

**THE DEPARTMENT OF VETERINARY SERVICES AND CONTROL OF
CONTAGIOUS CATTLE DISEASES IN ZAMBIA, 1907-1990**

BY

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**A Dissertation Submitted to the University of Zambia in Partial Fulfilment of the
Requirements for the Degree of Master of Arts in History**

THE UNIVERSITY OF ZAMBIA

LUSAKA

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DECLARATION

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APPROVAL

This dissertation of Vytalis Chavwanga is approved as fulfilling the partial requirements for the award of the degree of Master of Arts in History by the University of Zambia.

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ABSTRACT

The study examines the role of the Department of Veterinary Services in controlling and preventing contagious cattle diseases in Zambia from 1907 to 1990. The cattle disease environment prevailing at the onset of colonial rule forced the colonial authorities to create the Department of Veterinary Services in 1907 to take care of the health of domestic animals. The focus in this study is the control and prevention of Contagious Bovine Pleuro-Pneumonia (CBPP), Foot and Mouth Disease (FMD), Anthrax, Quarter Evil, Theileriosis and Bovine Trypanosomiasis (Nagana).

The study began by investigating the outbreak, incidence and geographical distribution of the above mentioned diseases. It found that the nature and epidemiology of the diseases varied from one region to another. It showed that some diseases were endemic in some regions while others were sporadic in nature, occurrence and non-existent in other regions. The most affected areas were the border regions of Western, Southern, Eastern and Northern Provinces due to trans-border transmission of diseases. The study also revealed that all contagious cattle diseases save for Bovine Trypanosomiasis were introduced in the country during the colonial rule.

The study established that the Department played an important role in controlling and preventing outbreaks of contagious cattle diseases. It argued however, that achieving effective disease control and prevention at all times was difficult as the Department encountered a myriad of challenges. These included among others inadequate number of trained veterinary personnel, inadequate and erratic funding, lack of cooperation by farmers, few diagnostic laboratories and frequent unavailability and high cost of drugs. Such challenges hindered effective control of cattle diseases.

DEDICATION

To my late mother Alice Mwiinde Chavwanga, my inspiration in academia.

ACKNOWLEDGEMENTS

The study was made possible through the cooperation, criticism, comments, advice and assistance of many people and institutions. I am grateful to Dr. W. S. Kalikiti for his superb guidance as my supervisor. I am greatly indebted to him for his patience and consistent guidance in the process of preparing the draft and final copy of my dissertation. He read every page I wrote and gave me his comments with the skills of a teacher and the affection of a friend.

I am also greatly indebted to Dr. B. S. Siamwiza who helped to define the research topic and also played the role of an unofficial co-supervisor. His scholarly criticism and suggestions greatly shaped the form of this study. I am also grateful to him for assisting me with books including his 'precious' Ph.D. dissertation I used during my taught part of the Masters programme and for writing this dissertation. Ndalumba Kapati! A huge debt also goes to Prof. B. Namangala for his input in the research proposal on which this dissertation is based.

The members of staff in the Department of History also deserve my thanks for their valuable comments in shaping up the research problem. This dissertation would not have been written without the invariable help of the staff at both the University of Zambia Library and the National Archives of Zambia in Lusaka. I sincerely thank them all. Special thanks also go to Mr. Christopher Siame of Mazabuka Veterinary Research Station for offering to be interviewed and for assisting me with data.

I would also like to thank my father Mr. Joseph Mainza Chavwanga for his material and moral support. My brothers and sisters deserve special thanks for their inexhaustible patience and support. Their consistent encouragement was a source of inspiration for me to work hard during the collection of data and the actual writing of the dissertation. I am also grateful to my friends,

namely, Trywell Milipili, Alistair Kandyata, Muyangali Muyangali, Nasilele Lubinda, Carrington Siatontola, Eff Munsaka, Victor Sichone, Chimuka Haamukwanza, Chabota Mwanamoonga, Raymond Muyovwe and Michelo Miyoba for their unconditional support and encouragement during the writing of this dissertation.

I also wish to express my gratitude to Cedric Nanja for typing the dissertation at a time he was busy with his academic work. Cedric did not only type the dissertation but also offered his printer for printing the draft chapters and the final dissertation. I will forever be grateful to him. What more can I say? Just to wish him the Almighty's continued blessings. In addition, I am exceedingly humbled to Patricia Mwaka Kandunda for her moral and emotional support.

I also want to thank my postgraduate classmates: Alice Banda, Miyanda Simabwachi, Boyd Mwanabayeke, Monde Sililo, Meldad Chama, Theresa Tonga and Margret Phiri for the good time we had during the study. Finally but not the least, I am grateful to Lubosi Kikamba, Patrick Sikayomia and Nisbert Machila, all my senior at post graduate studies for their encouragement and advice in writing the dissertation.

TABLE OF CONTENTS

Abstract.....	iv
Dedication.....	v
Acknowledgements.....	vi
Table of Contents.....	viii
List of Maps.....	x
List of Tables.....	xi
List of Abbreviations.....	xii
List of Old and New Names of Places.....	xiii

CHAPTER ONE: INTRODUCTION

Introduction and Historical Background.....	1
Statement of the Problem.....	5
Objectives of the Study.....	5
Rationale.....	5
Literature Review.....	6
Research Methodology.....	10
Organisation of the Study.....	11

CHAPTER TWO: CATTLE DISEASES, INCIDENCE AND THEIR GEOGRAPHICAL DISTRIBUTION

Introduction.....	16
Cattle breeds and geographical distribution.....	16
Pre-colonial indigenous knowledge of cattle disease control.....	20
Cattle diseases in the history of Zambia.....	21
Conclusion.....	36

CHAPTER THREE: CONTROL AND PREVENTION OF CONTAGIOUS CATTLE DISEASES

Introduction.....42
Fighting Contagious Bovine Pleuro-Pneumonia.....43
Challenges of Foot and Mouth Disease.....51
Anthrax.....55
Quarter Evil.....58
Theileriosis.....60
Trypanosomiasis..... 66
Conclusion.....75

CHAPTER FOUR: CONSTRAINTS IN CATTLE DISEASE CONTROL AND PREVENTION

Introduction.....83
Lack of cooperation from cattle keepers.....83
Financial Constraints.....88
Institutional and Logistical Challenges..... 89
Geographical Challenge.....93
The Wild Game in the Kafue Flats.....95
Conclusion..... 96

CHAPTER FIVE: CONCLUSION

Conclusion.....100

BIBLIOGRAPHY.....104

LIST OF MAPS

	page
Map 1: Map of Zambia showing the distribution of indigenous cattle in Zambia	19
Map 2: Map of Zambia showing geographical distribution of Foot and Mouth Disease	26

LIST OF TABLES

	page
Fig. 1: Dipping tanks in African reserves	65
Fig. 2: Aerial operations carried out in Zambia between 1968 and 1978	83

LIST OF ABBREVIATIONS

ANC	-	African National Congress
BRE	-	Barotse Royal Establishment
BSAC	-	British South African Company
CBPP	-	Contagious Bovine Pleuro-Pneumonia
CD	-	Corridor Disease
CVRI	-	Central Veterinary Research Institute
ECF	-	East Coast Fever
FAO	-	Food and Agriculture Organisation
IFAD	-	International Fund for Agricultural Development
IMF	-	International Monetary Fund
NALEIC	-	National Livestock Epidemiology and Information Centre
NAZ	-	National Archives of Zambia
TNDP	-	Third National Development Plan
UDI	-	Unilateral Declaration of Independence
ZIAH	-	Zambia Institute of Animal Health

LIST OF OLD AND NEW NAMES OF PLACES

Old Name	New Name
Abercorn	Mbala
Barotseland	Western Province
Broken Hill	Kabwe
East Luangwa	Eastern Province
Feira	Luangwa
Fort Jameson	Chipata
Northern Rhodesia	Zambia
Southern Rhodesia	Zimbabwe
Tanganyika	Northern Province
Veterinary Assistant School	Zambia Institute of Animal Health

CHAPTER ONE

INTRODUCTION AND HISTORICAL BACKGROUND

The history of veterinary services in Zambia is closely associated with the livestock diseases prevalent at the onset of colonial rule. Little information is available about pre-colonial cattle diseases except for Bovine Trypanosomiasis. Gelfand observed that in much of the rest of the country, totaling over one third of Zambia, tsetse infestation had traditionally prevented the keeping of cattle.¹ However, more virulent diseases such as Anthrax, Foot and Mouth Disease (FMD), Contagious Bovine Pleuro-Pneumonia (CBPP), Quarter Evil began to appear after the introduction of colonial rule.² The control and prevention of cattle diseases was under the jurisdiction of the Department of Veterinary Services. This study examines the role of the Department in the control and prevention of contagious cattle diseases in colonial and post-colonial Zambia. The focus is on the prevention and control of Contagious Bovine Pleuro-Pneumonia, Foot and Mouth Disease, Anthrax, Quarter Evil, Theileriosis and Bovine Trypanosomiasis, also known as *Nagana*. These diseases occurred frequently and were the most dangerous diseases due to the high mortality they caused among cattle.

