and control of an area within twelve hours of a presumptive or confirmed positive case of a high consequence disease. Even though procedures are in place to effectively close borders during an animal and/or zoonotic disease outbreak, these measures are only moderately effective in limiting the spread of animal and/or zoonotic diseases. Nevertheless, Uganda has had some success in implementing quarantines at the national and local levels.¹⁴⁷ Enforcement of the Animal Diseases Act and the relevant regulations in the country relating to animals is primarily a mandate of the department of Livestock Health and Entomology in collaboration with veterinary departments within the districts. However, in some cases the police, local administration police, and immigration officers at the border points assist with enforcement in collaboration with MAAIF. The MAAIF is expected to operate animal control points (ACPs) in high animal disease risk areas and along the NSRs.¹⁴⁸ The government historically has responded to livestock disease outbreaks with quarantines and sanctions on livestock movement within districts and between bordering countries.¹⁴⁹

Tracing animal movements and food distribution following a contagious high consequence animal or zoonotic disease event or outbreak

Uganda is included within a group of developing countries with an increasing interest in animal identification/recording and traceability systems. Since the beginning of the 1990s, animal identification and traceability systems have been used mainly to protect human health through identification of animals and tracing and controlling their movements. Animal identification, registration and traceability are addressed by various international agreements and standards, such as the World Trade Organization (WTO) Agreement on the Application of Sanitary and Phytosanitary Measures and its Agreement on Technical Barriers to Trade, the OIE *Terrestrial Animal Health Code* and the Codex Alimentarius under the Joint FAO/WHO Food Standards Program. In response to cattle rustling activities in the region, in 2011 a new livestock identification and traceability program began in the Karamoja region of Uganda.¹⁵⁰

Government communication, coordination, and cooperation during an animal or zoonotic disease event or outbreak

In 2010, the Government developed a National Policy for Disaster Preparedness and Management (NPDPM) Program to address its emergency response needs. The policy outlines potential natural and human induced disasters, which could affect Uganda, identifies policy actions for each disaster, and lists responsible institutions from national to local levels for a response to each disaster. It also describes the National Disaster Preparedness and Management Institutional structure and the make-up and responsibilities of the entities that work together within that structure.

The National Emergency Coordination and Operations Center (NECOC) is responsible for the effective coordination and networking of the various emergency response institutions for the government. It is directly linked to the Uganda Police Operations Center and all district police stations on a 24/7 basis, and is linked to UPDF and other security organs of government.¹⁵¹ In general, the national government uses a variety of techniques to communicate, coordinate and cooperate with other organizations. These include generating/transmitting alerts, coordination with

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¹⁴⁸ <http://www.performanceaudit.afrosai-e.org.za/sites/performanceaudit.afrosai-e.org.za/files/Uganda%20-%20Prevention%20and%20Control%20of%20Livestock%20Diseases.%202009.pdf>

¹⁴⁹ <http://ugandaradionetwork.com/a/story.php?s=39093>

¹⁵⁰ <http://ugandaradionetwork.com/a/story.php?s=32865&PHPSESSID=8f1f03f8c7ed859b21de56b14adf66b>

¹⁵¹ <http://opm.go.ug/manage/pdfs/DISASTER%20POLICY.pdf>

regional and local governments, public/private sectors, educational campaigns, across borders to neighboring countries, NGOs, and to other international organizations (television, newspaper, radio, internet, and the mail system). A recent example of success is the bird flu outbreak where each of the methods outlined above were used.¹⁵² From the national government down to the local level there is a general sense that an accurate and honest assessment is presented to the public concerning an animal and/or zoonotic disease event. Information is reported in a timely manner with regular frequency. However, government officials, disease experts, and the media are only minimally effective in interacting with one another during animal and/or zoonotic disease outbreaks.

