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An assessment of veterinary diagnostic services needs in Uganda

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The government of Uganda has experienced continued fiscal challenges from late 1980s to date. Consequently, the provision of veterinary services was liberalized and decentralized. This exposed veterinary service provision to many actors without adequate regulation and supervision. With the resurgence of infectious diseases, increased economic and health risks especially to the rural poor, there is the need to understand relational patterns of actors to ensure good governance and address emerging and re-emerging animal diseases risks. A questionnaire surveillance was undertaken in the district veterinary service centres of Uganda to assess the status of veterinary diagnostic services and evaluate their influence in the delivery of clinical and preventive veterinary services. The structure of veterinary diagnostic services in the districts in Uganda is still lacking. There is need to improve veterinary diagnostic service delivery in the districts in an attempt to improve the control of livestock diseases in Uganda to ultimately improve livestock production and productivity and hence household income.

Key words: Veterinary diagnostic services, Uganda.

INTRODUCTION

The history of Veterinary services in Uganda dates back to 1908 when the first British Veterinarian arrived to serve in the protectorate. Prior to this, urgent disease problems were dealt with by the Chief Veterinary Officer in Kenya who took three days to travel from Nairobi to Kampala. Later on, by 1912, the number of animal health specialists in the country increased to five and they were all foreign. The Veterinary Department was made formally responsible for the animal industry in 1921. The Uganda Veterinary service was at first concerned with the control of rinderpest and contageous bovine pleuropneumonia (CBPP), two diseases which continue to be priorities for the veterinary services today (Silkin and Kasirye, 2002). However, due to rigorous vaccination campaign, rinderpest has been eradicated globally.

All the top veterinary posts in the country by 1953 were still dominated by British veterinarians. These prevented the promotion of Africans without British qualifications by the colonial government to positions of Veterinary Officers or Heads of Department. This prompted the African diploma holders of the time to encourage one of their own to pursue further training in the UK. He returned in 1962 as the first veterinary graduate in East Africa, with Membership in the Royal College of Veterinary

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Surgeons. After the establishment of the East African Community (EAC), training shifted between the different campuses of the member states. The Veterinary school moved from Makerere in Uganda to Kabete in Kenya in 1959. It was later in 1962 incorporated into the University of Nairobi awarding the Bachelor of Veterinary Science degree (Mosha et al., 1997). The Assistant Veterinary Officer course in Makerere was abolished in 1962 and consequently, all serving diploma holders were sent to Kabete for a one year up-grading to Bachelors of Veterinary Science. A Veterinary Training Institute in Entebbe began training Animal Husbandry Officers in 1962 on a 2-3 year course in milk and meat production, to work alongside the Veterinary Assistants who were concentrating on animal health. The Faculty returned to the Makerere campus in 1971, and could turn out 30 to 35 veterinary graduates a year (Silkin and Kasirye, 2002). To-date, the faculty was rebranded as the College of Veterinary Medicine, Animal Resources and Bio-Security (COVAB), Makerere University. The college has diversified to a number of animal related study courses both at the undergraduate and postgraduate levels from Bachelors, Masters Degrees to Doctor of Philosophy (PhD).

The Uganda government adopted structural adjustment programs in the 1980s and early 1990s. This resulted in the decentralization and privatization of clinical veterinary services and the downscaling of the civil service (Haan and Umali, 1992). Consequently, clinical services, breeding and spraying for tick control were privatized, while vaccination of animals against epidemic diseases, quarantines and tsetse control were retained under the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) (Ilukor et al., 2014). These reforms were intended to reduce the costs of the public administration and to cut public expenditure. Unfortunately, this policy intervention had no impact because various challenges like corruption and the creation of more districts under decentralization resulted in increased public expenditure and stressed the capacity and accountability of both local governments and the central government. Hence the ultimate goal to reduce public administration costs as a proportion of public expenditure did not bear fruit.

Since 2005 to-date, the Ugandan government has been in the process of dividing districts into smaller units. This decentralization is intended to prevent resources from being distributed primarily to chief towns and leaving the remainder of each district neglected (Ocwich, 2005). Each district is further divided into counties and municipalities, and each county is further divided into sub-counties. The head elected official in a district is the chairperson of the Local Council five (usually written with a Roman numeral V). Originally, since independence Uganda had 33 districts divided into 4 regions. The regions of Uganda are known as Central, Western, Eastern, and Northern. These four regions are in turn divided into districts. There were 56 districts in 2002 (Uganda Bureau of Statistics, 2013), which expanded into 111 districts plus one city (Kampala) by 2010 (Ministry of Local Government, 2010).

