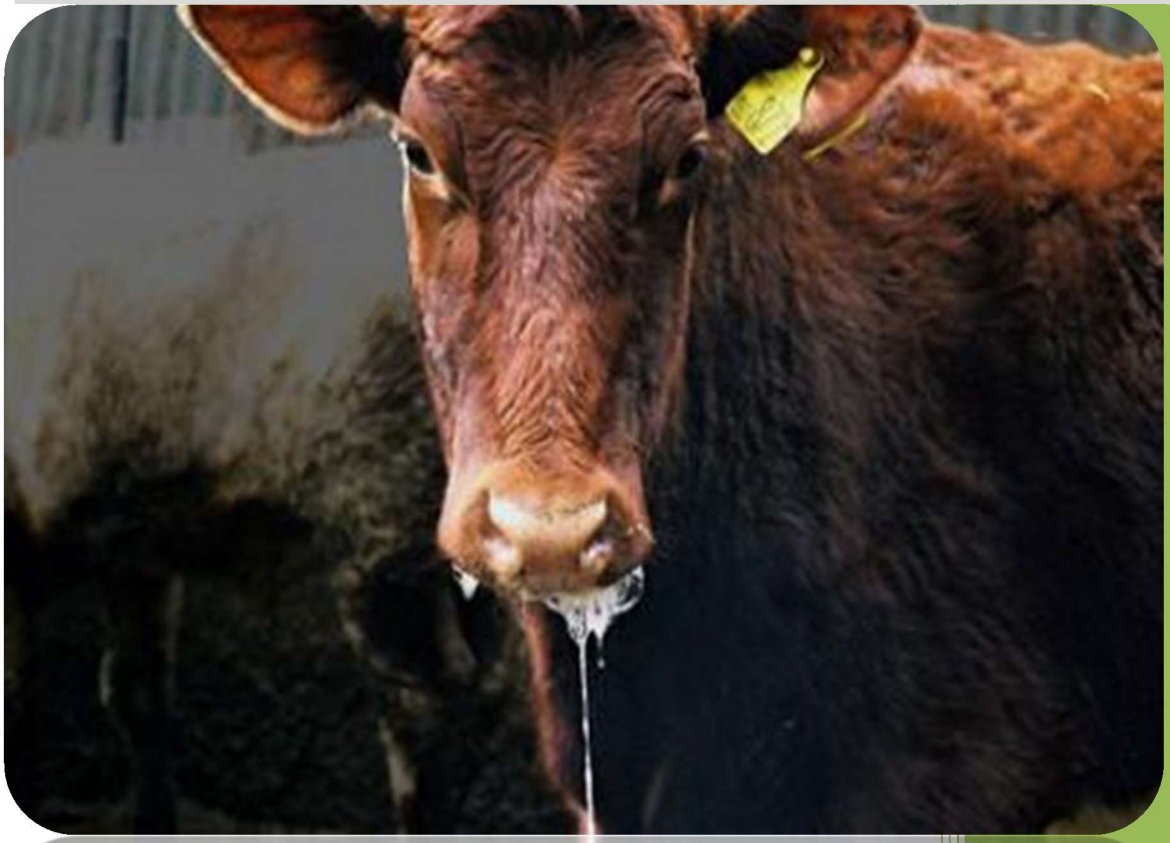
Performance Audit
Report No. 3 of 2018

CONTROL OF FOOT AND MOUTH DISEASE BY DEPARTMENT OF VETERINARY SERVICES



Office of the Auditor General
Republic of Botswana

FROM: Office of the Auditor General

P.D. LETEBELE
AUDITOR GENERAL

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TO: Hon. K. O. Matambo
Minister of Finance and Economic Development

DATE: 23rd April 2018

SUBMISSION OF PERFORMANCE AUDIT REPORT NO. 3 OF 2018 ON CONTROL OF FOOT AND MOUTH DISEASE BY DEPARTMENT OF VETERINARY SERVICES, MINISTRY OF AGRICULTURAL DEVELOPMENT AND FOOD SECURITY

I have undertaken a Performance Audit on the Control of Foot and Mouth Disease by the Department of Veterinary Services, Ministry of Agricultural Development and Food Security, pursuant to the Public Audit Act, 2012.

In addition to Section 124 (2) and (3) of the Constitution, Section 7 (1) of the Public Audit Act, 2012 gives the Auditor General the mandate to carry out Performance Audit in the public sector and that Performance Audit Reports are to be laid before the National Assembly, by the Minister responsible for Finance.

Accordingly, I submit the Performance Audit Report No.3 of 2018 on the Control of Foot and Mouth Disease by the Department of Veterinary Services, Ministry of Agricultural Development and Food Security to be laid before the National Assembly in accordance with the Public Audit Act.

Thank You

AUDITING FOR BOTSWANA GOVERNMENT

The Auditor General is the head of the Office of the Auditor General, appointed under the Constitution. She carries out her duties under the Public Audit Act 2012. She thereof, undertakes Performance Audits on the public sector bodies and submits reports to the National Assembly. The aim of the audit is to improve the public sector administration and accountability.

Auditor General's reports are available from the Government's Department of Printing and Publishing Services Bookshops.

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LIST OF ACRONYMS

AFROSAI-E	African Organisation of Supreme Audit Institution English Speaking Countries
APP	Annual Performance Plan
AU-IBAR	African Union Inter-African Bureau for Animal Resources
BNVL	Botswana National Veterinary Laboratory
BVI	Botswana Vaccine Institute
DVS	Department of Veterinary Services
DRFs	Disease Register Forms
DWNP	Department of Wildlife and National Parks
EIA	Environmental Impact Assessment
EU	European Union
FMD	Foot and Mouth Disease
INTOSAI	International Organisation of Supreme Audit Institutions
LAC	Livestock Advisory Centre
MoA	Ministry of Agriculture
OAG	Office of Auditor General
0IE	Office International des Epizooties
PMS	Performance Management System
SADC	Southern African Development Community
SAT	Southern African Territories
TADs	Trans boundary Animal Diseases
TV	Television

EXECUTIVE SUMMARY

FMD as a contagious disease has a major impact on the beef industry in Botswana as its outbreaks prevent the country from gaining access to major beef markets such as the European Union (EU). The outbreaks has proven to be costly to the Government, as they require radical steps to be taken to control and eradicate the disease and to prevent further outbreaks. For instance, during the period 2009 to 2014, the Government of Botswana spent P127 211 668 on the control of FMD.

The Government of Botswana therefore charged the Department of Veterinary Services (DVS) with the responsibility of promoting sustainable livestock industry through the control of animal diseases including FMD.

The Office of the Auditor General (OAG) therefore carried out a performance audit on the Control of FMD to assess whether the Department's goal of controlling FMD was being achieved. The significant observations made during the audit pertaining to the Department's planning in FMD control; FMD outbreak risk mitigation; strengthening of extension services as well as collaboration of the Department with key stakeholders are discussed hereunder;

SUMMARRY OF KEY FINDINGS AND RECOMMENDATIONS

1. STRATEGIC PLANNING

The DVS had not developed a comprehensive long-term departmental strategic plan that could provide a clear direction for the Department's FMD control efforts, identifying objectives and strategies to accomplish those objectives as well as outlining measurable goals supported with realistic, quantifiable benchmarks for monitoring and evaluating the department's overall performance in the long term. Additionally, the DVS had not adequately planned (Action Plan) for implementation of important interventions and resolutions pertaining to Foot and Mouth Disease Control,

with some plans lacking timelines for deliverables (e.g. Construction of the Protection Zone) which are crucial for monitoring implementation of key strategies and measuring progress.

Recommendations

The DVS should;

- Develop a comprehensive Departmental Strategic Plan clearly spelling out its long term objectives in the control of FMD.
- Devise action plans both at headquarters and district level, in line with different FMD related strategies including major capital projects like construction of protection zones and clearly stating timeliness for all activities in such plans.
- Devise an effective monitoring framework for implementation of all strategic and operational level objectives.
- Establish a clear and direct link between its strategic level planning and budgeting to ensure adequate resource allocation and efficient utilisation of resources.

2. FMD OUTBREAK RISK MITIGATION

The audit has revealed that the DVS had not adequately managed the risk of recurrent FMD outbreaks in the FMD high risk areas of the country. This was evidenced by sporadic FMD outbreaks in vaccinated zones, which resulted in Government spending over P129 million just on the control of the disease during the period from 2009/2010 to 2013/2014.

Key attributes to the Department's deficiencies in managing the risk of FMD outbreaks were mainly:

- Inadequate vaccination coverages
- Gaps in implementing surveillance plans
- Inadequate maintenance of cordon fences
- Deficiencies in implementing bio-security measures

- Deficiencies in cattle the traceability and identification system used in the FMD high risk zones.

Recommendations

The DVS should;

- Strengthen its farmer outreach strategies aimed at enhancing farmer awareness, participation and cooperation in FMD control, necessary for achieving adequate vaccination coverage.
- Fully involve farmers not only in execution but also in planning for vaccination campaigns which could help in improving cattle turnout during vaccination campaigns.
- Strengthen supervision and coordination at district level to ensure full compliance with surveillance plans necessary for early detection of FMD as well as enhancing credibility of FMD status of different zones.
- Ensure that surveillance plans are fully integrated into district level plans to ensure harmony with other activities (at district level) as well as to ensure efficiency in resource utilisation.
- Provide adequate budget provisions so that cordon fences are continuously maintained to ensure effective control of movement of both cattle and wild animals to prohibited areas thus minimising the risk of an FMD outbreak.
- Continue exploring (in collaboration with other relevant Ministries and farmers) options of devising an effective long term strategy that will help minimise damages to fences caused by elephants.
- Expedite the implementation of Botswana Animal Information and Traceability System in the entire country to complement the current branding system and ensure better livestock traceability and identification.

3. STRENGTHENING OF EXTENSION SERVICES

The DVS had not adequately provided of extension services to farmers particularly in communal areas, attributed to the Department's capacity constraints in terms of human resources and transport. This resulted in limited farmer participation and support in the control of FMD.

Recommendation

The OAG recommends that the DVS should:

- Devise clear guidelines in terms of content and structure of extension services programmes targeting farmers particularly in communal areas.
- Incorporate extension services in planning at district level and devise effective monitoring tools for extension services provided by Technical Officers in all extension areas.
- Devise means of enhancing and sustaining Farmers' Associations particularly in communal areas for effective information dissemination and buy-in by farming population.

4. COLLABORATION WITH KEY STAKEHOLDERS

Collaboration with important stakeholders was key to complement the efforts of the DVS in controlling FMD, particularly in the areas of transport, information sharing and manpower for fence patrols. However, the audit revealed that the DVS had not forged and formalised collaborative structures with other Government Departments in the fight against FMD. Where there was some form collaboration, the DVS had not developed a clear guide (for operational personnel) for such collaboration. This resulted in the DVS not adequately seizing the opportunities for gaining substantial support from other ministries in terms of resources crucial for the control of FMD.

Recommendations

The OAG recommends that the DVS should:

- Identify and explore opportunities for collaboration with relevant stakeholders particularly other Government ministries to ensure efficacy in the fight against FMD.
- In consultation with relevant stakeholders (including farmers), develop formal guidelines for shared responsibilities in the fight against FMD. This will encourage future participation of farmers in the fight against the FMD and hence in sundry, integrate them into their socio-economic wellbeing.
- Forge sustainable collaborative structures or platforms for the purpose of animal disease control.

CHAPTER 1

1.0 BACKGROUND INFORMATION

1.1 INTRODUCTION

Foot and mouth disease (FMD) is a highly contagious viral disease of cloven-hoofed domestic and wild animals, such as cattle, bison, pigs, sheep, goats, and deer. Because FMD is highly contagious, it is arguably one of the most destructive/devastating livestock diseases in terms of economic impact throughout the world.[1] This disease is often referred to as an economic disease because of the magnitude of economic harm that would result from production losses of livestock and severe restriction of agricultural exports during an FMD outbreak.[2]

FMD was first reported in Botswana in the early 1930's when the country became infected through the spread of the disease from the then Rhodesia and South Africa. It was later eradicated in 1934, but only to reappear sporadically throughout the 1940's, 1950's, 70's and 80's. Thereafter, no outbreaks were recorded until 2002.[3] Botswana has developed a national FMD control strategy hinging on the following pillars: passive and active surveillance, movement controls, zoning, strategic vaccination, stamping out where relevant, biosecurity, good legal framework, public education and awareness as well as bilateral and regional collaboration. As a result, the country has progressively extended its FMD free zones over the years since 1994. Currently, 85% of its cattle population resides in FMD free zones. FMD freedom opens up animal movements locally, regionally and creates access to all levels of markets including international markets.[4]

[1] THE ECONOMIC IMPACTS OF A FOOT-AND-MOUTH DISEASE OUTBREAK: A REGIONAL ANALYSIS (2007) by Dustin L. Pendell, John Leatherman, Ted C. Schroeder, and Gregory S. Alward
[2] FootAndMouthDiseaseInfo.org
[3] REVIEW OF FOOT AND MOUTH DISEASE CONTROL STRATEGIES IN BOTSWANA (JUNE 20012), DEPARTMENT OF VETERENARY SERVICES IN COLLABORATION WITH BOTSWANA VACCINE INSTITUTE
[4] FAO/OIE SUB-REGIONAL SEMINAR, 16-18 MARCH 2011

However, ever since the 2002 FMD outbreak, the country has been experiencing sporadic FMD outbreaks even in areas that had been declared FMD free zones by the Department of Veterinary Services (DVS) in the Ministry of Agriculture (MoA). The DVS is endowed with the responsibility to among other things, manage and control the FMD with a long term vision of ultimately eradicating the disease completely.