The national government maintains strong relationships, programs, plans, and interaction with bordering countries, other countries worldwide, NGOs, international organizations, and its trading partners that could be called upon before, during, and following an animal and/or zoonotic disease event. At all government levels officials have had successes and failures in providing adequate information during animal and/or zoonotic disease outbreaks. In the case of an Ebola virus outbreak, open discussion of the epidemic, providing daily updates, fact sheets, and press releases were effectively employed. Thus, all levels of the community demonstrated solidarity and response to public health interventions that led to the rapid management and control of the Ebola outbreak.¹⁵³ However, there have been failures, as during a 2009 outbreak of ASF in Entebbe most herds were wiped out due to a lack of providing sufficient information to the public.¹⁵⁴

Coordination and interaction with entities outside the country and/or in the region regarding veterinary diseases

The national veterinary services infrastructure is highly dependent upon the WHO, FAO, OIE, and other NGOs for assistance.¹⁵⁵ International aid and NGOs play a large role in the Ugandan government's ability to respond to animal and/or zoonotic disease outbreaks where they place partial reliance on international assistance to prevent, respond to, and control animal and/or zoonotic diseases.¹⁵⁶

Biosecurity / Biosafety

In 2008, the Ugandan Cabinet approved the National Biotechnology and Biosafety Policy that established a system where the country could benefit from safe applications of modern biotechnology while at the same time assess and address any potential risks from those applications.¹⁵⁷ In 2009, the Uganda National Council for Science and Technology developed the Biotechnology / Biosafety Bill which, among other things, was meant to implement the 2008 policy and minimize and manage potential risks to the environment, human, and animal health that may be associated with genetically modified organisms ("GMOs").¹⁵⁸

Uganda Laboratory Biosecurity

In Uganda, BSL-3 laboratories are located at the Uganda Virus Research Institute (UVRI) in Entebbe and at the Makerere University Walter Reed Project (MUWRP) in Mulago, Kampala. The UVRI deals with specific highly pathogenic microorganisms. As noted earlier, there are no BSL-4 laboratories in Uganda.¹⁵⁹ Also as noted earlier, the government's laboratory biosecurity practices are weak. as Personnel working in laboratories have limited awareness of biosecurity matters and the majority of personnel involved in high-consequence animal and/or zoonotic diseases primarily work in the field.¹⁶⁰

Valuation or appraisal methodologies

As an officially stated policy, under the Uganda Animal Disease Act, any person whose animal is slaughtered under the provisions outlined in the Act will be compensated by the Government of an amount equal to the market value of the animal as assessed by a veterinary officer.¹⁶¹ Compensation after a loss from either the national or state-

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¹⁵³ Ibid

¹⁵⁴ Ibid

¹⁵⁵ Ibid

¹⁵⁶ Information was derived by private industry research analysts in the course of their normal research projects through discussions with knowledgeable individuals with good access to the information. The individuals providing information included Doctor's of Veterinary Medicine (DVM) serving as local and district veterinary officers, DVM faculty at Makerere University and private veterinary practitioners in Uganda.

¹⁵⁷ Government of Uganda, 2008

¹⁵⁸ UNCST, 2009

¹⁵⁹ Ibid

¹⁶⁰ Information was derived by private industry research analysts in the course of their normal research projects through discussions with knowledgeable individuals with good access to the information. The individuals providing information included Doctor's of Veterinary Medicine (DVM) serving as local and district veterinary officers, DVM faculty at Makerere University and private veterinary practitioners in Uganda.

¹⁶¹ http://www.ulii.org/ug/legis/consol_act/ada1918138/

equivalent government to the public is not even widely known to be available.¹⁶² In the private sector, Lion Assurance, an insurance company in Uganda, offers livestock products that cover risks related to livestock mortality and emergency slaughter on medical grounds. However, diseases such as tuberculosis, horse-sickness, redwater or gall sickness, FMD in the western region, and AI are excluded. Also, diseases resulting from an epidemic are excluded from compensation. In 2006, Lion Assurance began to offer a product for FMD for a small number of livestock owners in the Northern part of the country, but this insurance will not be available throughout the whole country, as the western side is currently under quarantine due to a high prevalence of FMD.¹⁶³