Uganda lies astride the Equator, between latitudes 4° 12´N and 1° 29´ S and longitudes 29° 34´W, and 35° 0´E. Temperatures are in the range of 15° to 30°C. More than two-thirds of the country is a plateau, lying between 1,000 to 2,500 m above sea level. Precipitation is fairly reliable, varying from 750 mm in Karamoja in the Northeast to 1,500 mm in the high rainfall areas on the shores of Lake Victoria, in the highlands around Mt. Elgon in the east, the Ruwenzori mountains in the south-west and some parts of Masindi and Gulu. Uganda has a total land area of 241,548 km^2; Lakes, swamps and protected areas constitute 25%. More than 75% of the country (over 18 million hectares) is available for both cultivation and pasture. This land resource, together with the bodies of water, are the base upon which most of the 34.9 million Ugandans (2014 census estimates) and their livestock depend for their livelihood. The capacity of this land resource to sustain the rapidly increasing populations largely depends on the influence of edaphic (relief and soil fertility), climatic and biotic factors and how well they can be managed to increase and sustain its productivity. The country can be conveniently divided into seven broad agro-ecological zones which have similar economic and social backgrounds, and in which ecological conditions (soil types, topography, rainfall), farming systems and practices are fairly homogeneous.

Agriculture is the backbone of Uganda's economy; 95% of the population farms (both crops and livestock) on small farms for food and cash income, and on fairly large farms including ranches, of an average size of 1,200 ha and crop farms (5 to 20 ha). Agriculture contributes over 40% to the gross domestic product (GDP) and over 90% to the country's foreign exchange earnings. It also contributes over 60% of total Government revenue in addition to employing more than 80% of the total labour force and providing over half of the total income for the bottom three-quarters of the population (MFP and ED, 1996).

The major livestock species in Uganda include cattle, sheep, goats, pigs, rabbits and poultry. Livestock production is an important sub-sector of agriculture contributing about 7.5% to total GDP or 17% to AGDP. It is estimated that mixed farming small holders and pastoralists own over 90% of the cattle herd and all of the small ruminants and non-ruminant stock; they produce the bulk of domestic milk and slaughter animals. From an economic point of view, cattle are the most important livestock with significant contributions, though to a lesser extent, from goats and sheep. Pig and chicken meat production are also important.

METHODS

We did a needs assessment of Veterinary diagnostic services in

Uganda was conducted from 11th to 15th January, 2010. This was the initial stage of the project "Development of diagnostic tools for livestock diseases in Uganda". Busia, Tororo, Mbale, Kumi, Soroti, Lira, Masindi, Hoima, Kiboga, Mukono, Jinja and Iganga districts were visited. These were representative of the different geographical regions of Uganda including: Eastern, Northern, Western and Central Uganda. A questionnaire was administered to District Veterinary staff at District Veterinary service centres by interviewing District Veterinary Officers (DVOs), Veterinary officers (VOs) and Animal husbandry officers AHOs.

The Veterinary premises at the district headquarters were inspected, checking for laboratories, laboratory instalments, services like water and electricity, waste disposal, among others. Human resource capacity was also investigated at the district in terms of manpower skills and qualifications and capacity for laboratory diagnosis, for instance presence of laboratory technicians.

Ethical clearance

The study was conducted under permission from the National Agricultural Research Organization (NARO, Uganda) and Institutional Ethical and Animal Care guidelines were adhered to during the surveillance exercise.

RESULTS

Common diseases identified included Tick-borne diseases [East Coast Fever (ECF), Anaplasmosis, Babesiosis, Heart water]; Trypanosomosis; Brucellosis; Contageous bovine pleuropneumonia (CBPP); Mastitis; Tuberculosis; Foot and Mouth Disease (FMD); Helminthiasis; Orf; African Swine fever (ASF); Rabies; New castle Disease (NCD); Fowl Pox; Fowl typhoid; Gumboro; Coccidiosis; Bird Flu; Metritis; Mareks.

Methods used for disease diagnosis included: Clinical diagnosis (the most commonly used); farmer or environment; history; post mortem approach; wet, thin and thick, smears; faecal analysis, for example flotation method for faecal analysis; brucella antigen test for brucellosis in a few laboratories (Mbale, Soroti, Masindi); California mastitis test (CMT) (in Kiboga); drug sensitivity test for mastitis (in Kiboga); haematocrit centrifugation technique (HCT). Methods of diagnosis needed included: Basic tests for diagnosis wet, thin and thick, smears, faecal analysis, HCT. They are not being used in some districts either because the staff are not trained or there are no reagents/equipment; serological tests like agglutination tests for the above diseases especially viral diseases; molecular tests like polymerase chain reaction (PCR).