1.2 MOTIVATION

FMD is a disease that has a major effect on the beef industry in Botswana as its outbreaks prevent access to beef markets. More than 80 % of Batswana rely on the beef industry for their livelihood through products such as milk, meat, hides, draught power, income and socio-psychological support. Beef contributes the larger share (80%) of total contribution by the agricultural sector to the economy's Gross Domestic Product. This thus underscores why it is critical to deploy sufficient resources and commitment in the control of FMD in Botswana.[5] Even though the DVS had measures in place and despite the fact that the Government of Botswana through the DVS had expended approximately P127 211 668 on the control of FMD between financial years 2010 to 2014, the country continued to experience FMD outbreaks. In the last twelve (12) years (since 2002), there has been seven (7) outbreaks in FMD free zones and ten (10) outbreaks in the vaccination or infected zones which make an average of approximately two (2) outbreaks per year. The frequency of outbreaks has been increasing throughout this twelve year period. Table 1 provides an illustration of FMD cases recorded during the period from 2008- April 2015.

[5] DVS: Review of Foot and Mouth Disease Control Strategies in Botswana, June 2012

Table 1: Number of crushes affected on yearly basis from 2007 to 2015

Year	Number of crushes affected
2007/08	120
2009	14
2010	2
2011	7
2012	10
2013	15
2014	6
2015	9

***Source**: DVS Files*

Despite the Government's substantial investment in the fight against this disease, and despite the measures put in place by the DVS to control FMD, there were still inconsistencies and inefficiencies that resulted in the frequent occurrence of the disease. The Department of Veterinary Services used the cordon fence strategy as its back bone in the fight against the FMD. However, these fences are often damaged by elephants, farmers, as well as illegal immigrants leading to incursions of both buffaloes and cattle into prohibited areas. The DVS also experiences low vaccination coverage which leaves cattle susceptible to the FMD virus. Improper fence maintenance as well as indications of inadequate supervision of fence patrols, disease control gates personnel and maintenance work observed by the audit team during the preliminary study were all clear indications of the gaps in the DVS's efforts of ensuring effectiveness of the measures devised to ensure sustained protection of livestock from possible FMD outbreak. Based on the gaps outlined above, a main study was therefore undertaken to fully assess the effectiveness of the FMD control measures used by the DVS.

1.3 OBJECTIVES

The objective of the audit was to assess the extent to which the DVS had implemented measures in place to ensure effective control of the foot and mouth disease. The following were the specific objectives:

- To establish the extent to which the DVS ensured early detection of FMD virus infections/outbreak and rapid response to control its spread
- To ascertain whether the DVS adequately carried out maintenance of disease control infrastructure to ensure their effectiveness in livestock movement control.
- To establish the extent to which the DVS involved key stakeholders, necessary for complementing its efforts in the control of FMD.

CHAPTER 2

2.0 DESIGN OF THE AUDIT

2.1 STANDARDS AND GUIDELINES

The audit was conducted in accordance with International Standards for Supreme Audit Institutions. The standards require that the audit is planned and performed in order to obtain sufficient and appropriate evidence to provide a reasonable basis for the findings and conclusions based on the audit objectives

2.2 SCOPE AND LIMITATIONS OF THE STUDY

The audit focused on the entire FMD control process taking into account the strategies and procedures through which the Department of Veterinary Services (DVS) controlled foot and mouth disease.

The audit covered the FMD prone areas in the country delineated as red zones by the DVS, which are Zones 1, 2, 3, 6 and 7. The choice of these zones was mainly based on the consideration that they had experienced FMD outbreaks. Additionally, even at the time of the audit, FMD had broken out in Zone 2. The audit was also limited to the situation during the period from 2010/2011 to 2014/2015 financial years.

2.3 METHODS OF DATA COLLECTION

2.2.1 Interviews

A total of 19 verbal interviews were conducted at headquarters and at district level to gain insights into the disease control measures the DVS had in place as well as to identify gaps in the Department's efforts, important for drawing conclusions on the performance of the DVS. Additionally, nine (9) farmers were interviewed to understand the extent to which the DVS engaged farmers in the fight against FMD. Refer to **Annexure 1** for a list of officers interviewed during the study.

2.2.2 Document Review

Data was also collected through reviewing documents pertaining to the control of the FMD, reports produced from Districts and Headquarters as well as evaluation reports from trading partners (EU). In addition plans and legal instruments pertaining to the control of foot and mouth disease were reviewed. The documents reviewed as well as the reasons for reviewing them are depicted at **Annexure 2**.

2.2.3 Physical Observation

Tour of the disease control fence was made on the 17 November to the 5 December 2014 in zones 2, 6 and 7 respectively, to verify the condition of the fence and to observe the fence patrols. Places visited include Samochima, Matabologa camp and protection buffer zone fence, Setata gate, Seokgwe- Setata cordon fence, Kuke Gate, Matsiloje Border Gate, Ramokgwebana Border Post and Mawana camp. Selection of these places was random but consideration was made on accessibility in terms of terrain.

CHAPTER 3

3.0 DESCRIPTION OF THE AUDIT AREA

3.1 DEPARTMENT OF VETERINARY SERVICES

The Department of Veterinary Services is a Departments in the Ministry of Agriculture. It is headed by a Director. The Department is tasked with the responsibility of animal disease control to attain sustainable livestock industry to achieve food security and improve living standards of Batswana. It subscribes to the following Vision and Mission.[6]

Vision

The Department strives to provide the best services conducive to sustainable, globally competitive livestock industry to contribute to the achievement of food security, poverty alleviation and socio-economic growth in partnership with other stakeholders.

Mission

The Department of Veterinary Services strives to provide quality service to farmers and other stakeholders in order to promote sustainable livestock industry through; prevention and control of animal diseases, effective extension service, and provision of veterinary public health service. This will be achieved through a dedicated, skilled, well-resourced and highly motivated staff.

3.1.1 DIVISIONS OF THE DVS

1. POLICY, COMPLIANCE & DEVELOPMENT

Livestock Advisory Centre

The Division exists to serve as an outlet for the sales of livestock inputs to the farming community such as veterinary medicines, livestock feeds e.t.c, with

[6] http://www.gov.bw/en/Ministries--Authorities/Ministries/MinistryofAgriculture-MOA/Departments-of-MOA/Department-of-Veterinary-Services-DVS/ retrieved July 2014

centres established in major villages and towns. Currently there are thirty six (36) Livestock Advisory Centres country wide.

Compliance

The Division also coordinates Department's services associated with policy regulations and compliance to market requirements. Generally the office oversees the implementation of official controls by DVS staff. This involves;

- Training staff on official controls
- Monitoring and evaluation of official controls
- Coordination of internal audits of official controls

2. FIELD EXTENSION SERVICES

The Field Extension Services Division is responsible for animal disease control and prevention through;

- Monitoring, control and prevention of epizootics
- Clinical diagnosis and treatment of animals
- Provision of extension service on animal disease control and management
- Facilitation Livestock identification and meat traceability.

3. DISEASE CONTROL

The Disease Control Division is responsible for the development and formulation of diseases control, prevention and management guidelines; which include:

- Regulations on public health and zoonosis,
- Prevention of loss of genetic materials in certain breeds e.g. during disease outbreaks that requires stamping out,
- Establishment of the national disease standards system,
- Development of disease surveillance system,

- Management of the national livestock disease database and production of international reports on livestock events/diseases (OIE, SADC and AU-IBAR).
- Support research institutions through provision of data.

4. VETERINARY RESEARCH AND LABORATORY SERVICES

The Veterinary Research and Laboratory Services Division provides national laboratory services through;

- Disease diagnosis
- Research
- Food quality assurance.

5. MEAT HYGIENE AND QUALITY CONTROL

The Meat Hygiene and Quality Control Division is responsible for provision of veterinary public health services through;

- Meat inspection
- Supervision of meat processing plants.

6. IMPORTS AND EXPORT DIVISION

The Imports and Exports Division is responsible for the following;

- Establishes protocols of live animals and products
- Production of import/export data
- Monitoring and assurance of sanitary safety of imports
- Supervises departmental border inspection personnel
- Monitors compliance with live animals permits
- Implements and monitors livestock traceability system.

7. HUMAN RESOURCE AND ADMINISTRATION

The Human Resource and Administration Division is tasked with the provision of human resource/ administration functions as a support function.

3.1.2 RESOURCE ALLOCATION

3.1.2.1 FINANCES

Table 2 below displays both the Recurrent and Development budget for the control of FMD in Botswana between financial years 2010 and 2014.

Table 2: FMD Recurrent & Development Budget 2010-2014

YEAR	BUDGET PROVISION		EXPENDITURE	
	Recurrent	**Development**	**Recurrent**	**Development**
2009/2010	P 12 998 691	P 13 780 403	P 12 979 370	P 7 545 900
2010/2011	P 8 240 000	P 242 363	P 8 239 624	0
2011/2012	P 12 437 920	P 7 200 000	P 12 165 407	P 6 965 057
2012/2013	P 26 331 300	P 20 000 000	P 26 302 508	P 13 958 167
2013/2014	P 20 016 000	P 20 000 000	P 19 991 729	P 19 063 906
			GRAND TOTAL	**P 127,211,668**

***Source**: DVS Files (Administration Division)*

3.1.2.2 STAFFING

The Department has an establishment of 3650 staff both at headquarters and in all Veterinary Districts (10) countrywide. Refer to **Annexure 3** for the Organisational structure of the DVS relevant to FMD control and prevention.

3.2 KEY STAKEHOLDERS AND THEIR ROLE

FMD is a complex disease and the fight against it cannot be won by the DVS alone. For the Department to succeed in its effort to completely eradicate and control the diseases, it needs to collaborate with other stakeholders. The DVS therefore, in its determination to control the foot and mouth disease has partnered with the following entities in an attempt to manage the FMD challenge.

3.2.1 BOTSWANA POLICE SERVICE AND BOTSWANA DEFENCE FORCE

The DVS engages the BPS and the BDF during outbreaks to ensure that animal movement protocol is followed. They assist the DVS officers to search vehicles and bags of people crossing the gates to ensure that prohibited products do not cross to FMD free zones in an effort that FMD is contained in one area. The DVS also engages these forces for fence patrols, especially patrol of the border fences. They report to the Department any damages caused to the fence which in most cases is caused by illegal immigrants as well as report cattle incursions into Botswana or any of the neighbouring countries.

3.2.2 DEPARTMENT OF WILDLIFE AND NATIONAL PARKS

The role of the Department is to provide expertise on how the DVS can best deal with wild animals. The DWNP assists the DVS during buffalo incursions to drive the animals back into the park as a way of curbing the risk of the buffaloes mixing with cattle and infecting them with FMD virus as well as posing a threat to human lives.

3.3.3 FARMERS

The main role of farmers is to round up their cattle during vaccination campaigns and ensure that all their cattle are vaccinated against FMD. Farmers also patrol the fences near their farms to ensure that they are in good condition. It is the responsibility of farmers to report any damages observed on the fence to the Department of Veterinary Services for maintenance. Farmers are also expected to report incursions of both cattle and buffaloes to the Department to necessitate appropriate action being taken.

3.3 FMD CONTROL FRAMEWORK IN BOTSWANA

3.3.1 FOOT AND MOUTH DISEASE

FMD is an infectious and sometimes fatal viral disease that affects cloven-hoofed animals, including domestic (e.g. cattle, goats and pigs) and wild ruminants (e.g. antelopes). The virus causes a high fever for two or three days, followed by blisters inside the mouth and on the feet that may rupture and cause lameness. The disease in Botswana is caused by 3 serotypes of the Southern African Territories (SAT) FMD virus namely SAT 1, SAT 2 and SAT 3. These are found in the areas where there are buffaloes, in the northern part of the country. The African Buffalo (*Syncerus caffer*) is the carrier (host) of the FMD virus. The virus however does not cause any illness to the buffaloes. Therefore, buffaloes are not a threat as long as they do not come into contact with cattle and other susceptible animals (goats and pigs). All efforts in FMD control are aimed at preventing the transfer of the virus from buffaloes which are free ranging in National Parks and Game Reserves to susceptible animals[7].

Due to the predominant communal livestock management system in the country, presence of buffaloes in the north, lack of natural physical barriers (like mountains, lakes and rivers); the FMD control strategy is mainly premised on the following:

[7] FMD Contingency Plans for Botswana

- Risk based vaccination in FMD high risk areas,
- Biosecurity measures, disease surveillance,
- Separation of livestock populations with different FMD status,
- Movement control
- Public education.