Cleaning and Disinfection Plans

The national/regional governments and private industry possess moderately established, effective, efficient, and viable cleaning and disinfection plans for the full range of potentially affected premises during and following an animal and/or zoonotic disease event. Procedures are in place to allow the progression from the classification of an infected premise to beginning the cleaning and disinfection phase within 72-96 hrs. However, these procedures for accountability and record keeping are considered too inconsistent for developing historical records.¹⁶⁴

Depopulation and Disposal Plans

The Animal Diseases Act addresses the issues of livestock depopulation and carcass disposal. Although only partially effective at the national and other levels, the Act makes provisions that allow any veterinary officer to have the authority to cause the slaughter of any animal affected or suspected of being affected by any disease. Any animal, which has been in contact with a diseased animal or has been otherwise exposed to the infection or contagion of disease, may also be slaughtered. If an animal dies of disease, any veterinary officer or inspecting officer may give directions with reference to the burial, destruction, or disposal of the carcass, hide, skin, hair, wool, litter, dung or fodder.¹⁶⁵ Carcass disposal techniques vary, but include onsite-burial, open-air burning, and incineration. However, the application of these methods does not meet OIE standards for infected/contaminated material and carcass disposal. Moreover, the National Veterinary Service has no interaction with the military in the areas of depopulation and disposal. However, very close ties exist between the National Veterinary Service and the international community as well as with state/regional/local governments. The National Veterinary Service would find it quite difficult seeking support from private industry. If animals were to be euthanized, the number of animals, species, risk of spreading the disease agent, and public acceptance would all be factors taken into consideration and, although expected, it is uncertain whether or not the carcasses would be disposed of within twenty four hours of euthanasia.¹⁶⁶

Regionalization Plans

There are national government agencies within the country in charge of regionalization, functioning in collaboration with the private sector.¹⁶⁷ These agencies work with stakeholders in establishing animal disease-free zones and identifying animal subpopulations with distinct health status. There are instances where Uganda successfully regionalized, and has been involved in trade negotiations with other countries concerning this topic. In the past, outbreaks of Anthrax and Rinderpest were managed successfully, in part, by employing limited regionalization.¹⁶⁸

Personnel Protective Equipment

Some personnel protective equipment (PPE) and training does exist in Uganda. However, guidelines and standards for disease-specific equipment are generally lacking. Typical PPE is simple, including gloves, masks, and coveralls, but does not include up-to-date equipment or special PPE for use during emergency situations. Medical monitoring is also a challenge and would not likely be carried out efficiently during an animal and/or zoonotic disease outbreak/event.¹⁶⁹

Wildlife Management and Surveillance

A wildlife surveillance and management program is established, but not solely by the government. It is carried out in collaboration with NGOs and the Uganda Wildlife Authority (UWA).¹⁷⁰

¹⁶² Information was derived by private industry research analysts in the course of their normal research projects through discussions with knowledgeable individuals with good access to the information. The individuals providing information included Doctor's of Veterinary Medicine (DVM) serving as local and district veterinary officers, DVM faculty at Makerere University and private veterinary practitioners in Uganda.

¹⁶³ http://www.oie.int/fileadmin/Home/eng/Support_to_OIE_Members/docs/ppt/OIE_-_Insurance_products_Part_III_.pdf

¹⁶⁴ Ibid

¹⁶⁵ http://www.ulii.org/ug/legis/consol_act/ada1918138/

¹⁶⁶ Information was derived by private industry research analysts in the course of their normal research projects through discussions with knowledgeable individuals with good access to the information. The individuals providing information included Doctor's of Veterinary Medicine (DVM) serving as local and district veterinary officers, DVM faculty at Makerere University and private veterinary practitioners in Uganda.

¹⁶⁷ Ibid

¹⁶⁸ Ibid

¹⁶⁹ Ibid

¹⁷⁰ Ibid