The cattle disease environment the British South African Company, hereafter BSAC administration faced led it to create the Department of Veterinary Services in 1907. The Department was charged with protecting the 'nation's domestic animal wealth. As a result it gave priority to the control of cattle diseases over diseases affecting other animals. This explains why the veterinary services were largely confined to preventive and disease control measures. These control and prevention 'services' were introduced by the BSAC and the colonial government as a way of protecting European-owned cattle from the reservoirs of disease in

African herds.³ European cattle owners and traders were constantly, and understandably, concerned with the prevention of cattle diseases, which could deal a more severe blow to their fortunes than almost anything else. The services were, however, extended to the African farmers in the 1920s as the indigenous livestock sector was critical in the supply of beef to the copper mines in the Copperbelt and Katanga.

Lane was the first veterinary officer to work in Northern Rhodesia and was appointed to the service of North-Eastern Rhodesia Administration in 1907.⁴ Lane headed the Department until 1921, when Smith became in charge of the Department. Until 1940 the veterinary officer at Choma superintendent Livingstone, Kalomo, Namwala and Choma districts with the assistant of stock inspectors who were posted at each of these places. The veterinary officer at Lusaka had stock inspectors at Lusaka, Mumbwa, Kabwe, Mkushi and Ndola. The veterinary officer at Mongu was in charge of operations in Barotseland (now Western Province). There were independent stock inspectors at Abercorn (now Mbala) and Fort Jameson (now Chipata). These were strategically placed to effectively control and prevent outbreaks of livestock diseases. The Department operated under the Stock Diseases Ordinance of 1913.⁵

Nothing much happened in the work of the Department during the company rule administration. During this early period, the Department concentrated much on controlling CBPP, Bovine Trypanosomiasis and Anthrax in Barotseland, Eastern and Southern Provinces.⁶ The year 1929 marked the turning point in the work of the Department, when a major Research and Experimental Station was opened in Mazabuka. The aim behind the setting up of the station was to combat cattle and horse diseases. It was also meant to educate Africans in modern animal hygiene and husbandry so as to ultimately improve the quality of their stock.⁷ However, the operations of the station were seriously hampered by the economic depression of 1929 whose

effects had spread to Northern Rhodesia by the early 1930s. Despite financial constraints experienced in the early 1930s, the colonial government through the Department embarked on a programme of dip-tank construction in Southern and Eastern Provinces to control tick borne diseases.

The year 1943 was another turning point in the history of the Department. In that year the Veterinary Assistant School (now Zambia Institute of Animal Health) at Mazabuka was established. Students enrolled into this school were given a two-year course of training and upon qualifying as veterinary assistants, were posted into the rural areas. These men formed a grass root of veterinary staff throughout the country and were instrumental in the control and prevention of cattle diseases. Rootselaar and Bwalya stressed that this was one of the major colonial input in the development of the traditional cattle sector.⁸

After the Second World War there was increased concern for African welfare as a result of African participation in the war on the side of the Allied Nations. Immediately after the war, the Department reviewed the livestock industry in Northern Rhodesia. It was found that the cattle population had been static for many years and therefore inadequate to supply the territory with its requirements of livestock products.⁹ Consequently, the Department drew up a development plan for the livestock industry. In this plan the Department set out measures for disease control, livestock improvement and management. Mulongo observed that this change of policy was in line with the colonial outward-looking policy for Africa as a whole.¹⁰ Cattle disease control measures were improved and intensified. The Department largely focused on the control of tsetse flies on the north bank of the Kafue River in Namwala and in the Eastern Province in the plateau area.

At independence in 1964, the Zambian government like other African governments assumed complete responsibility for all animal health care matters for its citizens. In addition the state sought to increase the number of traditional herds to stem the rise in beef imports and meet the rising urban demands. Leonard pointed that the state heavily subsidized veterinary extension services to the farmers.¹¹ The constitutional changes culminating in the attainment of independence had little effect on the work of the Department and its policy remained unchanged.

During the First and Second National Development Plans, projects of the Department were directed mainly towards infectious cattle diseases that led to actual loss of life of cattle.¹² Such projects included construction of dip tanks to control East Coast Fever, and provision of facilities to eradicate tsetse flies.

However, in the mid-1970s there was a worldwide recession and decline in the value of copper. A collapse in copper prices and oil price shocks had a devastating effect on the Zambian economy. The resulting economic decline had catastrophic effect with per capita income falling almost 5 percent annually between 1974 and 1990.¹³ This led to reduction in operating funds for the Department and disease control measures were almost brought to a halt. Most disease control measures were now being implemented by foreign cooperating agencies.

In 1986 the Zambian government with the cooperation of the Japanese International Cooperation Agency established the Samora Machel School of Veterinary Medicine at the University of Zambia. The school aimed to promote high level research and training in the areas of animal health and disease control.

Statement of the Problem

Many scholars have studied and written on the role of cattle, cattle diseases and their socio-economic consequences but no comprehensive work has been written on the role of the Department of Veterinary Services in containing and preventing contagious cattle diseases in Zambia. Yet the role of the Department in containing and preventing cattle diseases is important for an adequate appreciation of the forces that helped shape the country's experiences of cattle diseases and veterinary services provision and delivery. This study therefore examined the role played by the Department of Veterinary Services in preventing and containing outbreaks of contagious cattle diseases in Zambia.

Objectives of the Study

The study had the following objectives:

1. To investigate the incidence and geographical distribution of selected contagious cattle diseases in Zambia.
2. To examine the role played by the Department of Veterinary Services in the prevention and control of contagious cattle diseases.
3. To assess the challenges faced by the Department in the prevention and control of cattle diseases in Zambia.

Rationale

This study is a contribution to the historiography of veterinary medicine and services in Zambia. It will also provide an understanding of the links between veterinary services and aspects of

cattle diseases and help provoke academic and research interest in the theme of veterinary medicine and services in Zambia.

Literature Review

Studies have been carried out on livestock diseases and their associated socio-economic consequences. But no comprehensive work has been written on veterinary service provision and delivery. Musambachime's work on the "*Impact of Contagious Cattle Diseases in Colonial Zambia*" is relevant to this study as it highlights the incidence of five contagious cattle diseases and their impact on the economy of cattle keeping societies in colonial Zambia.¹⁴ The work also highlights the measures that were taken by the Department of Veterinary Services in mitigating these diseases but not comprehensively.

Simuyaba discusses the socio-economic consequences of Bovine Trypanosomiasis, Contagious Bovine Pleuro Pneumonia, Foot and Mouth Disease and Corridor Disease.¹⁵ Further, Simuyaba discusses the measures taken by the Department of Veterinary Services to mitigate the diseases. Similarly, Chikaza examines the social and economic role of cattle and assesses the impact of cattle diseases on the cattle industry and the culture of the people in Namwala district.¹⁶ Although he summarily highlights the measures that were taken by the Department to control and prevent cattle diseases, the information is valuable in understanding the role of the Department in cattle disease control and prevention.

Using Namwala district as an example, Mulongo argues that underdevelopment in Africa was due to ecology and colonial policies.¹⁷ He argues that the new economic opportunities in agriculture and livestock-keeping were frustrated by environmental setbacks and poorly-defined policies on African development. In Namwala, the cattle population was constrained by disease,

especially Trypanosomiasis. However, he acknowledges that the colonial government undertook measures to correct the problem of cattle diseases. This is vital in examining the role of the Department in cattle disease control and prevention.

Siamwiza's work on *Famine in Zambia* identifies among the causes of famine, livestock diseases such as Rinderpest and Contagious Bovine Pleuro-Pneumonia.¹⁸ While discussing livestock diseases as part of the causes of famine he explains the measures taken by the Department to control the spread and occurrence of the diseases during the colonial period.