3.3.2 SOCIO ECONOMIC IMPACTS OF FMD

FMD is probably the most devastating animal disease in the world causing impact on trade, both local, national and international, reductions in livestock production and significant costs in prevention and treatment. In cattle, FMD causes a range of production losses. It reduces milk production, with important knock on impacts on the availability of milk for calves and for human consumption. In some areas reduction of milk output has been reported to be as high as 33%. There are also additional costs associated with the presence of FMD, since countries with organised FMD control programmes have specialist units dedicated to the disease with the state Veterinary Services. These groups may be involved in disease investigations, surveillance, diagnostics, and control measures such as vaccination, movement control and sometimes culling and compensation.[8]

3.3.3 GUIDANCE AND REGULARITY INSTRUMENTS IN FMD CONTROL

FMD control in Botswana primarily derives guidance from the World Animal Health Organisation (well known by its French acronym *Office International des Epizooties* – **OIE**) International Standards, commonly known as the OIE International Standards. The OIE sets standards that are used worldwide in the area of animal health and livestock trade. Botswana is a member of the OIE. Managing FMD is spelt out in the standards set by the OIE which provide standards for testing, abattoirs, animal welfare as well as controlling of animal diseases (disease control). Terrestrial Animal Standards are the ones relevant to

[8] OIE: The Global FMD Control Strategy, 2012

the control of FMD world-wide and all procedures built into the control of FMD in Botswana are drawn from the OIE standards and as a member she has committed to adopting and using these standards to guide trade. In the Terrestrial Animal Standards, there is animal health code under which all animal diseases are dealt with including FMD. All procedures built in the control of FMD in Botswana are drawn from the OIE standards. In addition, the Diseases of Animal Act (1977) is used to manage and control livestock diseases including FMD in Botswana. [9] The Act provides for the prevention and control of animal diseases, the regulation of imports and exports, the movement of animals and animal related products, and under certain circumstances, the quarantine of animals.

3.4 FMD CONTROL MEASURES

The key strategies used in the control of the spread of the FMD during outbreaks include measures such as; cordon fences, vaccination, biosecurity, movement controls and surveillance.[10]

3.4.1 CORDON FENCES

Cordon Fences are a cornerstone of the FMD control strategy in Botswana[11]. The country's lack of natural barriers such as mountain ranges and permanent water bodies, and the predominately communal land system means that zoning is not possible without cordon fences. The Department of Veterinary Services has therefore erected a network of double cordon fences (5 meters apart) country wide which demarcates the country into different FMD control zones. Additionally, a buffalo fence separates the national parks from the vaccination zones. The primary purpose of these fences is to separate livestock populations with different FMD status as well as to control movement of livestock and

[9] Interview with Deputy Director-DVS
[10] Department of Veterinary Services-FENCE STRATEGY, FMD Contingency Plans for Botswana
[11] Department of Veterinary Services-FENCE STRATEGY

livestock products. Through these fences, the country is divided into different zones which are;[12]

1. **FMD vaccination zone (Red Zone)**

These are areas in the northern part of the country where there are buffaloes and are prone to FMD outbreaks. In these areas, vaccination for FMD is routinely undertaken to boost immunity of cattle against FMD virus. These zones include;

a) **Zone 7**: The zone shares an international boundary to the north and north east with Zimbabwe an FMD infected county, an FMD free zone of South Africa to the south-east and FMD free zone 9 and 8 to the south, west and north respectively (refer to figure 1). The zone is physically isolated by a double cordon disease control fence. It is an infected zone which is subjected to systematic vaccination against FMD at an interval of four (4) months.
b) **Zone 2e**: The zone borders with zone 12 and Central Kgalagadi Game Reserve (CKGR) to the south, zone 4a to the east, to the north is zone 2d and to the west is 2f. A network of fences isolate the zone from other zones.
c) **Zone 2f**: This zone borders with zone 12 to the south, Namibia to the west, to the east and south east is zone 2d, 2c and 2b to the north. The zone is delineated by disease control fences except to northeast.
d) **Zone 3b**: To the east, the zone borders with Zimbabwe and zone 3c (Maitengwe) to the south and south east. To the north, west and northwest are wildlife management areas. The zone is physically isolated by a network of fences.
e) **Zone 6 Protection Fence**: This is a double fence approximately 150km running from Dikgatlhong Dam in the south end to Vakaranga at the common boundary with neighbouring Zimbabwe in the north end.

[12] Department of Veterinary Services-FENCE STRATEGY, FMD Contingency Plans for Botswana

2. FMD surveillance zone

Commonly known as the Yellow Zone or Buffer zone: These are areas at the interface of the FMD prone areas (Red Zones) and FMD free areas (green zones).

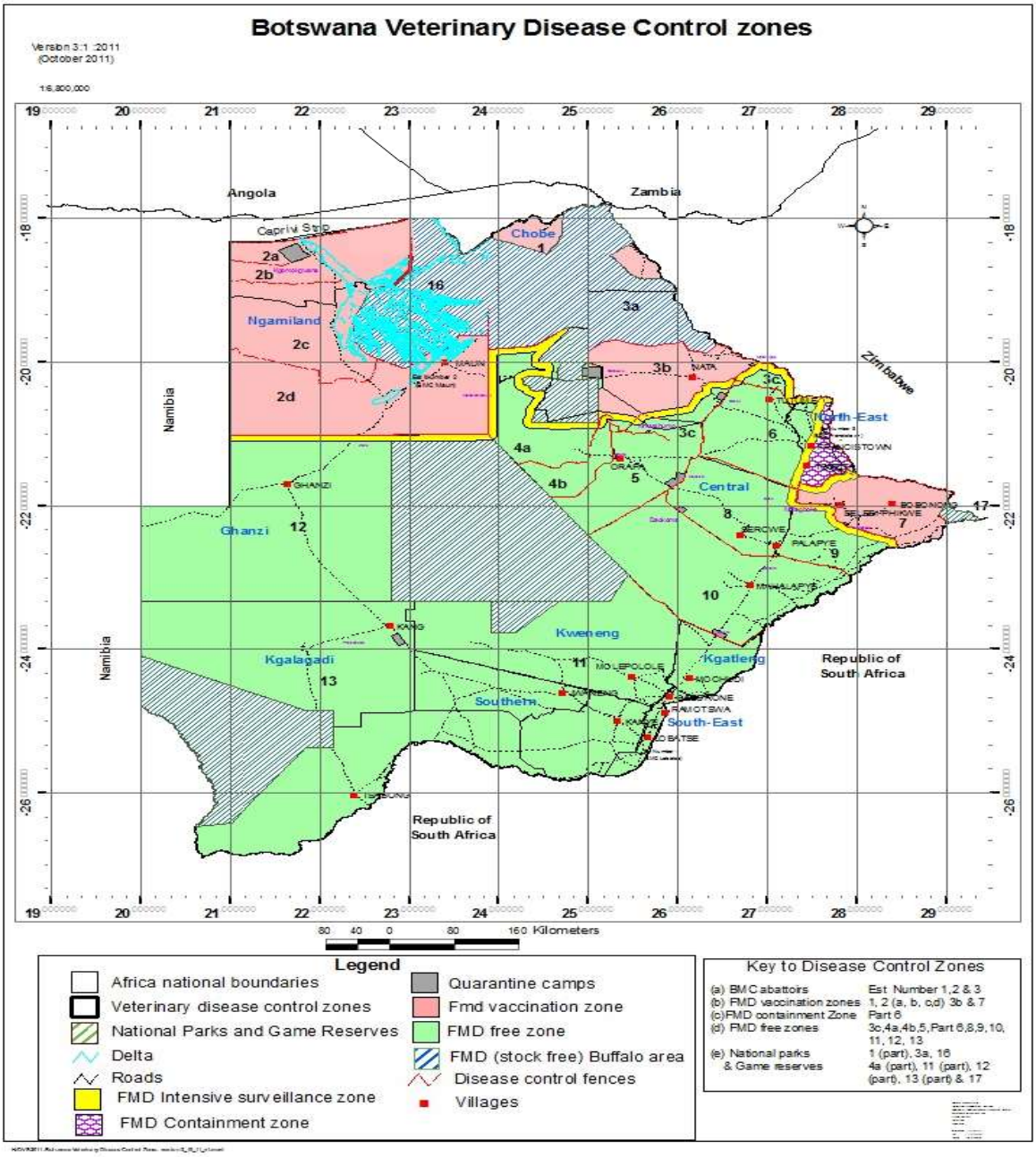
3. FMD free/Non-vaccinated zone (green Zone)

The country has one large FMD free zone which covers approximately two thirds (2/3) of the country. The free zone is resident to approximately 85% of the national livestock population. The zone covers a vast area of approximately 840 km long and 560 km wide. FMD free zone comprises of geographic disease control zones: 3c (Dukwi), 3c (Maitengwe), 4a, 4b, 5, 8, 9, 10, 11, 12 and 13. The FMD free zone is bordered by the FMD free zone of South Africa in the South and South-East and the FMD free zone of Namibia to the West. Zimbabwe which is an infected country and zone 7 are to the North East, and geographic disease control zones 2, 3b and Makgadikgadi National Park (MNP) to the North.[13]

In addition to these zones, there are stock free zones such as wildlife areas (National Parks and Game Reserves). These zones are separated by a double cordon fence, with one line being a 2.4 meter game proof fence and another one being a standard 1.5 meter cattle fence. However, in areas colonised by elephants, the DVS has decided that game proof fences not be used, rather standard fences (shorter) be used instead, so as to minimise damage to fences by elephants.[14] Most of the cordon fences are in the northern parts of the country which are predominantly FMD free zones with vaccination and are highly susceptible to FMD outbreaks due to presence of buffaloes in those areas.[15]

[13] Establishment of a protection zone by re-designation of the OIE recognised FMD free zone of Botswana
[14] DVS-Fence Strategy
[15] Department of Veterinary Services-FENCE STRATEGY

Figure 1: Map showing FMD delineated Zones



Source: *DVS documents (ToR Presentation September 2012)*

3.4.2 ROUTINE FENCE MAINTENANCE AND PICKET PATROLS

To ensure the effectiveness of cordon fences in controlling animal diseases, the DVS regularly maintains the fences. Each cordon fence has a number of camp sites for fence maintenance staff comprising fence erectors, gate keepers, store keepers and drivers. In between camps, there are pickets manned by picketers. Picketers patrol allocated fence sections, carry out minor repairs to the fence and chase away livestock from the cordon fence. Each patrol by a picketer is about 5 km or 10 km if on bicycle. District Offices supervise fence maintenance work and patrols through weekly visits to the fences, and ultimately report monthly on fence condition to DVS headquarters. During disease outbreaks, fence patrols are strengthened by joint fence and border patrols with the police and the army.[16]

3.4.3 QUARANTINES

As part of the country's zoning programme, the DVS has established 18 cattle quarantine camps to control animal movement into higher animal health status zones (green zones). These camps are large tracts of land, usually double fenced and divided into several paddocks with a central borehole and a crush pen. Animals are kept for 28 days and vaccinated against FMD at days one (1), 14 and 28. Quarantines are used for infected animals and suspected animals. Although these quarantine camps are not used to achieve a higher health status (FMD freedom), they indicate that the DVS is able to establish and maintain a form of compartmentalisation[17].

3.4.4 MOVEMENT CONTROLS

In an FMD outbreak, quarantine and movement control are critical activities for an effective FMD response effort. Movement of infected animals, animal products, and contaminated fomites, are restricted to stop the spread of the

[16] Interviews with DVS Technical staff, DVS Fence Strategy
[17] FMD Contingency plans for Botswana, Review of FMD Control Strategies in Botswana

virus. These movement control measures are carried out at entry points from FMD high risk areas (red zones) into FMD free zones without vaccination (green zones) as well as at border posts from neighbouring countries. All livestock movements from any farm premises or areas are prohibited once disease has been confirmed and a declaration published. Movements within farm premises (e.g. from field to another contiguous field) may continue to take place. These restrictions will apply until the extent of the disease has been assessed and the risk of further spread is minimised. Movement permits are required before animals and animal products can be allowed to move between zones. Movement of infected livestock poses the greatest risk of a disease spread.[18]

3.4.5 VACCINATION

Areas in Botswana where cattle are vaccinated against FMD viruses are delineated "red zones". These areas are confluent with the buffalo areas in which the FMD virus is endemic. Vaccination is done biannually in most of these areas but in the identified high risk areas (Chobe and Shakawe), vaccination is carried out three times a year. These vaccinations are continued because of the risk involved. Whenever there is an outbreak in the red zone, the livestock is re-vaccinated to strengthen their immunity. It is important that the vaccinations are done efficiently and effectively in order to maintain good immunity in cattle herds.[19] Where vaccination coverage is too low, follow-up vaccinations (booster vaccination) are arranged and conducted to complement routine vaccination campaigns. During each FMD vaccination campaign, all cattle from the vaccinated zones are branded for identification purposes.