Diagnostic training needs included: Refresher courses to update knowledge on current diagnostic tools for example, PCR; training in laboratory techniques for people working in the laboratory (many of them are animal husbandry officers who are depending on knowledge they acquired during their training); more training in clinical diagnosis (the decision support card will be helpful) Tables 1 and 2.

Challenges in disease diagnosis

1. Lack of laboratory space for some districts.
2. Lack of trained personnel in disease diagnostics for example, technicians. They have resorted to using animal husbandry officers or Veterinary doctors who are not trained in disease diagnosis.
3. Lack of funds for supplies and other necessities for laboratory diagnosis.
4. Lack of equipment.
5. Veterinary staffs are not motivated to carry out disease diagnosis.
6. Farmers are not motivated to support laboratory diagnosis.
7. Lack of confirmatory tests for most diseases- treatment is based on clinical diagnosis and hence not accurate. Result is that animals are exposed to drugs they do not need resulting in drug resistance.

Observations

1. Partnerships are very important for sustaining the district diagnostic services. Most districts with laboratory services had partners like Mbale, Kumi, Kiboga were/are supported by JICA, Jinja Veterinary department is sharing with the medical sleeping sickness laboratory, Masindi Veterinary department staff take their samples to the hospital laboratory for testing, Busia veterinary department make use of the services of the Busia (Kenya) Veterinary department.
2. Donor-supported laboratories will close when the projects end.
3. Due to diagnostics challenges faced by veterinary staff because of lack of diagnostic skills, many of them are interested in undergoing training in diagnostic skills.

DISCUSSION

The status of Veterinary diagnostic services in Uganda is still lacking. Many districts do not have diagnostic laboratories and laboratory technicians. They depend on clinical signs for diagnosis, or they send samples to regional reference laboratories. This is a challenge as it compromises the quality of veterinary provision in Uganda. The skills of the Veterinary staff at the district in addition to the district Veterinary infrastructure are also lacking. There is need to equip the district Veterinary staff with refresher courses in Veterinary disease diagnosis and practice in general. The control of Veterinary diseases is important both for livestock production and productivity but for public health regarding zoonosis control as well since many emerging zoonotic diseases are of animal origin. The lack of established Veterinary diagnostic services and infrastructure (Tables 1 and 2) in addition to laboratory technicians implies that many diseases are left undiagnosed and many economic losses occur and public health casualties in form of

Table 1. Status of District Veterinary diagnostic services in Uganda.

District	Laboratory Yes/No	Laboratory personel	Laboratory equipment								
			Microscope	Centrifuge	Fridge/Freezer	Incubator	Weighing balance	Water bath	Sterilizer	Autoclave	Oven
Tororo	No (since Dec 2008 when celing of their building collapsed)	1 retired last yr, DVO (when he has time & it is a must).	10 (2 phase contrast, 8 light)	2	3 (1 faulty)	2	2?	0	1	1	
Busia	Yes	LA	1	0	1	0	0	0	0	0	0
Mbale	Yes	LA, 2 BVM (trained in diagnostics at Entebbe by JICA)	3	2 (HCT)	1	1	2 (1 digital pocket size)	0	1	1	1
Kumi	Yes	AHO & LA	2	2 (micro and macro)	2 (1 damaged during transportation)	0	0	0	1	0	0
Soroti	Yes	BVM, AHO	2	2 HCT (1 very new)	3 fridge/ freezer, I deep freezer.	0	0	0	1	0	0
Lira	Yes	NIL	1	1	3 (2 in good condition)	0	0	0	0	0	0
Masindi	Yes (non functional)	LA (retiring end of Jan, 2010)	1	1 (HCT)	5 (1 for -80, rest are -20, 4)	0	0	0	0	0	0
Hoima	Yes (about 3 km from their current location, just moved to a new building with no provision for lab)	Lab staff died sept, 2009)	2	2 (manual & electric)	4	0	1	1	1	0	1
Kiboga	Yes (well equiped)	BVM	2	2 (bench)	3 fridge/ freezers, 2 -20 freezers, 1 convertible fridge (kerosene/ electricity)	1	1 (Digital pocket size)	1 (waterbath/ sterilizer	1 (waterbath/ sterilizer	1	0
Luwero	No (for wet smears when very necessary)	BVM	1	0	2	0	0	0	0	0	0
Mukono	Yes	NIL	0	0	1	0	0	0	0	0	
Jinja	No (sharing with trypanosomiasis medical lab)	2 AHOs trained in some diagnostic skills.									
Iganga	No (former offices had but roof removed by heavy storm).	AHO, Ag DVO (mainly for tryps)	1(no x100 eye piece)	1 (HCT)	2	0	0	0	0	0	0

Table 2. Services.