Chizyuka's investigation of the epidemiology and chemotherapy of Bovine Trypanosomiasis helps us understand the incidence of the disease and the various measures taken by the Department of Veterinary Services to control it. Chizyuka's work informs this study that control and prevention measures were not static but changed over time with improvements in scientific innovations. Chizyuka's study compliments Lubinga's which highlights challenges of Trypanosomiasis faced by the early European settlers in Zambia and by the Department both during the colonial and the post-colonial periods.¹⁹ Lubinda also examines the role played by the Department in preventing and controlling the prevalence and spread of the disease.

Jordan investigated the impact of Trypanosomiasis in relation to rural economies in Africa, especially on its hindrance on the domestication of livestock.²⁰ In the case of Zambia, he observed that many areas were tsetse-infested and this hindered the domestication of livestock. Jordan thus provides valuable information on the geographical distribution of Trypanosomiasis in Zambia. Vail studied the impact of colonial policies on ecology, focusing on the Eastern Province of Zambia in relation to colonial policies and the Department of Veterinary Service's

efforts in controlling the disease both in humans and livestock. He also shows the extent to which the Department mitigated Animal Trypanosomiasis and Sleeping Sickness as did Hellen.²¹

Pollock, Gouldsbury and Sheane focuses on the disease environment before and during colonial rule in North Eastern Rhodesia.²² They discuss the incidence and geographical distribution of Sleeping Sickness, Rinderpest and Animal Trypanosomiasis. Smith's personal diary, *Vet in Africa* explains his experiences of livestock diseases, disease outbreaks and efforts applied to mitigate their impact.²³ Smith covers the period between 1915 and 1933 and discusses the role of the Department in mitigating Foot and Mouth Disease and Contagious Bovine Pleuro-Pneumonia.

Prins's *Hidden Hippopotamus* among other issues, discusses the disease environment at the onset of colonial rule. He argues that the 1890s brought about human and cattle epidemic diseases.²⁴ Prins informs this study on the geographical distribution of some contagious cattle diseases. Hermitte and Macmillan although not necessarily focusing on veterinary diseases, do discuss the outbreak of Contagious Bovine Pleuro-Pneumonia, its impact and control in the Western Province.²⁵

Huddart and Wood investigated outbreaks and control measures of Contagious Bovine Pleuro-Pneumonia during the colonial period and after independence. The first outbreak occurred in 1915 and lasted until 1944. The second outbreak occurred in 1970 and did not abate until 1973.²⁶ Mutuwo's work analyses the impact of the Rinderpest outbreak on human populations in early colonial Zimbabwe. He also analyses the colonial authorities' various attempts and challenges to contain and eradicate the disease.²⁷ Although the work is on Zimbabwe the challenges faced by

the colonial authorities in eradicating the disease in that country were similar with what prevailed in Zambia.

Gelfand in *Northern Rhodesia in the Days of the Charter* discusses how the disease environment posed a great challenge to the BSAC administration and observed that veterinary services were essential if the company was to effectively carry out its role of trustee.²⁸ He justifies the establishment of the Department of Veterinary Services and its mandate of preventing and mitigating cattle diseases.

Kandyata discusses the role of the Department of Veterinary Services in containing livestock diseases in Namwala during the colonial period. He also surveys the control methods used by the Department that included inoculations, quarantine, and slaughter of infected herds, bush clearing, aerial spraying to eradicate tsetse fly and ban on cattle movements.²⁹ In addition, he highlights the political challenge posed by the African National Congress (ANC) in the control and prevention of cattle diseases. Chilonda's thesis discusses the veterinary delivery system in Zambia. He discusses the functions of the Department of Veterinary Services.³⁰ His work informs this study of the fundamental task of the Department in mitigating the cattle disease burden.

Mulongo's comparative study of Bangweulu and Namwala argued that ecological problems in agriculture, animal husbandry, game and fishing were serious constraints in the economic development of the two regions. Colonial administrators were at first lethargic in carrying out policies to solve these problems and with their labour policies, encouraged uncontrolled and accelerated exploitation of natural resources. He argues that the policies that were formulated and implemented after 1940 to deal with these problems met with partial success in Namwala

and failed altogether in Bangweulu.³¹ Mulongo helps us understand that the political will of the colonial government was important in ensuring the Department successfully carried its role of disease control.

Dixon-Fyle, among other issues, discusses how the African National Congress influenced Tonga farmers to boycott cattle inoculation in the 1940s. He stresses that Congress sabotaged the efforts of the Department of Veterinary Service's personnel who had the responsibility for inoculating African cattle against diseases.³² This study helps to understand some of the challenges met by the Department in the control and prevention of cattle diseases. Similarly, Vickery reveals how the Tonga of Monze and Mazabuka districts opposed dipping and inoculation in the 1920s and 1930s.³³

The works of Musambachime, Siamwiza, Jordan, Pollock, Prins, and Gelfand discuss the disease environment that informs this study and provide reasons behind the creation of the Department of Veterinary Services. While the works of Mulongo, Chizyuka, Lubinda, Smith, Huddart, Wood, and Smith examines the role of the Department in the provision of veterinary services. Kandyata, Dixon-Fyle and Vickery provides information on the challenges faced by the Department in the control and prevention of cattle diseases.

Research Methodology

The study is based on qualitative research methodology. The University of Zambia Library provided the initial sources. Data was collected from books, journal articles, Ph.D. theses, M.A dissertations, Department of Veterinary Services Annual Reports, Native Affairs, later African Affairs Annul Reports and various documents from the Special Collection Division of the Main Library and School of the Veterinary Medicine Library at the University of Zambia. The

National Archives of Zambia was consulted for documents such as District Notebooks, Tour Reports, Official Government Correspondences, African Affairs Annual Reports, Animal Health and Veterinary Annual Reports. Documents from the Ministry of Livestock and its predecessor ministries and departments were consulted for veterinary reports and documents. Veterinary Annual Reports at the National Livestock Epidemiology and Information Centre in Lusaka supplemented the above sources. Data was also collected from the Zambia Institute of Animal Health in Mazabuka where written and oral interviews were consulted and conducted respectively.

Organisation of the Study

The study has five chapters. Chapter one is the introduction and historical background. It focuses on the historical development of the Department of Veterinary Services and the theme of the dissertation. Chapter two discusses the cattle diseases, incidence and geographical distribution of the diseases. Chapter three examines the role of the Department in controlling and preventing outbreaks of cattle diseases. Chapter four assesses the challenges met by the Department in the control and prevention of cattle diseases. Chapter five is the conclusion.

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CHAPTER TWO

CATTLE DISEASES, INCIDENCE AND THEIR GEOGRAPHICAL DISTRIBUTION

Introduction

This chapter investigates the outbreak, incidence and geographical distribution of contagious cattle diseases during the colonial and post colonial period to 1990. The diseases discussed include Contagious Bovine Pleuro-Pneumonia, Foot and Mouth Disease, Anthrax, Quarter Evil, Theileriosis and Bovine Trypanosomiasis. Contagious Bovine Pleuro-Pneumonia and Foot and Mouth Disease are viral diseases while Anthrax and Quarter Evil are bacterial diseases. Theileriosis and Bovine Trypanosomiasis are protozoal diseases. The chapter suggests that the nature and epidemiology of cattle diseases varied from one region to another by demonstrating that some diseases were endemic in some regions while others were sporadic in nature and occurrence. The chapter also reveals that all contagious cattle diseases apart from Bovine Trypanosomiasis appeared for the first time in Zambia during the colonial period.

Cattle breeds and geographical distribution

Cattle have been kept in Zambia since time immemorial. Evidence from Gundu, Kalomo district and Ing'ombe Ilede, Gwembe Valley in the Southern Province suggests that Early Iron Age inhabitants kept cattle and small livestock.¹ Colson also indicated that cattle have been part of the Tonga economy at least since AD 900.² Roberts also suggested that cattle have been kept in Zambia at least a millennium before the introduction of colonial rule.³ Fielder pointed out that cattle were a dominant feature of pre-colonial Ila economy as is the case today.⁴ Mulongo suggested that by the 1850s the Ila had already become established as cattle keepers. Kalikiti has

argued that the availability of indigenous owned cattle provided a basis for the emergence of white settler ranching in Northern Rhodesia.⁵

Wood also highlighted that cattle have been kept on the upper Zambezi flood plain from at least the mid Seventeenth century when the Lozi settled in the area. In 1853, Chapman noted that “the great valley is not put to a tithe of the use it might be. It is covered with coarse succulent grasses, which afford ample pasturage for large herds of cattle; these thrive wonderfully and give milk copiously to their owners.”⁶ Livingstone saw these herds to be the main determinant of settlement patterns as people were required to live apart on account of their cattle.⁷ The Lozi extensive vocabulary to describe cattle, their diseases and management practices was indicative of a long history of cattle keeping.