3.4.6 SURVEILLANCE

The DVS carries out FMD virus surveillance in a 20 km surveillance delineated areas along the area that borders Botswana with the high risk neighbouring

[18] Tropicultura by Derah, N & Mokopasetso, M: The Control of FMD in Botswana and Zimbabwe
[19] Extracted from FOOT & MOUTH DISEASE CONTIGENCY PLANS FOR BOTSWANA

countries. The objective of surveillance is to assess the level of immunity in cattle against FMD in vaccination zones. The other objective is to determine the viral/disease activity in both vaccinated and FMD free zones specifically targeting high risk areas that are prone to FMD incursion.

The surveillance involves clinical inspection and statistical serum sampling of susceptible livestock on quarterly basis (every 3 months per year) and during outbreaks. Countrywide surveillance is conducted during routine activities such as Anthrax and Quarter Evil Disease vaccinations. The disease surveillance is carried out in farms and communal areas in the event of an outbreak in Botswana and/or neighbouring countries.[20] Disease surveillance is conducted mainly in two (2) ways, namely;

a) Active surveillance: Active surveillance is the deliberate search for FMD or infection. It is conducted in both the red and green zone for different reasons. In the green zone, this is done to ensure that there is no active FMD virus in areas illegible for export to the EU as well as to protect the status of the zone for trading purposes. Surveillance in the red zone is mainly done to assess the immunity level (viral activity) of cattle. This is done through various ways;
   - Planned clinical surveillance
   - Planned targeted clinical and serological surveillance in high risk areas
   - Monitoring of antigenic variation of the field FMD virus by Botswana Vaccine Institute (BVI).[21]

b) Passive surveillance: Passive surveillance is the routine gathering of disease data/information. This is done through various ways;
   - Farmer interviews

[20] FMD Surveillance Plan for 2013
[21] Foot and Mouth Disease (FMD) Contingency plans for Botswana

- Attendance of clinical cases
- Inspection of cattle prior to issuing of livestock movements permits
- Abattoirs inspections
- Submission of laboratory samples and their results.[22]

SURVEILLANCE OF BUFFALO INCURSION IN FMD FREE ZONES

Incursion of buffaloes in all FMD free zones triggers a series of activities that must be carried out compulsorily. These include immediate removal of buffaloes either by destruction and burial/burning or in the case of large herds by being driven away in collaboration with stakeholders (DWNP). Once removal is done, a list of all crushes through which direct or indirect contact of cloven hoofed livestock with buffaloes may have occurred shall be submitted to the Head of Field Services who shall in turn submit to the Head of Disease Control Division for development of survey design, in order to carry out both clinical and serological surveillance in in-contact livestock. Once surveillance is completed, the Disease Register Forms (DRFs) and associated samples together with a report on all clinical findings shall be submitted to the laboratory for testing.[23]

INCURSIONS OF FMD VACCINATED LIVESTOCK INTO FMD FREE ZONES

The offending livestock shall immediately be removed from the free zone following the current movement protocol (may be through destruction, slaughter or returned to district of origin). Once the removal is achieved, a list of all crushes through direct or indirect contact of cloven hoofed livestock with buffaloes may have occurred shall be submitted to the Head of Field Services who shall in turn submit it to the Head of Disease Control Division for development of survey design, in order to carry out both clinical and serological surveillance in in-contact livestock. Once surveillance is completed, the DRFs and associated

[22] Foot and Mouth Disease (FMD) Contingency plans for Botswana
[23] FMD Surveillance Plan for 2013

samples together with a report on all clinical findings shall be submitted to the laboratory for testing.[24]

3.4.7 BIOSECURITY

Biosecurity is the prevention of disease causing agents entering or leaving a livestock premises or area. It involves a number of measures and protocols designed to prevent potential disease causing agents being spread from one area to another. Biosecurity measures include disinfection (at disease control fence gates) of vehicles and people travelling from FMD high risk areas (red zones) into the FMD free zones with no vaccination (green zones). Trucks, market places, and loading ramps – in or over which infected animals may have travelled are a disease risk and are therefore properly cleansed and disinfected. The DVS also carries out disinfection at ports of entry along the borders with countries with high risk as a precautionary measure to prevent FMD introduction into the country. [25]

3.5 PUBLIC EDUCATION AND AWARENESS

The DVS regularly educates farmers and members of public on FMD control as well as on their responsibilities and measures to take during disease outbreaks. Such education is conducted through newspaper, radio and television broadcasts, kgotla meetings, workshops and seminars. FMD awareness campaign is also incorporated in the extension services provided by the Ministry of Agriculture. This education strives to encourage farmers to always remain alert and report suspected cases of FMD to the Veterinary Officers or the nearest Police Stations for immediate action.[26]

[24] FMD Surveillance Plan for 2013
[25] FMD contingency Plans for Botswana
[26] Interviews with DVS Technical staff

CHAPTER 4

4.0 FINDINGS

4.1 PLANNING IN FMD CONTROL

4.1.1 STRATEGIC PLANNING

The Performance Management System (PMS) in the Public Service requires that Ministries and their Departments develop strategic plans which articulate what they would deliver to the public during the six-year planning period.[27]

It was observed during the audit that the DVS had not developed a comprehensive long-term departmental strategic plan. Such a plan could provide a clear direction for the department's FMD control efforts, identifying objectives and strategies to accomplish those objectives as well as outlining measurable goals supported with realistic, quantifiable benchmarks for monitoring and evaluating the department's overall performance in the long term. Instead, the DVS developed several strategy documents such as the Fence Strategy, Fence Maintenance Strategy, the 2014/2015 Annual Performance Plan, the 2013 Surveillance Plan as well as the Annual Disease Surveillance Plan October 2014-March 2016. Such strategies lacked clear and measurable time bound objectives. While such documents were adequately relevant to FMD control, it was important to integrate them into a comprehensive Departmental plan in the form of a strategic plan, which could serve as a blue print of the DVS commitment to delivering on its mandate. Absence of a Departmental Strategic Plan was attributed to an oversight of management on the need for it (strategic plan). This oversight emanated from consideration that there was already a Ministerial Strategic Plan in place. However, it should be noted that such a plan was to a considerable extent generic and lacking clear focus on critical aspects of the mandate of the DVS such as disease control.

[27] PERFORMANCE MANAGEMENT IN THE BOTSWANA PUBLIC SERVICE- PUBLIC SERVICE REFORMS-BOTSWANA

Without a strategic plan, the DVS could not adequately coordinate district level planning to ensure its alignment with the overall organisational goals. A strategic plan could have enabled the department to efficiently prioritize its resources and could have also served as a baseline from which overall organisational progress could be measured.

4.1.2 ACTION PLANNING

The PMS requires that ministries develop action plans in the form of Annual Performance Plans in line with strategic plans to define what they (ministries) plan to achieve during a particular year.

Review of documents revealed that the DVS had not adequately planned for implementation of some important interventions and resolutions pertaining to Foot and Mouth Disease Control. While the Department developed an Annual Performance Plan (APP) for 2014/2015, the document did not adequately capture some key initiatives the Department had endeavoured to embark on as spelt out in different FMD strategy documents. In addition, those FMD strategy documents lacked clear timelines for all deliverables which could have helped the Department in monitoring implementation of its strategies as well as in measuring progress. For instance, review of the Update on Strategies for Combating Foot and Mouth Disease revealed that the document only listed the DVS short and long-term interventions without specifying the timelines when such interventions would be implemented and completed. In particular, the document lacked specific timelines for implementation of the following strategic interventions:

- Expansion of FMD free zones
- Commodity Based trade
- Establishment of FMD vaccine Bank
- Establishment of Disease Control Fund
- Establishment of Protection Zones
- Prioritised Disease Control Infrastructure Maintenance

No subsequent action plans were developed to clearly demonstrate time and resource allocation for implementation of such interventions. The only time bound intervention in the document was the Endorsement of the FMD Control Strategy by the OIE under which it was stated that the Department shall submit the FMD control Strategy in 2014 to the OIE.

Such action plans could specify the specific actions the DVS needed to take to address each of the top departmental issues and to attain each of the associated goals. In addition, the action plans could clearly specify who will complete each action and when. In the absence of such a well-coordinated planning framework, the Department lacked clear guide and commitment to implementation of key strategies regarding FMD control. Developing strategies without subsequent action plans also made it difficult for the department to appropriately monitor implementation of its long term objectives in controlling the FMD as well as to effectively plan and prioritise resource allocation and utilisation particularly at district level. Therefore, OAG found it difficult to evaluate performance of the DVS in implementing the strategic interventions captured in different strategy documents as there were no clear performance yardsticks to measure against.

Nevertheless, the OAG appreciates the Department's efforts in developing action plan for routine activities like surveillance (e.g. Surveillance Plan, October 2014-March 2016) and vaccinations (campaign schedules). The OAG also acknowledges the fact that implementation of some of the above mentioned key interventions was underway at the time of audit. The establishment of the Ngamiland Protection Zone and Prioritised Disease Control Infrastructure Maintenance were already being implemented at the time of audit, despite absence of clear action plans for such interventions.

RECOMMENDATIONS

The DVS should;

- Develop a comprehensive Departmental Strategic Plan clearly spelling out its long term objectives in the control of FMD.
- Devise action plans both at headquarters and district level, in line with different FMD related strategies including major capital projects like construction of protection zones, clearly stating timeliness for all activities in such plans.
- Devise an effective monitoring framework for implementation of all strategic and operational level objectives.
- Establish a clear and direct link between its strategic level planning and budgeting to ensure adequate resource allocation and efficient utilisation of resources.

4.2 FMD OUTBREAK RISK MITIGATION

One of the key aims of the Foot and Mouth Disease Control Strategy is to reduce the risk of FMD incursion in FMD free zones as well as to reduce the risk and to lessen the impacts of FMD outbreaks in FMD vaccinated zones. Vaccination of FMD susceptible livestock (cattle, sheep, goats and pigs), FMD surveillance as well as separation of livestock according to their FMD status through cordon fences (zonation) are some of the key strategic initiatives that define the DVS's FMD control framework.[28]

The following discussion shows some challenges in the implementation of the FMD control strategies by the DVS.

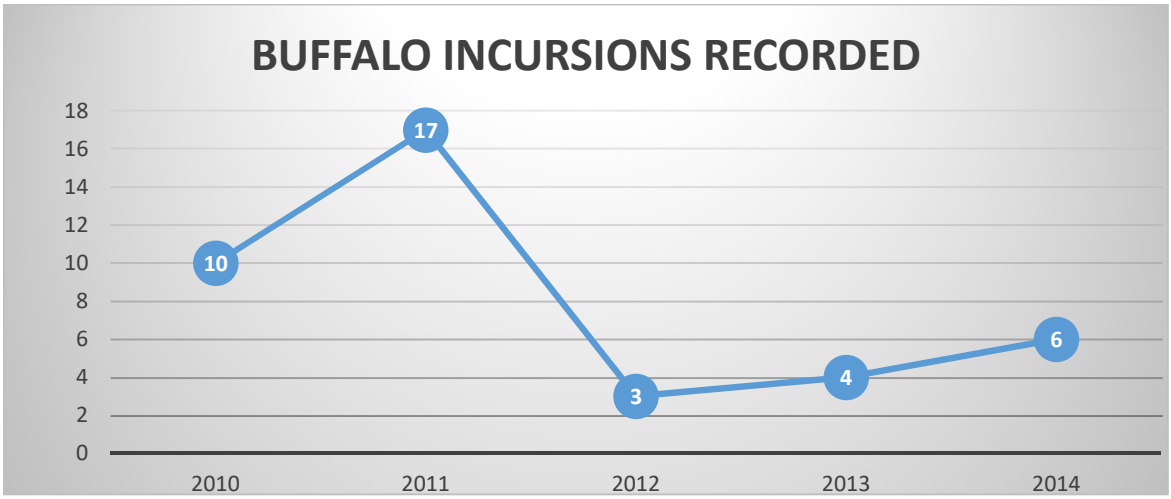
[28] Foot and Mouth Disease Contingency Plans for Botswana

4.2.1 CLINICAL SURVEILLANCE SUBSEQUENT TO BUFFALO INCURSIONS

Item 4.1.4.3 of the Surveillance Plan (October 2014- March 2016) requires that, after removal of buffaloes following an incursion into vaccination zones, clinical surveillance in in-contact livestock should be undertaken.

Review of Buffalo Incursion Reports and District Monthly Reports from Shakawe, Maun and Francistown Veterinary Offices revealed that, despite the fact that several buffalo incursions into vaccination zones were recorded in the period under audit, no documentary evidence availed at the time of audit, provided proof that, subsequent clinical surveillance was carried out as per the Surveillance Plan. For instance, the graph in **figure 2** shows that a total of 40 buffalo incursions (data retrieved from the districts monthly reports) were recorded in the period from 2010 to 2014.

Figure 2: Graph showing frequency of buffalo incursions in Ngamiland and Francistown districts



***Source**: Maun, Shakawe and Francistown District Report Files*

However, none of the buffalo incursion reports reviewed (under "action taken" part of the reports) showed that clinical surveillance was conducted subsequent to the reported incursions. The actions reported were either destruction of buffaloes or driving the buffalo herd out of the livestock area. Even in the

surveillance reports, the only clinical surveillance that was recorded was the scheduled surveillance as per the surveillance plans, no clinical surveillance following a buffalo incursion was recorded. According to the DVS, the main reason for not always carrying out clinical surveillance subsequent to buffalo incursions in Zone 2 was due to fact that the Department is overwhelmed with other competing activities in the district. The Department however stated that the situation was expected to improve as it continued to relieve itself of none regulatory functions.