District	Supplies					
	Electricity	Water	Generator	Gas cylinder	Water distillers	NGO/ partners
Tororo	Yes	Tap water	1 (not serviced)	None	None	
Busia	Yes	Tap water	None	None	None	Busia- Kenya Vet department
Mbale	Yes	Tap water	2	1 (13.7)	spoilt	JICA & FAO
Kumi	Yes	Rain water	1		None	JICA
Soroti	Yes	Tap water/ distilled water from Entebbe	spoilt	None	None	None
Lira	Yes	Tap water	1 (very old)		None	None
Masindi	Yes	Buy tap water	None	None	None	None
Hoima	Yes	Mineral water	1		0	Medical lab
Kiboga	Yes	Tap water/ rain water	1	1	0	JICA
Luwero	Yes	Tap water	None	None	None	None
Mukono	Yes	Rain water	None		None	None
Jinja	Yes	Tap water				Medical tryps lab
Iganga	No (but can get from nearby building) their former offices had.	Tap water/ Rain water	None	None	None	None

animal and human zoonotic deaths are left unaccounted for. The root cause of this challenge stems from the Government which decentralised Veterinary services yet district veterinary funding and staff recruitment is crippled. The Veterinary industry in Uganda is not given much attention as more funding and priority are given to other professional sectors. As a result, Veterinary diseases are widely spread and endemic in Uganda. The Government as a consequence cannot export animal products hence lost revenues. Zoonotic diseases are also widely endemic in Uganda, all as a result of the weak veterinary sector and funding in Uganda. Uganda is a country gifted by nature with a conducive environment for agriculture, yet it still suffers poverty, food shortage, shortage of animal protein and cases of malnutrition. Veterinary medicine plays a key role in the control and elimination of Neglected Tropical Diseases; therefore, if not sufficiently funded, disease control is compromised.

RECOMMENDATIONS

1. Regional laboratories should be established to help in solving some of the diagnostic problems especially those that need tests that cannot be availed at every district. This will reduce the costs and time required to take samples to the central Diagnostic laboratory in Entebbe. This will also enable farmers and veterinary staff make the right/timely decisions early enough since sometimes farmers never know the results that come from the tests done in Entebbe and even when the results come they may not be helpful to the farmer because almost all animals may have died and the problem may have been solved by guess work in which case more costs might have been incurred.
2. Veterinarians/Paraveterinarians should be trained in diagnostics skills. Animal Husbandry Officers (AHOs) can be taken for training in diagnostic skills and be taken on to handle laboratory work. This is in case the government (MAAIF/Local govt) cannot adjust its structure to provide fully trained laboratory technicians.

However, there will be need for some motivation to be given to those working in the laboratory since it requires more commitment than field work.
3. Diagnostic tools that are fast, simple and cost effective (especially penside tests) should be developed and disseminated. These do not require a lot of expertise and can even be used by farmers if trained. In addition, these tests may even be affordable by the farmers or given to them at subsidised prices and hence sustainable. Finally, since these tests are fast and simple, it will take a short while to get results and timely/right decisions can be made.
4. Farmers should be trained in good animal husbandry practices since some of the diseases result from poor animal husbandry practices.

Abbreviations

ECF, East coast fever; **CBPP,** contagious bovine

pleuropneumonia; **ASF,** African swine fever; **NCD,** New castle disease; **FMD,** foot and mouth disease; **JICA,** Japan International Development Agency; **FAO,** Food and Agriculture Organization; **DVO,** district veterinary officer; **VO,** veterinary officer; **AHO,** animal husbandry officer; **HCT,** haematocrit centrifugation technique; **Tryps,** trypanosomiasis; **BVM,** bachelor of veterinary medicine; **LA,** laboratory assistant; **PCR,** polymerase chain reaction; **CMT,** California mastitis test; **MAAIF,** Ministry of Agriculture, Animal Industry and Fisheries; **EAC,** East African Community.

Conflict of Interests

The authors have not declared any conflict of interests.

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