Mwenya pointed that the keeping and distribution of Zambian indigenous cattle was influenced by the interaction of climate, disease and vegetation.⁸ Indigenous cattle were found under traditional systems of management and were completely acclimatised to the local environment. Although cattle have been kept for many centuries in several parts of Zambia, tsetse infestation traditionally prevented the keeping of cattle in many areas. This partly explains why cattle were only kept by the peoples of Southern, Western, Eastern and Central Provinces and by the people living in the extreme northeast near the Tanzanian border.

The traditionally indigenous cattle in Zambia were classified into three major groups based on geographical locations and physical appearances namely; the Angoni, Barotse and Tonga of Eastern, Western and Southern Provinces, respectively. The indigenous cattle of Zambia are a combination of Zebu and Sanga. The Angoni cattle of the Eastern Province being an example of the Zebu type, the Tonga and Barotse cattle are Sanga. The Angoni are short horned

trypanosusceptible Zebu cattle found in Zambia, Malawi and Mozambique. In Mozambique, they are known as Angone.⁹ According to Brownlee, the existence of the Angoni cattle dates back to AD 700 in Zululand, South Africa, where they were known as the Nguni breed.¹⁰ The Nguni breed survived the era of Shaka and Mzilikazi who raided and moved it across the Limpopo through Matebeleland and across the Zambezi River into Zambia. In Zambia, the Angoni were originally kept by the Ngoni around Lundazi and Chipata in the Eastern Province. They are medium-sized cattle and their colour is very variable and may be red, brown, black, red and white, black and white or brindle. The hump and dewlap are large and well developed in both sexes.

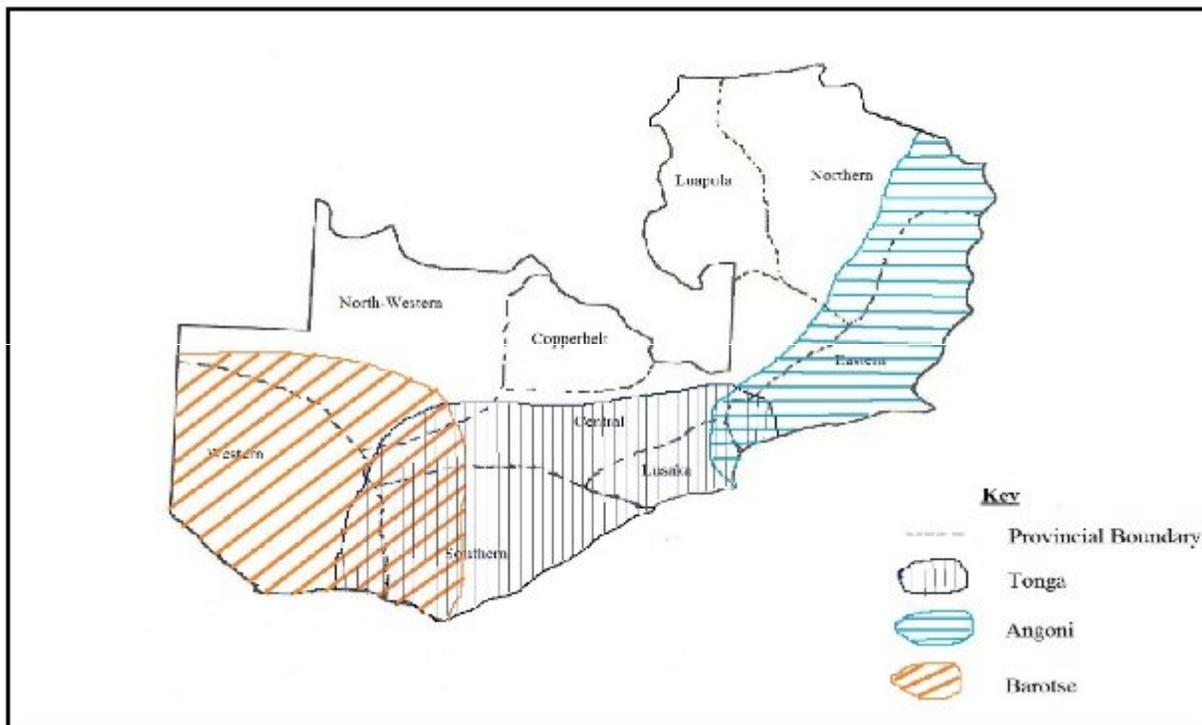
The Barotse cattle are found on the flood plains of the Zambezi and extend westwards into Angola. Barotse cattle were already in the area before the Kololo arrived and conquered the Lozi. It is a product of the crossbreed of the Sanga and the humpless taurine and humped Zebu. Sanga is an Ethiopian word meaning 'bull' which relates to the origin and center of dispersal of this group of cattle breeds.¹¹ Sanga cattle were introduced into Southern Africa by the Khoikhoi when they crossed the Zambezi River about 700 AD.¹² The Barotse cattle are big bodied with heavy bones and large spreading horns. The common colours are brown, black and dark red. Ears are medium size and the hump is small in the male and almost absent in the female. The dewlap is moderately developed.

The Tonga breed also has its own origin from the Sanga and was in Zambia before the Bantu migration from Central Africa.¹³ It is a short-horned breed, largely found in the Southern region of Zambia between the Kafue and Zambezi Rivers. The Tonga breed is very similar to the Mashona breed of Zimbabwe. Its horns are shorter than the Barotse but larger than those of the Angoni. They are smaller than other breeds. The hump is on the neck and small in the male and

may be absent in the female. The dewlap is moderately developed. The body is not deep and the legs are long.

The exotic cattle were introduced by the white settlers during the colonial period. These were reared on a commercial basis and the geographical distribution followed a pattern similar to that of traditional cattle keeping areas. The exotic breeds in the commercial sector included Africander, Friesians, Jersey, Guernsey, Sussex, Brahman, Hereford and the Boran. Challens observed that the exotic breeds were easily identified from the indigenous cattle due to their big size in body and their humplessness.¹⁴

Map 1: The distribution of indigenous cattle in Zambia



Source: Mwenya, The Diversity and Conservation of Livestock and Poultry Genetic Resources in Zambia, 2001.

Pre-colonial Indigenous Knowledge of Cattle Disease Control

Little is known about the pre-colonial cattle disease environment and the traditional African methods of combating disease outbreaks. What is clear, however, is that the indigenous people kept cattle, which, by all early accounts, were in a fit and healthy condition. Livingstone, during his journeys, saw ‘many fine cows’ perhaps due to the indigenous cattle’s natural immunity to diseases.¹⁵ The other reason could be that the cattle may have benefited from traditional African veterinary medicine practices. Kjekshus reported that the local people of East and Central Africa knew and understood the relationship between tsetse flies, wild animals and bush and the survival of their own cattle.¹⁶

Kirk observed among the peoples of the Zambezi Valley that:

The Makololo are a people from infancy accustomed to tend cattle, possessing a thorough knowledge of the most fattening pastures to be sought, and noxious herbs to be avoided. Their only wealth consists in cattle, which they number by thousands. All affirm that on entering certain localities by day the oxen die shortly afterwards; this they have proven....They have further learned that these deadly places may be crossed with safety by night if sufficiently narrow to allow of the cattle being driven through before sunrise.¹⁷

This statement suggests that Africans were already familiar with cattle diseases in the pre-colonial period and had perhaps developed remedies to combat them especially Bovine Trypanosomiasis. It is also likely that because people lived very close to their cattle and therefore could easily detect ailment that affected their stock.

Long experience of cattle keeping and keen observation seem to have equipped the African husbandmen, with knowledge of prophylaxis against diseases. With such experience and

observation, diseases such as Bovine Trypanosomiasis were avoided largely through superfluous curative measures, what John Ford called ‘an agro-horticultural prophylaxis.’¹⁸ The flies were annually controlled through bush fire. Using this technique the flies were pushed to certain areas and could be avoided when herding. However, if a village continued to be terrorized by disease, another dramatic step was to abandon the site and look for a new location.

Several repellents were also used to chase away the tsetse fly. Although no adequate evidence points to any ethnic group in Zambia for having used it, the method was common in East Africa and the Congo. Livingstone, while in the Manyema country, east of the Lualaba River in the Congo in 1871, reported the repellent technique:

Lion’s fat is regarded as a sure preventive of tsetse or bungo...It is smeared on the ox’s tail, and preserves hundreds of the Banyamwezi cattle in safety while going to the coast.¹⁹

The practice of smoking cattle was used as a temporary repellent against tsetse fly. Burning dried cattle dung in the cattle kraals during nights generated a very strong repellent from which the cattle received a certain degree of protection.