Failure to carry out clinical surveillance subsequent to buffalo incursions into vaccination zones heightened the risk of FMD infection spreading unnoticed in crushes that possibly had contact with such buffaloes. Such an improper risk management practice could also result in erosion of the DVS's hard earned trust from key trading partners and thus putting the beef industry in jeopardy.

RECOMMENDATIONS

The DVS should:

- Ensure that mechanisms are in place to ensure prompt response in terms of conducting surveillance subsequent to buffalo incursions, so as to minimise the risk of the FMD infection spreading in other areas and crushes that may have had contact with such buffaloes.
- Expedite the exercise of relieving itself of none regulatory functions to enhance its response efforts to high risk veterinary cases.

4.2.2 COMPLIANCE WITH SURVEILLANCE PLANS

The FMD Surveillance Plan for 2013 and the Disease Surveillance Plan (October 2014-March 2016) outlines surveillance schedules and sample sizes for cattle and small stock in different disease control zones. These plans are developed to provide assurance that the OIE FMD recognised FMD free zones continue to be free of FMD as well as to monitor viral activity and antibody protection levels in FMD vaccination zones (i.e. FMD prone zones). District Offices, which implement these plans are required to fully comply with the prescribed sampling schedules and sample sizes.

Review of documents highlighted that the DVS had not adequately implemented surveillance plans during the period under audit. This is evidenced by the fact that, District Offices had in some instances not submitted samples at all or submitted less than the required number of samples to the Botswana National Veterinary Laboratory (BVNL) for testing, or were not undertaking surveillance according to schedules prescribed in the surveillance plan[29]. Table 3 shows some statistics of FMD surveillance in small stock in the vaccination zones, and cattle in Zone 7 only, (2013 Surveillance Report). Data for other years under review was not available.

[29] SAVINGRAM REF: DVS 6/1/37 IV (56) -**COMPLIANCE TO THE FOOT AND MOUTH DISEASE SURVEILLANCE PLAN FOR 2013**. DATED 16th August 2013.

Table 3: Samples collected from FMD vaccination zones in cattle (zone 7 only) and small stock (all FMD vaccination zones) in 2013

Month	Species	Samples	
		Expected	**Tested**
April	Small stock	470	80
May (zone 7)	Cattle	950	1152
September	Cattle	950	0
November	Small stock	470	0
December	Cattle	950	0
TOTAL SAMPLES COLLECTED		**3790**	**1232**

Source: *FMD Surveillance Report 2013.*

Table 3 shows that the FMD Surveillance Report 2013, prescribed samples sizes of 470 and 950 (shown under "*expected*" column) for small stock and cattle respectively. These sample sizes were statistically derived as the plan prescribed. However, the Table depicts that contrary to the plan requirement, surveillance was not carried out at all in the months of September, November and December 2013. The Table also shows that in April and May 2013, samples tested were not consistent with sample sizes prescribed by the plan. Instead of 470 samples only 80 were tested in April and 1152 instead of 950 in May 2013. This was a clear compromise in terms of reliability and credibility of the surveillance results as they were not a true statistically derived representative of the animal population in the surveyed zones.

The report only provided an explanation of non-submission of samples for the month of December 2013 which it attributed to postponement of the vaccination

campaign due to severe drought. No explanation of zero submissions for September and November 2013 was provided in the report.

Another example of the non-compliance to the surveillance plan by the DVS is illustrated in Table 4 below:

Table 4: **Samples collected from the FMD intensive surveillance zone (Protection Zone) in 2013**

Month	Species	Samples	
		Expected	**Tested**
May	Cattle	950	1043
	Small stock	470	254
August	Cattle	950	127
November	Cattle	950	941
	Small stock	470	677
TOTAL SAMPLES COLLECTED		**3790**	**3042**

Source: *Surveillance Report 2013.*

Table 4 depicts significant inconsistencies in adherence to the prescribed sample sizes of 950 and 470 for cattle and small stock respectively. In August 2013, only 127 cattle were sampled for FMD testing, representing 13.4% of the expected number of samples. A similar situation was also reported in May 2013 where 254 samples instead of 470 samples were tested for FMD (representing 54% of expected samples).

The report attributed those gaps in surveillance plan implementation to some districts (Letlhakane, Nata and Palapye District offices) missing sampling in August 2013. No explanation was provided in the report as to why the districts

missed the August 2013 sampling. The Department attributed the gaps in surveillance implementation mainly to inadequate monitoring at district level, low cattle turn-out (few cattle presented by farmers to crushes for sampling) as well as other competing activities which resulted in resources diverted to other activities.

According to the DVS, the inconsistencies in compliance to the surveillance plan resulted in lack of up to date information on the FMD situation. That implied that, the results were not representative of the target population and therefore the results might not be adequate to extrapolate the general animal health status in a given population. Not only could this possibly lead to late detection of FMD infection in the surveyed zones, it could also go a long way in creating a trust deficit between the DVS and some key trading partners like the European Union who emphasize on stringent measures and reliable information on FMD status of beef export zones in the country.

RECOMMENDATION

The DVS should:

- Strengthen supervision and coordination at district level to ensure full compliance with surveillance plans necessary for early detection of FMD as well as enhancing credibility of FMD status of different zones.
- Ensure that surveillance plans are fully integrated into district level plans to ensure harmony with other activities (at district level) as well as to ensure efficiency in resource utilisation.

4.2.3 DISEASE CONTROL GATES/ CHECK POINTS

The DVS Fence Strategy prescribes working guidelines for management and supervision of veterinary disease control infrastructure, namely; cordon fences, camps, quarantines, gates and check points. Disease control gates should be constructed in such a way that they ensure implementation of stringent bio-security measures.

The OAG noticed that the fence strategy and other documents lacked specifics on designs of veterinary disease control gates against which assessment of adequacy of gates as effective bio-security assurance facilities could be based. There was also no other document which exclusively prescribed standardised basic specifications of disease control gates which guided construction and maintenance of the gates. In the absence of written down specifications for disease control gate construction, some inconsistencies in gates designs were observed during the audit with some gates structurally deficient of some key components essential for effective implementation of bio-security measures. Table 5 presents results of assessment of disease control gates visited during the audit.

Table 5: Status of Cordon Fence Gates (Check Points) Visited During the Audit

Name of gate	Signage	Lighting	Cattle grid	Vehicle bath	Movement protocol board	Guard house
Matabologa	✓ (too close to the gate)	✓	x	x	x	X
Setata	x	x (Generator broken since June 2014)	x	x	x	✓
Samochima	x	x	x	x	x	✓
Kuke	✓	✓	✓	✓	✓	✓
Ramokgwebana boarder gate	✓	✓	x	✓	✓	✓
Matsiloje boarder gate	x	✓	✓	x	✓ (fell)	X (tent)
TOTAL PRESENT	3	4	2	2	3	4

***Source**: Observations made during tour of gates*

Key: ☑ *Available* ☒ *Unavailable*

Note: *The following factors were considered during assessments of disease control gates;*

- *Signage: important for awareness of travelers needed for facilitating cooperation with DVS personnel at check points and safety of personnel on the road.*
- *Lighting: needed for providing visibility at night crucial for facilitating checks and disinfection at night as well as for security of staff manning the gates.*
- *Cattle grid: important for stopping cattle from straying into other zones especially in the event gates happen to be unmanned (due to bad weather conditions and staff absenteeism).*
- *Vehicle bath: facilitate better vehicle coverage during disinfection and cause less disruption to traffic flow, and therefore minimising inconveniences to travelers.*
- *Movement Protocol Boards: needed for awareness to travelers crucial for ensuring cooperation with DVS personnel at check points.*
- *Guard house: to shelter staff manning gates and their equipment*

As Table 5 indicates, most check points were deficient in many aspects, from a bio-security stand point. The only aspect that had alternative measures in place were vehicle baths whereby knapsack sprayers were used instead. However, it was observed that knapsack sprayers provided relatively limited coverage of vehicles (compared to vehicle baths) and were subject to improper application by the person spraying. For instance, the Setata and Samochima gates lacked lighting needed for disinfection throughout the night. Interviews with Principal Veterinary Officers in the visited districts attributed such structural deficiencies at the disease control gates to financial constraints. The safety of staff manning the gate at night and poor visibility (as a result of lack of lighting) could result in significant compromise in conducting searches and disinfection at night at the two gates.

The structural inadequacies of disease control gates was attributable to lack of standards for designs of disease control gates as well as inadequate resource planning for improving general conditions of movement control gates. There was no evidence (budget and plans) availed during the audit that could indicate that

the Department had taken deliberate action to address the structural deficiencies of some gates to ensure stringent bio- security measures at check points. As a result of the bio-security lapses at some disease control gates, the assurance of such gates as effective disease control facilities could therefore not be guaranteed. The OAG nevertheless, acknowledges the implementation of the Standard Operating Procedures (SOP's) in all gates visited during the audit.

RECOMMENDATION

It is recommended that, the DVS should:

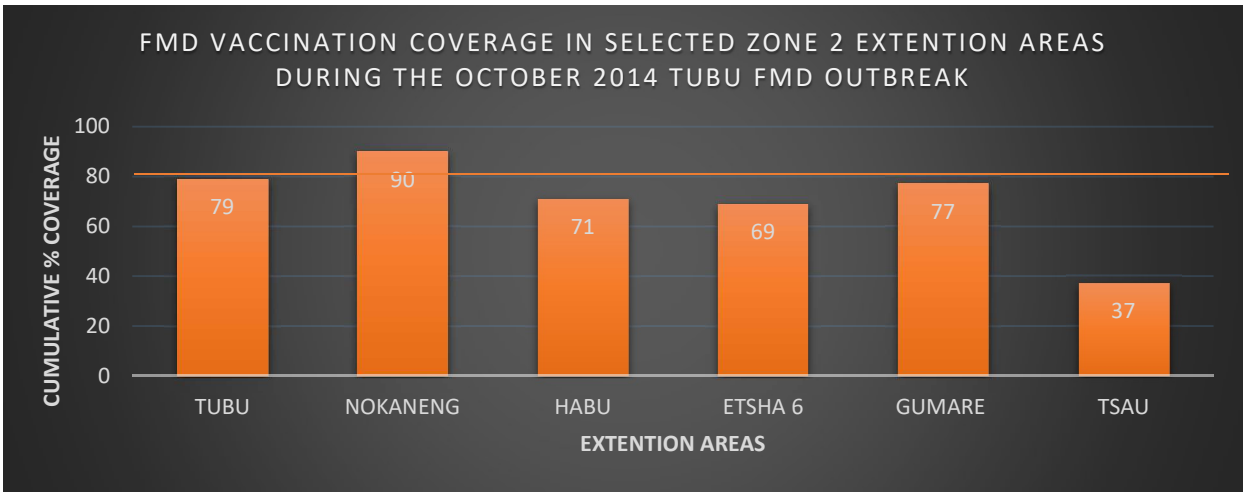
- Ensure that all disease control gates are equipped with adequate measures for assurance of stringent bio-security measures.
- Develop clear guidelines for construction and maintenance of disease control gates.

4.2.4 VACCINATION COVERAGE IN FMD HIGH RISK ZONES

The DVS FMD Control Strategy prescribes a vaccination coverage target of at least 80 % of total livestock population in an area, required to attain adequate herd protection and to lower the risk of disease spread in the event of an infection.

Review of documents revealed that the Department was struggling to attain the 80% vaccination coverage threshold, even in zones that were highly prone to FMD outbreaks such as Zones 2a, 2b, 2c and 2d (Ngamiland area). Figure 3 provides an illustration of the DVS performance in the Tubu vaccination campaigns (in Zone 2b) which took place during an FMD outbreak in the period from October –December 2014.

Figure 3: **Showing Cumulative average vaccination coverage during the 2014 Tubu outbreak**



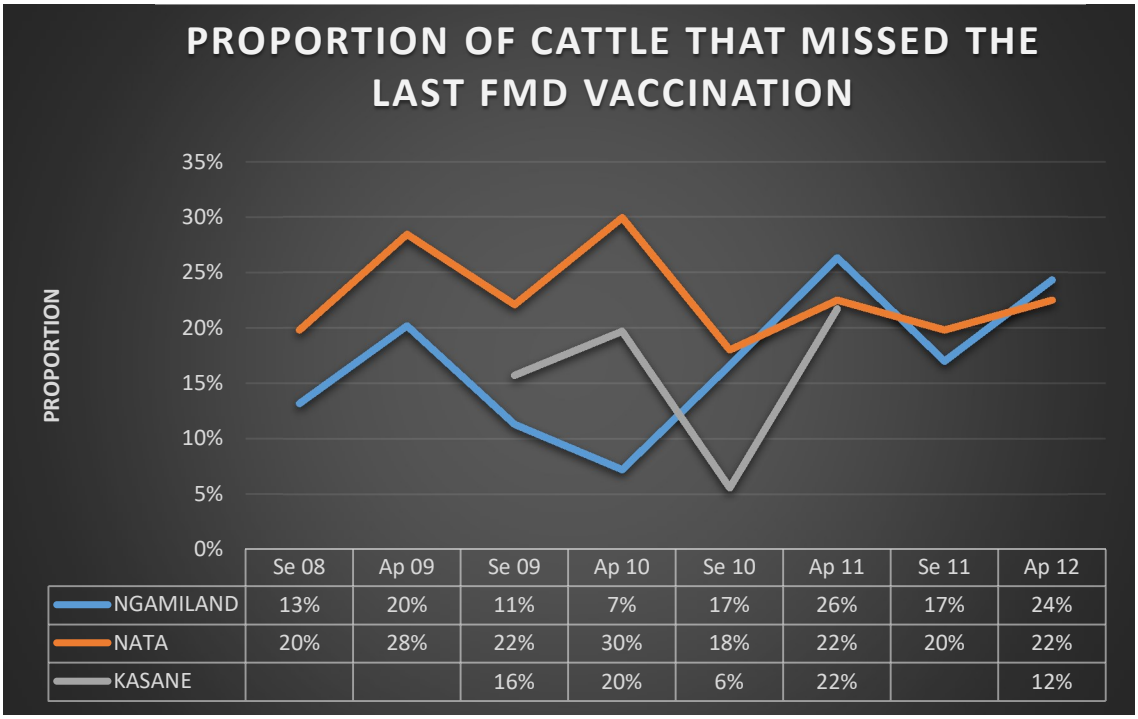
***Source**: Tubu Outbreak Update Reports October – December 2014*

Data in figure 3 shows cumulative average percentage coverage for extension areas where vaccination was undertaken in zone 2 during the 2014 Tubu FMD outbreak. As the chart in figure 3 shows, only one (1) extension area (Nokaneng) managed to attain a cumulative average vaccination coverage greater than the 80% vaccination coverage threshold. This implies that in most crushes in the extension areas, vaccination coverage was below 80%. Such low vaccination coverage particularly during an outbreak heightened the risks of disease spread which could have serious cost implications to the Government and could also threaten the beef industry.

Furthermore, several vaccination campaign reports[30] revealed that the DVS was faced with a challenge of low cattle turn out at vaccination campaigns. The chart in figure 4 provides an illustration of proportions of cattle that missed FMD vaccination.

[30] Maun and Shakawe District Monthly Reports (2011-2014): Vaccination Returns.

Figure 4: **Graph showing the Proportion of Cattle Missing FMD Vaccination in Ngamiland, Nata and Kasane during the period from September 2008 to April 2012**



	Se 08	Ap 09	Se 09	Ap 10	Se 10	Ap 11	Se 11	Ap 12
NGAMILAND	13%	20%	11%	7%	17%	26%	17%	24%
NATA	20%	28%	22%	30%	18%	22%	20%	22%
KASANE			16%	20%	6%	22%		12%

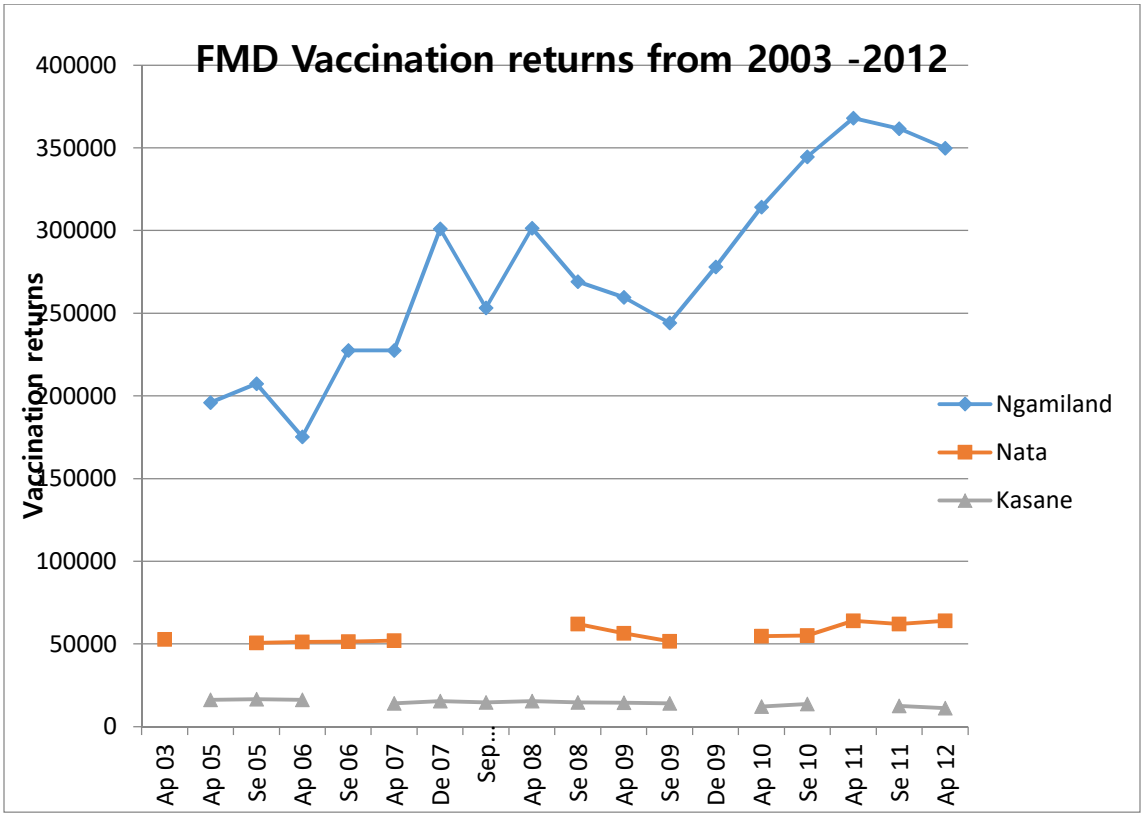
Key: **Se**- September; **Ap**- April;

Source: *TOR Presentation September 2012*

The chart indicates that for the period from September 2008 to April 2012, eight (8) out of a total of twenty one (21) vaccination campaigns in Ngamiland, Nata and Kasane attained lower than 80% vaccination coverage (as shown by proportions of cattle missing vaccination by more than 20%). However, interviews with the DVS Epidemiologist revealed that, the proportion of the animals that missed vaccination depicted in the chart could actually be understated considering the fact that there were indications that farmers were not disclosing correct figures of their herd sizes. This according to the Epidemiologist was evidenced by a sudden rise in cattle numbers recorded between 2009 and 2011 as shown by figure 5, which was a result of a

presidential appeal to farmers to bring cattle for vaccination in the Ngamiland area.

Figure 5: Graph showing FMD Vaccination Returns from Ngamiland, Nata and Kasane during the period from April 2003 to April 2012



Source: *Vaccination campaign reports*

Furthermore, low vaccination coverage in zone 2 (Kareng Extension Area) was revealed by inspections carried out in Kareng Extension Area, following an outbreak in March 2015 in the same area. According to a media brief (during the March 2015 Kareng outbreak) by the Minister of Agriculture[31], "In a particular crush out of the 118 cattle that were inspected, only 6 had proof of vaccination against FMD from the recent campaign translating only to 5.1%."

[31] The Patriot on Sunday, 22 March 2015

According to the DVS, low cattle turnout during FMD vaccination campaigns was mainly attributable to communal area farmers' apathy and failure to round up their cattle and avail them for vaccination. According to the DVS farmers' apathy was mainly due to farmers' loss of hope in cattle rearing that came with trade losses related to FMD outbreaks as well as farmers' inadequate awareness regarding the importance of vaccination in the control of FMD.

As a result of low vaccination coverage, there was an eminent risk of FMD outbreaks throughout the period under audit as evidenced by intermittent outbreaks in various FMD prone zones. Mitigating the risk of the costly sporadic FMD outbreaks requires among others, adequate vaccination coverage. This was also reiterated in the Field Services Division Annual Report (2010/2011) which identified poor vaccination coverage to be one of the key factors exposing the Ngamiland area to risks of resurgence of FMD[32].

RECOMMENDATION

The DVS should:

- Strengthen its farmer outreach strategies aimed at enhancing farmer awareness, participation and cooperation in FMD control, necessary for achieving adequate vaccination coverage.
- Fully involve farmers not only in execution but also in planning for vaccination campaigns which could help in improving cattle turnout during vaccination campaigns.

4.2.5. CATTLE TRACEABILITY IN FMD VACCINATED ZONES

According to the OIE Terrestrial Animal Health Code, whether in response to disease outbreaks or in the context of disease prevention, animal traceability can help countries to put in place a wide range of measures, including surveillance, early detection and notification of outbreaks, rapid response, control of animal

[32] FIELD SERVICES DIVISION-ANNUAL REPORT (2010/2011)- Item 1.0 FMD CONTROL,1.1 NGAMILAND, page1

movements, and zoning or compartmentalisation.[33] Furthermore, the European Union Council Regulations (Regulation EC 1760/2000 and EC 1825/12), require that "beef should be traceable back to the individual animal of origin and that a computerized central system must be established." Identifying individual animals in disease control is important when collecting disease surveillance information and when sampling animals for diagnostic purposes. [34]

It emerged from documents reviewed and interviews with Principal Veterinary Officers at the visited District Offices that, the system the DVS used in FMD vaccinated zones for livestock traceability was not computerised and was deficient in identifying and providing comprehensive information on individual animals in many aspects, essential for animal traceability in disease control. The following are deficiencies noticed in the system used by the Department for animal traceability and identification in FMD vaccinated zones:

- **Branding**: The DVS used the branding system for animal identification in FMD control in the vaccinated zones. However, branding was deficient in accurately identifying individual animals, in that the FMD brand which was relied upon was the same for all animals in a district and the owner's brand was the same for all animals in a kraal.
- **Herd Cards**: The other method of keeping herd cards for each kraal proved to be problematic where there was multiple ownership of cattle in the same kraal which was common in communal areas. In addition, reliability of information in herd cards could not be guaranteed as their updating lay with farmers who according to vaccination reports had not always availed them (herd cards) during vaccination campaigns.

[33] 2014 ©OIE - Terrestrial Animal Health Code

[34] FAOLEX- Legislative Database of FAO Legal Office (http:faolex.fao.org/cgi-bin/faolex.): **European Union:** Commission Regulation (EC) No. 1825/2000 laying down detailed rules for the application of Regulation (EC) 1760/2000 of the European Parliament and of the Council as regards the labelling of beef and beef products.

It is worth noting that in animal disease control, it is important to have a system of animal traceability that not only allows for accurate identification of individual animals, but also effectively safeguards information on health history of individual animals (e.g. vaccination and disease history).[35]

The gaps discussed above, which were identified in the traceability system used in FMD vaccinated zones were mainly attributable to the department's failure to devise an accurate and reliable animal traceability and identification system in the FMD vaccinated zones (red zones). The DVS only devised an enhanced computerised traceability system in FMD free zones called the Livestock Identification and Trace-Back System (LITS). This system used a reticular bolus as a form of identifying cattle (individually) and linking the bolus number to the owners' information and location. This information was digitally stored in the central database and was accessible to multiple remote users. However, management highlighted that LITS was not rolled out in FMD vaccinated zones due to consideration of the risks of FMD transmission inherent in the reticular bolus insertion process. Nevertheless, no alternative computerised system was ever devised for the FMD vaccinated zones.

As a result of absence of an accurate and reliable livestock traceability system in the FMD vaccinated zones, the risk of late detection of FMD infections cannot be overemphasised. Effective traceability of individual animals could have enabled prompt implementation of preventive measures (such as surveillance and post vaccination monitoring of individual animals) and assisted in timely control of outbreaks, thereby delivering considerable animal welfare and commercial benefits to the farming community in FMD vaccinated zones.

The Office of the Auditor General acknowledges that, at the time of audit, the Botswana Animal Information and Traceability System was being piloted in the FMD free zones with plans to roll it out to the entire country. This system was expected to bridge the gaps of the branding system used in vaccinated areas,

[35] http:faolex.fao.org/cgi-bin/faolex: EUC Regulations

thereby ensuring better traceability of animals vital for both disease control and livestock trading purposes.

RECOMMENDATION

The DVS should expedite the implementation of Botswana Animal Information and Traceability System in the entire country to complement the current branding system and ensure better livestock traceability and identification.