Cattle Diseases in the History of Zambia, 1913-1990

Contagious Bovine Pleuro-Pneumonia

Contagious Bovine Pleuro-Pneumonia hereafter CBPP, also known as Lung Sickness can be highly infectious acute, sub-acute, or chronic disease and is primarily of cattle affecting the lungs and the joints.²⁰ It is caused by *Mycoplasma mycoides* organisms which affect the lungs and the chest cavity of an animal. It is spread by an infected animal’s sputum, by face to face contact or, less commonly, by eating contaminated pasture or drinking from contaminated water places.²¹ It

is a highly infectious disease with several unpleasant features which render it difficult to control. It spreads rapidly but insidiously so that cattle can be infected for weeks or even months before infection become manifest. Mortality is high with only a small survival proportion.²²

The disease originated in Central Europe and spread throughout the continent during the Napoleonic wars. During the period of colonial expansion, CBPP was introduced into South Africa from the Netherlands by Friesian bulls landed at Mossel Bay in 1853 in what is now the Western Cape Province.²³ From Mossel Bay the disease was disseminated rapidly by trek oxen progressing in all directions along transport routes. Within two years the disease had killed over 100, 000 herd of cattle. Among its political effects was a major contribution to the Great Xhosa Cattle-Killing Movement of 1856 to 1857 which resulted in the starvation of tens of thousands Xhosas and the devastation of that nation. CBPP was later introduced into Angola from South Africa; probably by infected cattle belonging to the Dorsland Trekkers who emigrated from South Africa and settled near Humpata in the Huila Province in the early 1880s. Its presence was confirmed there in 1888. The extensive use of draught oxen was considered to be the cause of its rapid spread throughout Angola, and by 1914 the whole country had been infected.

The disease was introduced in Zambia from Angola by the medium of transport oxen employed in connection with an Anglo-Portuguese Boundary Commission.²⁴ It appeared first in Kalabo district of the Western Province in September 1914, but remained unknown until March 1915 by which time several herds had been wiped out in the district.²⁵ As is usually in the invasion of a clean territory by an epizootic, the rate of spread of the disease was extremely rapid. The disease quickly spread to other parts of the province and by mid-1915, the disease was diagnosed in the Southern Province.²⁶ During the next few years a great number of cattle died; the precise number

is not known because there were no reliable figures for the cattle population before the outbreak. The outbreak was not brought under control until 1944.

Although eradicated in 1944, CBPP was again introduced from Angola into the Western Province of Zambia in 1969 and lasted up to 1974 as a result of a combination of factors that included removal of the cordon line in 1967 and an influx of Angolan refugees into Western Province with their cattle. The disease spread quickly to other parts of the province but did not affect other provinces in the country. The outbreak resulted in a 75 percent morbidity rate and caused up to 68 percent mortality in infected herds.²⁷

Foot and Mouth Disease

Foot and Mouth Disease hereafter FMD, also known as *apthous* fever and *aftosa* is an acute, febrile, highly contagious disease of cloven footed animals caused by a filterable virus. The first recorded outbreak of the disease was in Europe in 1544.²⁸ It is characterised by fever and formation of vesicles on the mucous membranes of the mouth, on the nose and on the skin between and adjacent to the hooves. In cattle, vesicles are usually seen on the tongue, lips, cheeks, gums and palate, on the snout, between the hooves and on the coronary band. There is usually intense salivation, and when the epithelium of the vesicles ruptures, there is an area of raw tissue underneath. The mouth soreness discourages or prevents grazing and the foot lesions cause lameness. The lameness prevents the animals from grazing and causes loss of weight. In lactating cows lesions often appear on teats and udder.

Abortion, sterility, permanent reduction in milk yield and reduction in breeding ability commonly follow an outbreak of the disease.²⁹ Mortality is never high and death from the disease is uncommon except in young stock where there may be a considerable loss in calves,³⁰

but the loss of production is severe. Infection can be transmitted directly from animal to animal or indirectly by the movement of meat, hides, fodder and agricultural produce which have been contaminated by the virus. The virus can even be carried on people's clothing.

The virus has seven different types. These are known as O, A and C- the European type of virus, Southern Africa 1, 2 and 3- the African types of virus, and Asia 1- the Asiatic type of virus.³¹

The disease is spread by direct contact between cattle and infected game especially the buffalo. It is common where there is annual transhumance where cattle are left to wonder in the flood plains as the case was with the Kafue Flats. The disease can also spread by contact between infected cattle and un-infected cattle. Animals and birds may also spread the disease mechanically on their feet and sometimes airborne spread takes place during the night when humidity is dense. In infected areas, the virus remains infective in the animal droppings, hides, milk and in the vehicles used to transport live infected cattle or meat.³²

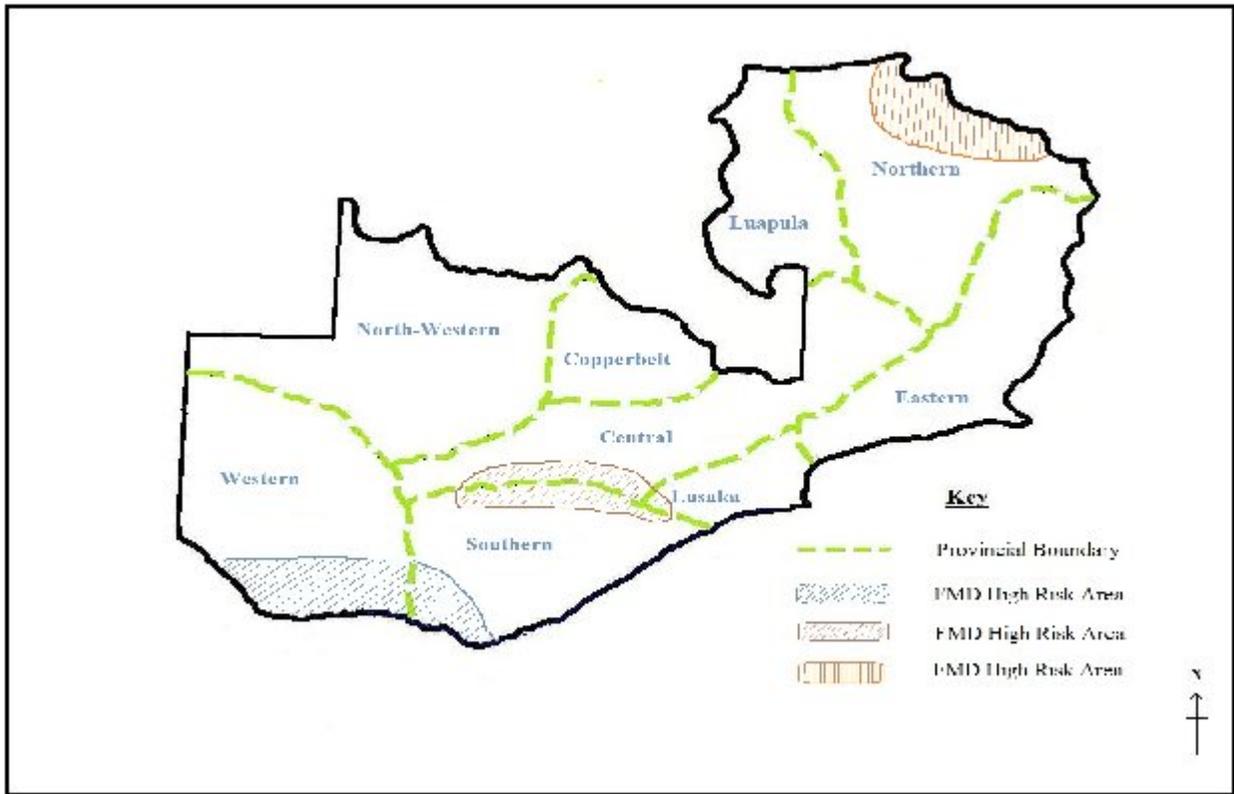
Overby and Zyambo argued that the Rinderpest panzootic of 1896, which wiped out a large number of the ruminant population, probably also eliminated FMD in the Southern African territories³³. This could be the reason why no outbreaks of the disease were reported in cattle in the early years of the Twentieth century. The first recorded outbreak of FMD in Zambia was in 1933 in the Western Province and since then there have been repeated outbreaks of the disease in Southern, Central and Western Provinces every one to two years. The disease was probably introduced into Zambia from Zimbabwe where there were several outbreaks, the first being in 1882.³⁴ In 1931, there was a serious outbreak which forced the Northern Rhodesia Administration to stop the transit of all livestock and food stuffs from Southern Rhodesia to Katanga.