4.2.7 MAINTENANCE OF CORDON FENCES

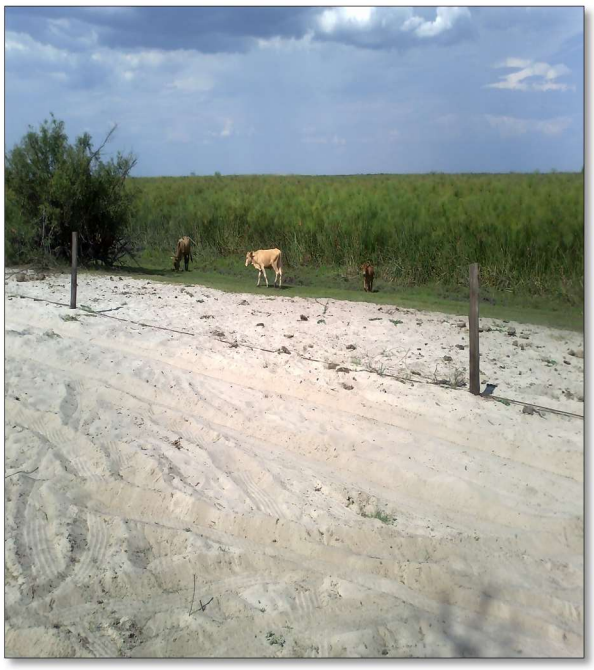
The Department of Veterinary Services Fence Strategy prescribes the working guidelines for management and supervision of veterinary disease control infrastructure, namely; cordon fences, camps, quarantines, gates and check points. Routine maintenance of cordon fences mainly entails erection of fallen fences and repairs of damaged fence. According to the fence strategy, regular maintenance should be carried out to ensure that fences at all times provide an effective barrier to unwanted and uncontrolled animal movements which are a key risk factor in the spread of the FMD.

During tour of the fences at the time of audit, it was observed that the DVS had not adequately maintained cordon fences in some areas in the FMD vaccinated zones. For instance, following a tour of the Samochima Fence in Ngamiland (Zone 2b) on the 25 November 2014, it was observed that fences were substantially damaged by elephants with complete fence fall observed particularly along the Okavango Delta. Pictures in **figure 6 and 7** below illustrate the observed fence damages by elephants along the Samochima Fence. It is worth noting from the pictures in **figure 6 and 7** that, cattle could be observed freely crossing into the delta, thus increasing the risk of FMD infection from buffaloes which also grazed inside the delta.

Figure 6 and 7: Photographs showing fallen fence and cattle grazing inside the Okavango Delta in Shakawe Veterinary District

Figure 6

Figure 7



Source: *OAG photograph taken on 25/11/2015 in the Okavango Delta near Samochima in Ngamiland*

Document review and interviews with management at DVS revealed that the inadequate maintenance of cordon fences was mainly due to financial constraints, which limited the DVS capacity to employ adequate personnel for maintenance of fences and procurement of fencing material. However, it is inconceivable to note that fences were not appropriately maintained during the years under audit and yet the development budget (specifically for fencing) had never been exceeded. For instance, during the years, **P13 536 373**[36] remained unspent. Management also attributed the problem to high elephant population in the area.

[36] Refer to Table 1 page 10 of this report

However, review of documents revealed that the DVS lacked a clear guideline on resource allocation in terms of manpower and vehicle allocation particularly at district level which the department could use to guide and monitor its resource allocation. Such a guide could also be used by the OAG as a yardstick to assess the efficiency of DVS resource utilisation in FMD control.

Assessment of the Department's resource allocation during the audit revealed some inconsistencies in resource allocation as illustrated in **Table 6** (showing data only from the districts sampled during the audit).

Table 6: Resource Allocation at selected Veterinary Districts

	TRANSPORT ALLOCATION				STAFF ALLOCATION				
DISTRICT	**FENCE Length (KM)**	**TRUCKS**	**VANS (L/CRUISERS)**	**TRACTORS**	**PICKETERS**	**FENCE ERECTORS**	**GATE KEEPERS**	**HUSBAND MAN HEALTH**	**Technical staff (TO's & VO's)**
Francistown	595	2 (not operational	2 (not operational	1 (not operational	56	15	21	0	2
Nata	667	5 (3 not operational	6 (4 not operational)	3 (2 not operational)	21	30	65	0	8
Selibi Phikwe	717	3 (2 not operational	8 (2 not operational	1 (not operational	69	17	109	6	9
Maun	1106	15 (11 not operational	23 (10 not operational)	4	0	54	96	12	25
Shakawe	1070	5 (4 not operational	2 (not operational)	4 (2 not operational	6	23	30	4	3

Source: *Files from DVS Administration Division (Head Quarters)*

As the table shows for instance, basing on the proportion of length of fence relative to resources allocated (in terms of both manpower and vehicles) Maun District was allocated relatively the most resources. Conversely, Shakawe District which had longer fence network and a relatively bad terrain (swampy and sandy) compared to Selibi Phikwe was allocated relatively fewer resources.

The DVS did not avail any document which could explain the criteria the department used in allocating resources. Furthermore, another attributable factor to inadequate maintenance of fences (according to management) was the continuous destruction of fences by elephants. During fence tours, substantial damages to the fence caused by elephants were indeed observed. However, the DVS had at the time of audit not devised an effective strategy to minimise damages to fences caused by elephants.

As a result of inadequate maintenance of fences by the DVS, there was a risk of uncontrolled movement of both cattle and buffaloes across disease control zones, as evidenced by reported buffalo incursions into zone 2 and cattle incursions into the stock free zone (zone 16),[37] thus increasing the risk of FMD virus transmission from buffaloes (which are virus hosts) to cattle. It should be noted that sporadic outbreaks are not only expensive to manage, but they also have far reaching effects of eroding both farmers and beef trading partners' confidence in the Government's ability to effectively control the FMD.

Notwithstanding the above observations, the OAG appreciates the efforts the DVS had made (at the time of audit) in devising the new Transport Strategy, Picketing Strategy and Fence Maintenance Prioritisation through which the DVS had expected to enhance its capability to address challenges in maintenance of fences. The OAG also acknowledges the fact that at the time of audit, the DVS was at advanced stage (Ministerial Tender Committee had approved a tender to supply and delivery of 1 MT of Bhut Jolokia Chilli, delivery expected in May 2015) of adopting the use of chilli powder for control of elephants movement away from disease control fences.[38]

[37] Shakawe District Monthly reports from 2010-2014

[38] Savingram Ref: DVS 3/5/1 XIX (34)- 18 March 2015: Supplementary Information on the use of Chilli Powder for Control of Elephants Movements Away from Disease Control Fences

RECOMMENDATION

The DVS should;

- Provide adequate budget provisions to ensure that cordon fences are continuously maintained so as to ensure effective control of movement of both cattle and wild animals to prohibited areas thus minimising the risk of an FMD outbreak.
- Formulate a clear guideline on resource allocation which the Department could use to guide and monitor its resource allocation.
- Streamline its resource allocation processes such that the limited resources are appropriately allocated taking into consideration, the risk of FMD outbreak, the size and potential demands of the areas to be serviced and demands of the farming communities.
- Continue exploring (in collaboration with other relevant Ministries and farmers) options of devising an effective long term strategy that will help minimise damage to fences caused by elephants.

4.3 STRENGTHENING OF EXTENSION SERVICES

According to the FMD Contingency Plan Revision 2007[39], the most important resource in the prevention of FMD is an informed animal owner, herder or manager. In order for the DVS to realise the objective of early warning contingency for FMD, the plan recommends among others;

- Regular contact between the extension officer and farmer in order to build high level of confidence and trust that will ensure rapid reporting of disease occurrence at an early stage;
- Well-planned extension programmes and consultative meetings with stakeholders;

[39] Ministry of Agriculture: FMD Contingency Plan 2007 produced by Department of Animal Health and Production

- Training of farmers by extension officers with emphasis on among others, consequences and benefits of FMD control and eradication through workshops, kgotla meetings and the media.

Review of documents during the audit highlighted that, the DVS was not adequately providing extension services to farmers particularly in communal areas. There was no documentary evidence availed during the audit, to the effect that District Offices constantly included extension programmes in their activity plans. Only kgotla meetings which were mainly on consulting farmers during FMD outbreaks or updating farmers on progress in disease eradication appeared in those plans. Despite Management confirmation that districts held workshops for farmers, no plans and reports availed at the visited districts provided evidence to that effect. This was corroborated by interviews with Technical Assistants in all the visited extension areas, who stated that due to time and transport constraints, extension services were not adequately provided for in their activity planning. While the review of documents indicated that the DVS intended to target farmers through Farmers' Associations, it was however noted that there was no evidence of existence of such associations particularly in communal areas. The OIE Evaluation Report[40] (Botswana, April 2010) also attested to that effect where it stated that "small holder farmers are not organised in farmers associations and miss the much needed extension contact."

The only Farmers Associations that were evidently functional were those from cattle ranches in such areas as North West (Haina Veldt Farmers Association) and Francistown (Tati Farmers Association). During interviews with farmers from communal areas in zone 2 (Xakao, Shakawe, Maun) and Zone 6 (Matsiloje, Kalakamati), farmers decried inadequate consultation and inclusion in the Department's fight against the FMD. Farmers stated that the DVS mostly

[40] OIE Tool for the evaluation of Performance of Veterinary Services: PVS Evaluation Report (Page 78): Botswana, April 2010.

convened Kgotla meetings at times of FMD outbreak which were mainly for providing update on the eradication of the disease rather than educational.

According to interviews with all Principal Veterinary Officers (Heads of Stations) at the Districts visited, the inadequate provision of extension services was attributed to capacity constraints in terms of staff and transport resources. As a result of such limited farmer education and consultation, particularly in communal areas, farmers were not fully participating in combating the FMD and seemed not to fully comprehend the risks associated with FMD as evidenced by reports of vandalism of disease control infrastructure (cordon fences) and low cattle turn out at vaccination campaigns even during FMD outbreaks.[41]

Nevertheless, OAG acknowledges the efforts the DVS has made in exploring other means of farmer outreach such as TV and Radio programmes as well as consultative forums such as the Ngamiland Consultative Forum which was set up in Maun in 2012 and was fully functional at the time of audit.

RECOMMENDATIONS

The OAG recommends that the DVS should:

- Devise clear guidelines in terms of content and structure of extension programmes (relevant to FMD and other animal diseases control) targeting farmers particularly in communal areas.
- Incorporate extension services in planning at district level and devise effective monitoring tools for extension services provided by technical officers in all extension areas.
- Devise means of sustaining farmer organisations (like farmers associations) particularly in communal areas.
- Incorporate a risk based farmer outreach approach into its extension programmes, as a means of ensuring prioritisation on high risk FMD zones.

[41] Tubu FMD Suspected Outbreak- Update Reports (2014)

4.4 COLLABORATION WITH KEY STAKEHOLDERS

According to the report on the review of the FMD strategies in Botswana by the Department of Veterinary Services in collaboration with the Botswana National Vaccine Institute (June 2012), "There is a need to develop participatory diseases control guidelines, in order to clearly define the roles and responsibilities of each stakeholder. This will enhance and strengthen their contribution towards effective management of livestock diseases particularly FMD."

However, document review and interviews with staff revealed that the DVS had not developed a clear guide on how DVS personnel particularly at district level were to collaborate with important stakeholders in disease control. For instance, the Botswana Police Service and the Botswana Defence Force deployed officers to patrol fences along the Botswana Zimbabwe border line in the Zone 6 and 7 areas. Those fences doubled as disease control fences and border fence and were constructed by the DVS. However, there was no documentary evidence of a formal agreement for the two security organs to share information with the DVS especially that of disease control interest, such as damage to the fence and cattle incursions. There was also no documentary evidence of formal agreement for collaboration in resource utilisation, particularly transport, despite the DVS' transport challenges at district level. Options like joint vehicle patrols between the DVS and the Security Officers deployed along the border fence as well as transporting of DVS fence maintenance personnel could be facilitated by such collaborative agreements.

Furthermore, despite animals particularly elephants and buffaloes creating significant challenges in the control of FMD, it transpired from interviews with management that the Department had not yet devised formal inter-ministerial coordination structures for collaboration between the DVS and the Department of Wildlife and National Parks (DWNP) with an aim to ensure sustainable harmony of wildlife conservation with livestock production. In addition, it

emerged from review of documents that no guidelines were in place to facilitate such collaboration between the DVS and the DWNP.

It is worth noting that the above observations were reiterated by the Report on Review of FMD strategies in Botswana (June 2012) which stated that "The current collaboration of the four (4) Ministries of Agriculture, Defence, Justice and Security, Environment, Wildlife and Tourism, Lands and Housing is critical to the control of FMD as this collaboration also addresses issues of security and land which can be predisposing factors to outbreaks of FMD and others Trans-boundary Animal Diseases." The report further highlighted that, "It is possible that the collaboration is not fully making use of its potential contribution to the control of FMD and it recommended that among others collaboration be strengthened".

As a result of lack of clear guidelines on collaboration between the DVS and other key stakeholders in FMD control, the DVS could not adequately seize opportunities for substantial support from other Government agencies to complement its (DVS) limited resources in the fight against FMD.

Nevertheless, the OAG recognises the collaborative efforts between the DVS and other Ministries and Government Departments including the DWNP and security agencies particularly at times of FMD outbreaks and cordon fence patrols along inter-country border fences.

RECOMMENDATIONS

The OAG recommends that the DVS should:

- Identify and explore opportunities for collaboration with relevant stakeholders particularly other Government ministries to ensure efficacy in the fight against FMD.
- In consultation with relevant stakeholders (including farmers), develop formal agreements or guidelines for shared responsibilities in the fight against FMD. This will encourage future participation of farmers in the fight against the FMD.

- Forge sustainable collaborative structures or platforms for the purpose of animal disease control.

OVERALL MANAGEMENT COMMENT

'We have no further comments to make regarding the report'.

UPDATE ON IMPROVEMENT IN PERFORMANCE SINCE THE AUDIT WAS COMPLETED

The OAG on the 11th of September 2017 requested an update on changes made regarding the findings of this audit through Savingram AG/PA 5/2 I (32): "Request for validation of comments on the performance audit report on the control of foot and mouth disease." Subsequent to that, the Department of Veterinary services provided update as follows:

OAG RECOMMENDATION	DEPARTMENT'S UPDATE
Strengthen its farmer outreach strategies aimed at enhancing farmer awareness, participation and cooperation in FMD control, necessary for achieving adequate vaccination coverage.	The DVS has filled frontline Extension Officer vacancies to improve on extension delivery with the main aim being to create farmer awareness on the FMD and FMD prevention and control. About 28 extension areas out of a total of 31 are manned.
Fully involve farmers not only in execution but also in planning for vaccination campaigns which could help in improving cattle turnout during vaccination campaigns.	Vaccination campaigns programmes are planned, shared and discussed with farmers association leadership and all the influential people in the district. Publicity of vaccination

	program is done from the crush point to institutions such as the Kgotla, clinics and Extension areas Offices.
Strengthen supervision and coordination at district level to ensure full compliance with surveillance plans necessary for early detection of FMD as well as enhancing credibility of FMD status of different zones.	The major impediments to effectively implement the surveillance plans is insufficient budget due to ceilings.
Ensure that surveillance plans are fully integrated into district level plans to ensure harmony with other activities (at district level) as well as to ensure efficiency in resource utilisation.	Surveillance plans are developed, shared and discussed with District leadership to incorporate the plan with other activities during any plan period. This is done to ensure that the leadership is accountable by availing resources such as manpower and transport to facilitate the implementation of the plan
Provide adequate budget provisions to ensure that cordon fences are continuously maintained so as to ensure effective control of movement of both cattle and wild animals to prohibited areas thus minimising the risk of an FMD outbreak.	All efforts to undertake disease prevention activities are being hampered by insufficient budget. Fence maintenance has been covered by development budget. The little budget under camps vote does not cope with the massive destruction to fences caused by elephants.

Continue exploring (in collaboration with other relevant Ministries and farmers) options of devising an effective long term strategy that will help minimise damages to fences caused by elephants.	The Department continues to collaborate with other Ministries in employing mitigating strategies. However, all these strategies have been applied only on a pilot basis (small scale) due to budgetary constraints.
The DVS should expedite the implementation of Botswana Animal Information and Traceability System in the entire country to complement the current branding system and ensure better livestock traceability and identification.	BAITS has been rolled out to cover the entire country where FMD vaccination is carried out. The Current tagging in Ngamiland is at approximately 72%. In Chobe 86% of cattle has been tagged.

OVERALL CONCLUSION

The effectiveness of any Foot and Mouth Disease control strategy primarily hinges upon its ability to facilitate early detection of the disease, prompt warning and effective prevention of disease spread as well as rapid response to outbreaks.

As the audit has revealed, the essence of the strategies adopted by the DVS in the control of the FMD, was mainly to mitigate the risk factors associated with FMD infections and spread. However, the OAG established some challenges in the department's implementation of the FMD control strategies which to a great extent increased the risk of FMD outbreaks. This was evidenced by among others, the continued incursions by buffaloes into livestock areas/zones,

destruction of fences by elephants as well as low vaccination coverage which remained a challenge in the DVS' efforts to control and eradicate the FMD in the country. Additionally, the role of key stakeholders like the farming community remained inadequate in the control of the disease.

Considering the economic importance of the beef industry in Botswana as well as the costs associated with FMD outbreaks, the OAG is of the view that the DVS needs to strengthen its overall framework for implementation of all the strategies it has devised for controlling FMD. The Department needs to adopt a farmer inclusive approach to FMD control, strengthen its extension outreach and ensure beneficial collaborations with other key stakeholders in the livestock sector to complement its efforts in the control of FMD. The continuous sporadic outbreaks of FMD even in zones designated as FMD free zones poses a risk of loss of confidence on the DVS' capability to control FMD which could result in substantial trade losses in the agricultural sector of Botswana's economy.

Nevertheless, Office of the Auditor General appreciates the efforts the DVS has made in keeping the entire southern part of the country free from FMD as well as the strides the Department continues to make in progressively reducing the number of FMD red zones.

ANNEXURES

Annexure 1

Interviews conducted during the audit

Interviewee	Reasons for interview
• Director	The Director was interviewed to gather information on Policy and coordination matters relating to control and prevention of FMD.
• Deputy Director	The Deputy Director was interviewed to gain insight pertaining to all coordination activities focused towards controlling FMD during outbreaks of the disease as well as post FMD (prevention).
• Deputy Director (Veterinary Laboratories)	To understand the role of BNVL in the fight against FMD
• District Agricultural Coordinator	To understand the level of cooperation between the DAC's office and the DVS
• 2 Principal Veterinary Officer	To understand operational level issues related to the control of FMD at district level
• 2 Technical Officer	The CTO was interviewed by the audit team with the view of understanding all the challenges and problems encountered at the Sub-District level
• 9 Farmers (both commercial and communal)	Farmers were interview to understand the extent to which they collaborated with the DVS.
• 4 Fencers (animal husbandman and health)	To understand the challenges they experienced on their day to day execution of their work
• 2 Gate keeper	To understand their work operation procedures as well as the challenges their work presents.
• 2 Principal Technical assistant	To gain an understanding of their role in the control of FMD
• 2 Veterinary Superintendent	To gain an understanding of their role in the control of FMD
• Epidemiologist	To understand planning, implementation monitoring framework for surveillance.

Annexure 2

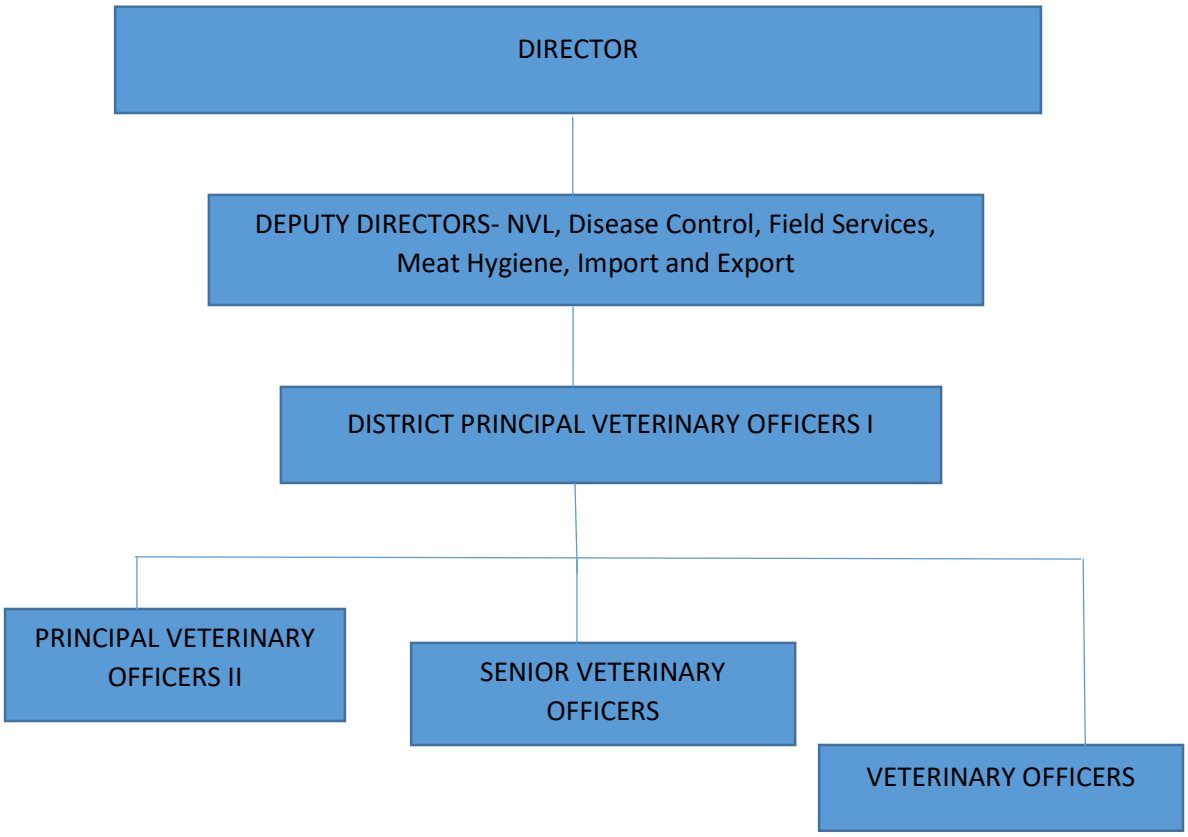
List of documents reviewed during the audit.

Document	Reasons for review
• Disease of Animals Act 1997 • Livestock and Meat Industries Act 2007 • Foot and Mouth Contingency Plans for Botswana	These document were reviewed to gain an understanding of the FMD regularity framework and test for compliance with the legal provisions of these documents
• 2013 2013 © OIE-Terrestrial Animal Health OIE Terrestrial Manual 2012 • Tropicultura Journal, Special Issue 2005: *The Control of Foot and Mouth Disease in Botswana and Zimbabwe*. Derah, N. and Mokopasetso, M. • FAO/OIE Sub-Regional Seminar: *"Progressing towards Foot and Mouth Disease (FMD) Control and OIE recognised status of SADC Member States"*. 16-18 March, 2011 • OIE 2012: The Global Foot and Mouth Disease Control Strategy, *Strengthening Animal Health Systems through Improved Control of Major Diseases.*	These document were reviewed to gain an international perspective of FMD control and prevention as well as to gather information on international best practices pertaining to FMD.
• District monthly reports • Anthrax, Quarter Evil, Contagious Abortion and Rabies Vaccination Update Reports • FMD Vaccination Campaign Reports • Supervisory visits on cordon fences report • Department of Veterinary Services: Review of Foot and Mouth Disease Control Strategies in Botswana. June 2012 • Department of Veterinary Services. Foot and Mouth Disease Surveillance Plan for 2013. • Fence Maintenance strategy • Field Services Division: Annual Report. 2010/2011 • Minutes of Kgotla Meetings addressed by the Minister of Agriculture • Buffalo incursion reports	These documents were reviewed to understand the operational matters related to the FMD control and prevention

• Disease Surveillance Plans	This was reviewed with the view to understand the circumstance under which surveillance was to be conducted as well as the frequency in which it was to be carried out.
• Establishment of protection zone by re-designation of the OIE recognized FMD free zone of Botswana	To understand how the DVS view its performance in relation to the controls in place especially controls on foot and mouth disease

Annexure: 3

DVS Organisational Chart for FMD Control & Prevention



Annexure 4

NGAMILAND VACCINATION RETURNS FOR TUBU FMD OUTBREAK (2014)							
CRUSH	October	November 1st phase	November 2nd phase	December 1st Phase	December 2nd phase	Average Coverage	Cumulative Average Coverage
Chaa	88%	138.30%	165.20%	165.20%	110.50%	133%	
Tubu	3%	32.40%	37.00%	37%	34%	29%	
Kangdalangodi i	16%	100.30%	111.70%	111.70%	115.00%	91%	
Kangdalangodi ii	23%	76.20%	81%	81%	70.30%	66%	
Xowa		63.40%	72.40%	94.80%	107.20%	84%	
Xhara	11%	58.80%	80.20%	80.20%	85.20%	63%	
Ngoshwe	4%	45.40%	64.20%	64.20%	53%	46%	
Samotshoka		130.80%	160.30%	160.30%	105.60%	139%	
Wazime		58.20%	60.20%	60.20%	61.60%	60%	
TUBU EXTENTION AREA							79%
Kgomothari		38.90%	55.80%	55.80%	66.60%	54%	
Khubuga		30.40%	55.40%	55.40%	60.20%	50%	
Danega		46.40%	62.40%	62.40%	15.60%	47%	
Weetema		116.70%	185.20%	183.90%	88.10%	143%	
Guda			169.80%	169.80%	119.20%	153%	
NOKANENG EXTENTION AREA							90%
Kakanaga			75.30%	82.70%	86.70%	82%	
Kenakemo			85.00%	85%	100%	90%	
Dineo			96.40%	96.40%	41.90%	78%	
Kaninangome			100.40%	100.40%	79.40%	93%	
Nxweree			63.10%	63.50%	41.30%	56%	
Habu			30.90%	30.90%	20.00%	27%	
HABU EXTENTION AREA							71%

Etsha 13			62.40%	62.40%	74.90%	67%	
Guma			65.10%	68.40%	62.60%	65%	
Etsha10			89%	89%	49.70%	76%	
ETSHA 6 EXTENTION AREA							69%
Tamma			72.60%	106.60%	116%	98%	
Gumare			48.30%	48.30%	71.20%	56%	
GUMARE EXTENTION AREA							77%
Masama			24.10%	60.50%	27.70%	37%	
TSAU EXTENTION AREA							37%