Further cattle movement restrictions were imposed as Southern Rhodesia continued to suffer from outbreaks of the disease in 1932 and 1933.³⁵ In 1933, the director of animal health reported an outbreak of the disease at Mongu. The disease had been widespread in the Western Province for some months previously, but the Lozi people and the veterinary staff attributed its manifestations to foot-rot. As there was practically no mortality, little attention was given to the disease and hence the disease spread into the Southern Province.³⁶

Zambia experienced outbreaks of FMD of varying magnitudes since the disease was first reported in 1933 in Western Province. The disease was caused by all of the three Southern Africa Territories serotypes (SAT 1, 2 and 3) and the European serotypes O and A. Primary outbreaks of FMD was shown to be spread from clinically affected and 'carrier' cattle or buffalo to susceptible cattle through contact. Cattle can remain carriers for up to two and a half years and African buffalo (*Syncerus caffer*) was reported to maintain carrier status for up to five years without showing any clinical sign of infection.³⁷

Three high risk areas of the disease outbreak in Zambia were the southern border from Livingstone westwards to a point beyond Sesheke where the border with Angola turns to the north-west; the Kafue Flats and the northern border with Tanzania between Nakonde and Mbala. It was common on the borders because the disease outbreaks from neighbouring countries easily spread into Zambia. In case of the Kafue Flats the wild buffalo were susceptible to the disease and due to close contact with cattle during grazing, the disease quickly spread to the latter.

Map 2: Geographical Distribution of Foot and Mouth Disease



Source: Mweene et al, *Viral diseases of livestock in Zambia, 1996.*

An accurate summary of outbreaks since 1953, however, is not possible as conflicting figures appear in various reports and reviews. Different interpretations of the term outbreak were also given and primary *foci* of disease was not always identified or mentioned in reports. Classification of Zambian FMD outbreaks began in 1948 when the Southern African Territories immunological types of FMD virus were recognised.³⁸ Since then virus type SAT 2 was identified in 13 of the 21 years in which outbreaks had occurred, type SAT 1 in eight years and in only one year (1981) were both types identified during the same year. Type O was detected on two occasions, in 1976 and 1982, following outbreaks in Mbala district of Northern Province near Nakonde on the border with Tanzania. The source of these outbreaks was attributed to a southward extension of a primary focus of infection in the Rukwa Plains in Tanzania which was

a result of illegal cattle movements.³⁹ Type A was first isolated in Zambia in 1990 in the same region under similar circumstances.⁴⁰ SAT 3 was found in game animals only.

The FMD outbreaks in the southern part of Western and Southern Provinces were considered as flare-ups or continuations of preceding wet season SAT 2 outbreaks.⁴¹ This was probably also the case with outbreaks in the area in 1975, but not with the occurrence of FMD in the same area in 1979-80. The disease was then first diagnosed in winter during the month of July 1979, and the virus was confirmed to be a different strain, SAT 1. Most of the outbreaks in Southern Province originated from wildlife in the Kafue National Park and Kafue Flats. This is because of close contact between the large concentrations of transhumant cattle and migratory carrier buffalo.

Anthrax

Anthrax, or splenic fever, is a subacute or acute communicable disease occurring in one form or another in all warm-blooded animals, including humans. Although it may attack all kinds of domesticated animals and humans, it is chiefly found in cattle. The disease is caused by a *bacterium* called *Bacillus anthracis* and is characterised by sudden death, bloody discharges from the body openings, and gross enlargement of the spleen.⁴² The *bacterium* is a spore-forming micro-organism, which is extremely resistant to adverse conditions of heat and cold, and remains viable in the soil for more than a decade.⁴³ As a result land heavily infected by Anthrax bacterium is very difficult to render safe to stock in the future. In nearly all cases, infection in cattle occurs by means of the animal swallowing the spores. Under the influence of heat and moisture in the intestine, these spores develop and eventually pass into the bloodstream as

bacteria. Multiplication is rapid and the resultant widespread inflammation within the infected animal's body leads to death.

Historically, Anthrax has been known to livestock producers since time immemorial.⁴⁴ Because of the great interest in the disease by early scientists, it was the first, for which a protective inoculation was produced, successfully protecting livestock exposed to the virulent stage of the bacterium. Documentary evidence of Anthrax among cattle in Zambia dates back to 1913 when cases of animals infected by the disease were reported in Namwala and Sesheke districts⁴⁵. Sporadic outbreaks involving a few cattle were reported from Southern and Western Provinces up to 1950. The origin of the disease in Zambia is unknown. It remains speculative that movement of cattle from Southern Africa introduced the disease into the country. Livestock entering the country in the early 1900s at Livingstone border were never quarantined. Mandatory quarantine of livestock entering the country was only introduced in 1931.⁴⁶

A severe outbreak of Anthrax occurred in 1947 in Western Province where 156 cattle and about 100 wildebeest died.⁴⁷ In 1950 two human deaths were also reported in Western Province when a butcher sold Anthrax infected meat.⁴⁸ There were no reported cases of the disease in its epizootic form between 1952 and 1986, except for a few sporadic cases confined to Southern and Western Provinces. The low numbers in outbreaks was attributed to the successful vaccination programmes. Between 1952 and 1978 the incidence of Anthrax was almost insignificant; the highest number of recorded cases being only 14 in 1966.⁴⁹ The incidence reduced to only one each year between 1971 and 1973 and was not recorded at all between 1974 and 1977. The disease reappeared in 1978 when three cases were reported, one each in Mazabuka, Monze and Kalomo in the Southern Province on commercial farms.⁵⁰

The disease was not uncommon in Namwala, Mazabuka, Monze and Choma districts of Southern Province and, Mongu and Senanga districts of Western Province. The last outbreak of Anthrax in Southern Province was in 1987 in Mazabuka district.⁵¹ The disease was rare in Central and Copperbelt Provinces. Anthrax was reported only once in Kafue district of Lusaka Province in 1928. Isolated outbreaks were reported from 1970-1975 in Mongu and Senanga districts and again in 1981 and 1987. This was followed by 45 reported cases in Senanga district in 1989 rising rapidly to 747 reported cases in four of the six districts in 1990.⁵²

Quarter Evil

Quarter Evil also known as Black Quarter is a sporadic, acute and highly infectious disease of cattle, sheep and pigs may also be infected. The disease is caused by a microscopic bacterium called *Clostridium Chauvoei* which like Anthrax bacterium, is highly resistant to extreme conditions of climate and remains dormant in the soil until it enters the animal's body either through the digestive system or through a wound or sore.⁵³ Young cattle are most susceptible and generally the disease attacks them between the ages of three months and two years. The disease is characterized by gas-filled swellings in the heavy muscles, especially of the hindleg, which crepitate or crackle when palpated. The bacterium, as is in the case of Anthrax, is picked up in the veld. The digestive system uncovers the bacterial spore and the bacterium is released into the tissues via the bloodstream. Once in the tissues the organism multiplies rapidly and causes high mortality.

Records of the Department of Veterinary Services indicate that Quarter Evil was introduced into the country through imported cattle in the early years of colonial establishment. In 1920 the disease was included to the list of scheduled diseases under proclamation 8 of 1913.⁵⁴ Sporadic

outbreaks occurred in both African and European owned cattle in Southern and Western Provinces in the 1920s and 1930s. Fewer outbreaks however, were usually recorded in European owned cattle due to regular vaccinations programmes in the commercial farms. In the early 1940s sporadic outbreaks occurred in different parts of the country. In 1943 the disease caused the greatest mortality.⁵⁵ The disease went to ‘sleep’ between 1946 and 1955, only to suddenly reappear in 1956 among African cattle in the Kalabo district of Western Province. In the same year European stockowners suffered heavier losses from the disease than ever before. In 1957 the disease broke out in the Southern Province districts of Kalomo, Namwala, Mazabuka and Choma and in the Western Province. In 1960 the disease was reported for the first time ever in its history in the country, in the Eastern Province.⁵⁶

Between 1959 and 1964 there were 30 cases of the disease per year which reduced to less than 20 between 1965 and 1971. But the cases rose again with 1976 having the highest cases of 48.⁵⁷ This incidence and pattern of the disease seemed to have followed the availability and amount of vaccines. The vaccinations against the disease remained low before 1968 while the vaccinations rose to over 300, 000 after 1971 but fell below 500, 000 in 1975. The disease increased in its occurrence in 1978 and became a threat to the livestock industry. A total of 28 outbreaks were recorded with 18 of these being in the Southern Province. By 1980 the disease was reported from all over Zambia and it became endemic. The main reason was the reduced vaccination cover since 1975. A total of 91 cases were recorded with 664 deaths in 1986. In 1990 a severe outbreak was recorded in Lui ward east of Mongu and more than 100 herds of cattle died and 1,972 cattle died in the whole country⁵⁸.

Theileriosis

Theilerioses are protozoan infections of wild and domestic *bovidae* caused by tick-borne apicomplexan parasites of the *Genus theileria*. In Zambia, Theileriosis manifests itself in the form of Corridor Disease caused by *Theileria parva lawrencei*, and East Coast Fever, caused by *Theileria parva parva*.⁵⁹ Corridor Disease is locally known as *Denkete* in Southern Zambia and as *Chigodola* in Eastern Zambia. East Coast Fever was found in the Northern and Eastern Provinces of the country, while Corridor Disease appeared in the Southern and Copperbelt Provinces beginning from the late 1970s. East Coast Fever is transmitted principally by the African brown ear tick, *Rhipicephalus appendiculatus* and is characterised by fever accompanied by swelling of lymph nodes. The infected cattle develop nasal and ocular discharges, lose appetite and develop diarrhoea and difficulty in breathing.

The origin of Theileriosis in Zambia is not known, but it is assumed as is the case in the neighbouring countries of Malawi, Mozambique and Zimbabwe, that it may have come through the Eastern and Northern Provinces from East Africa.⁶⁰ Several hypotheses exist on the origin of the disease in the Southern Province. One theory points to the cattle having contracted the disease from buffalo because of the perceived common grazing shared by cattle and buffalo in Lochinvar game reserve on the Kafue Flats.

Although the origin of Theileriosis in Zambia is unclear, the records of the Department of Veterinary Services suggest that the disease could have entered the country from Tanzania as the first recorded case in Zambia in 1922 was at Isoka, then Fife in Nakonde district of Northern Province.⁶¹ The disease then spread south and west to cover the districts of Mbala and parts of Kasama in Northern Province and Chinsali and Isoka districts in the new Muchinga Province. In

the Eastern Province, the disease was present in Lundazi, Chadiza, Chipata and parts of Katete district. The disease was not reflected in the annual reports of the Department of Veterinary Services between 1928 and 1945, only to be diagnosed again in Mbala district, west of Isoka in 1946.⁶² The disease then spread south to cover parts of Chinsali and Kasama districts. Between 1965 and 1974, 122 outbreaks of the disease were reported by the Department.

In the Eastern Province East Coast Fever was first introduced in Lundazi district between 1924 and 1927. There were early reports of the disease in Chipata district even before 1939 but control measures through dipping programmes may have effectively prevented the disease from establishing a foothold. The first major outbreak of East Coast Fever in Chipata district was in 1967 when the disease decimated thousands of cattle.⁶³ The situation improved thereafter and outbreaks of the disease reduced to five in 1968. Unfortunately, outbreaks of the disease increased again in 1975 when 261 cases were reported.⁶⁴ Each outbreak was usually associated with high mortality. In 1965, 900 cattle died in 27 outbreaks and in 1966, 700 died in 23 outbreaks respectively. There were 11 outbreaks in 1967 and 384 animals died. In early 1975 about 610 cattle died in a single outbreak in the Northern Province.

It is not clear when the first outbreak of Theileriosis in Southern Province occurred. However, Nambota regarded the outbreak at Hufwa in Monze district in 1978 as the first in the province.⁶⁵ During the 1977/78 rainy season, a malignant form of Theileriosis was detected in the Hufwa area. It is fairly certain that prior to this time Southern Province was free of the disease. Based on the criteria set by Neitz, this disease was diagnosed as Corridor Disease. According to Neitz, this form of Theileriosis was distinct from classical East Coast Fever because the number of *piroplasms* was low and there were hardly any *schizonts* seen and the disease ceased once the cattle were moved away from buffalo inhabited areas.⁶⁶ The Tonga people called it *Denkete* to

describe the short interval between infection and death. In the subsequent years, it spread to other parts of the Province. Later it spread to Central, Lusaka and the Copperbelt Provinces.

Bovine Trypanomiasis

Trypanosomiasis (Greek: trypan=borer, soma=body) is a general term for a group of diseases occurring in humans and animals caused by several species of *trypanosomes*. In cattle it is called Bovine Trypanosomiasis or Nagana. Nagana is a Zulu word meaning in ‘low or depressed spirits.’ Trypanosomes are transmitted from human to human, animal to animal and between animals and humans. Bovine Trypanosomiasis is caused by a protozoan parasite, transmitted by infected tsetse flies, *Glossina species*, during a bloodmeal from a mammalian host. The tsetse flies remain infected for the rest of their lives.⁶⁷ If an infected animal is in close contact with the rest of the herd, then the disease can be transmitted to others in the herd by ordinary biting flies which carry infected blood from this animal to the others on its mouth parts. However, these biting flies do not remain infected as do the tsetse flies. The most important trypanosomes affecting cattle in Zambia and in many other tropical African countries are *Trypanosoma congolense*, *Trypanosoma vivax* and *Trypanosoma brucei*. Domesticated animals and game act as reservoirs for trypanosomes. The disease is characterized by high temperature, followed by anaemia, a progressive weakness and loss of appetite resulting into death.⁶⁸

The prevalence of Bovine Trypanomiasis in Zambia has a long history, going way into the pre-colonial period. Chizyuka pointed out that the destructive effect of Trypanosomiasis on the rearing of livestock had long been recognized by the indigenous people in the areas where the disease occurred.⁶⁹ The fact that indigenous people before the establishment of colonial rule had different names for the disease shows that it has been long in existence. It was known to local

people under a variety of names. Some of these denote symptoms, for example, *Kaodzera* among the Ngoni, *Ndulu* among the Chewa,⁷⁰ while others are names of the fly itself such as *Luuka* among the Tonga, *Kamdzembe* among the Nsenga and *Zeze* among the Lozi.⁷¹

The disease was also reported by David Livingstone who identified the disease with respect to the tsetse fly bite. During his second journey across Central Africa, David Livingstone noted the ‘tsetse-fly disease’ in Zambia that “many tribes on the Zambezi can keep no domestic animals except the goat, in consequence of the scourge existing in their country”.⁷² Gelfand also observed that the presence of tsetse flies in most parts of Central Africa hindered many tribes from keeping cattle⁷³ as did Gouldsbury and Sheane in many areas of Northern Rhodesia.⁷⁴ In 1908 Montgomery and Kinghorn scientifically proved the existence of the disease in Zambia. It was around this time that European settlers came to fully appreciate the magnitude of the disease.

Recorded evidence shows that Trypanosomiasis in Zambia was discovered in 1906 along the Luapula Valley and later along the shores of Lake Tanganyika. From 1906 onwards, official reports from Lundazi mention of the spread of tsetse fly and the dying out of African owned cattle.⁷⁵ The Native Commissioner for Lundazi noted in his annual report for 1909 that, “were it not for the tsetse fly which is spreading everywhere, this eastern plateau will be [sic] a splendid country for scattered cattle herds”.⁷⁶ In 1911 the Department of Veterinary Services observed that in several villages on the main road to Chipata, cattle had died from Bovine Trypanosomiasis. In 1912 Dr. J. C. Spillane, a veterinary surgeon reported 11 cases of the disease at Magodi in Lundazi district. While in 1918 about 104 cattle belonging to the North Chartered Exploration Company died of Trypanosomiasis⁷⁷.

Apart from the Luangwa Valley, Trypanosomiasis also had a recrudescence in the Kafue Flats and Monze, Mazabuka, Gwembe, Namwala and Choma districts in the Southern Province. Cattle dying from Trypanosomiasis among African stock were reported in 1926 in Kalomo district.⁷⁸ In the 1930s, the Department of Veterinary Services reports revealed that approximately five-eighths of Zambia was infected with tsetse fly and Trypanosomiasis was enzootic in these areas.⁷⁹ In 1938 cattle Trypanosomiasis broke out in North-Western Province around Lealui-Balovale (Lukulu-Zambezi) border along the Zambezi plains for the first time in the history of the area. In 1944 serious mortality in cattle from the disease were recorded in the Namwala, Lusaka and Fort Jameson districts. About 5, 000 to 6, 000 herd of cattle died.⁸⁰ In 1952 and 1956-7, the disease killed cattle in most parts of the Southern Province.⁸¹ The most affected areas were Gwembe, Namwala, Choma, Mazabuka and Kalomo districts. In Choma district the Siachitema chiefdom suffered heavier loss than any other part of the district. The disease also spread to Bulozhi and there were repeated outbreaks from year to year in Sesheke and Senanga. The increase in the number of incidence was attributable to both carried fly and to direct acyclical transmission of trypanosomes.

After independence Bovine Trypanosomiasis continued to be a major problem confronting the Department of Veterinary Services in the country. This was more especially in the Eastern Province, where the Provincial veterinary officer commented in 1971, "Every animal lives at the mercy of a needle in this province".⁸² This was in reference to the 261, 000 treatments given for Trypanosomiasis to 182,000 herd of cattle in the province. There was a slight decline in the incidence and outbreaks of the disease between 1973 and 1975 largely due to eradication measures against the fly put by the government but the disease became a major problem in Sesheke west area where heavy mortalities were recorded. After 1975 the incidence of the

disease increased and throughout the 1980s it remained the most serious disease affecting cattle in Zambia. The 1988 veterinary records suggest that Bovine Trypanosomiasis remained one of the most serious disease entities in the country with a record of 141 deaths of out of the 1,399 recorded cases.⁸³

Conclusion

The chapter has discussed the incidence and geographical distribution of selected contagious cattle diseases. The border areas were entry points for most of the diseases and this explains why East Coast Fever from Tanzania and Malawi easily spread to Northern and Eastern Provinces. Contagious Bovine Pleuro-Pneumonia from Angola affected Western and Southern Provinces. However, interestingly ethnic groups in the affected border areas were not deterred from keeping cattle. The chapter has demonstrated that while some diseases were endemic in some areas others occurred sporadically causing heavy losses. The chapter also revealed that the natural environment of the Kafue Flats harboured diseases. The chapter also showed that all the cattle diseases with the exception of Bovine Trypanosomiasis were introduced into Zambia during colonial rule. However, its long existence had not prevented some ethnic groups from keeping cattle as they had developed preventive and curative strategies against it.

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CHAPTER THREE

CONTROL AND PREVENTION OF CONTAGIOUS CATTLE DISEASES, 1907-1990

Introduction

From its inception in 1907, the Department of Veterinary Services was tasked with the responsibility of looking after the health of livestock in the country. It had a responsibility of ensuring the livelihood of farmers and stock owners was not jeopardized by the loss of livestock from preventable and treatable diseases. This chapter examines the role of the Department in the control and prevention of Contagious Bovine Pleuro-Pneumonia, Foot and Mouth Disease, Anthrax, Quarter Evil, Theileriosis and Bovine Trypanosomiasis. The chapter suggests that effective disease control and prevention was largely determined by government policies and depended on the availability of veterinary personnel and the economic situation prevailing in the country at given times. It argues that despite a myriad of hardships the Department kept the country free from epizootic diseases at most times. The chapter also explains that the methods and techniques used in disease prevention and control were not static but changed over time with developments in scientific innovation. The chapter further explains that while the Department was robust in disease control and prevention after independence, from 1975 its efforts were hampered by the declining economy.

Fighting Contagious Bovine Pleuro-Pneumonia

The methods of control of CBPP in Zambia, as the case may have been elsewhere the disease was endemic, were determined by the specific epidemiological situation, animal husbandry methods applied, the availability and affectivity of veterinary services. Control methods included 'stamping-out' by slaughter of infected animals, vaccination, movement restrictions in endemic areas, quarantine and serological testing in specially designated disease control areas. Prevention measures included prohibition of cattle imports from infected countries and quarantine.

When CBPP broke out in 1915 in Barotseland, there were no veterinary officers in the Province.¹ The only veterinary officer who was stationed at Mongu decided to join the British military forces operating on the war front at Abercorn during the First World War. The African community, being unfamiliar with the nature and symptoms of the disease, were entirely unappreciative of the disastrous nature of the disease.² European traders operating in the same area were also unaware of it. The immediate response of people with large numbers of cattle was to rush them to Senkobo railway station in Livingstone where cattle sales were being conducted.

This sudden movement of cattle accelerated the spread of the disease as sick animals which were unable to walk any further were left behind in various villages where they became fresh foci of infection which quickly spread into some parts of Southern Province.³ The mortality was heavy among both European and African herds. By early July 1915 the loss in the Southern Province was estimated at 11, 000 and another 50, 000 African cattle were on the verge of death.⁴

The BSAC administration through the Department of Veterinary Services responded to the outbreak by banning all cattle movements from the areas of outbreak.⁵ But the action was rather late as cattle trade had already spread the disease far and wide in the Western and some parts of

the Southern Provinces. In the Southern Province the Department introduced vigorous control measures to arrest the spread of the disease. Smith, the country's chief veterinary surgeon, had this to say:

My advice is to shoot all infected cattle and all those which had recovered as they remain a source of infection. There is no compensation paid here; whilst the majority agree with the shooting of infected animals, many do not agree with shooting those that recovered. I am being criticized for this, but I am also advised to stop all cattle movements and the formation of quarantine areas.⁶

This suggests that the Tonga peasantry did not support the shooting of animals that had recovered from the disease, probably because they did not understand the carrier state which the recovered animals had.

The inoculation campaign was also started and to prevent further spread of the infection from Barotseland to Southern Province some BSAC Police were stationed at Mongu to patrol a cordon in order to control cattle movements.⁷ In addition to these measures, the administration imposed a heavy penalty of £25 to £100 or up to six months imprisonment for contravening quarantine regulations.⁸

By the end of 1915 a combination of slaughter and inoculation had cleared the disease from all parts of Southern Province except in Barotseland.⁹ The disease could not be eradicated in Barotseland because the inoculation scheme was unsuccessful largely due to shortage of qualified veterinary staff. In the words of Governor Ronald Storrs, an 'enormous mortality' resulted because "the casual lay staffs employed were undisciplined, incompetent and unscrupulous. Organisation and supervision were almost entirely lacking: aseptic precautions were unthought of and after care of inoculated animals was neglected."¹⁰ As the drastic effects of

inoculation manifested themselves the Lozi people became greatly alarmed. Cessation of operations was demanded and the scheme was abandoned and the animals 'left to their fate'. Thereafter, the Lozi living in the Mongu area became very suspicious of all veterinary measures and as such suggestions for renewed vaccination in 1923 were strongly objected to by the cattle owners.¹¹

In 1920 the disease broke out again in Livingstone due to the illicit movement of slaughter cattle from Barotseland. This was quickly controlled and eradicated by June, 1921.¹² The ultimate eradication of this outbreak was effected by a policy of slaughter and immediate re-stocking. To combat the disease from spreading eastwards, the government established the Barotse-Namwala cordon in late 1922. These control measures introduced in Southern Province were effective and afterwards there was no recrudescence of the disease in the province. Twelve years later, in 1934, a buffer zone was established along the Angola-Zambia border in Barotseland and maintained at an annual cost of approximately £1, 000 to prevent the infiltration of cattle from Angola. Guards were placed along the cordon and were responsible for the prevention of trans-border cattle movement.

In 1921, shortly after the 1920 outbreak, Smith undertook a radical programme of action by closing Barotseland and the Tonga Plateau; slaughtering for either local consumption, or for exports to the Congo the entire cattle population in the Livingstone district. He replaced the cattle, compensating African owners on a one-for-one basis, with cattle from Bechuanaland (now Botswana) supplied by the Susman brothers. He also prohibited the movement of cattle between Livingstone and Barotseland.

Meanwhile suggestions for renewed vaccination in Barotseland in 1923 were strongly objected to by the cattle owners and the situation was left for the disease to continue its course.¹³ Although no census of cattle in Barotseland was allowed by the Barotseland Royal Establishment (BRE) until the early 1930s, there were an estimated 350,000 herd in 1913 in the kingdom and this was reduced to 72, 000 in 1926 suggesting atleast about 280, 000 herds had died from CBPP.¹⁴

Serious colonial concerns to eradicate CBPP from Barotseland began in 1929 when information concerning successful vaccinations in other British colonial territories reached the Northern Rhodesia Department of Veterinary Services. After a protracted debate with the administration and the colonial office it was agreed to carry out a vaccination and slaughter campaign throughout Barotseland.¹⁵ However, this could not be done due to financial constraints emanating from the economic depression that had just engulfed the world. Financed from the Colonial Development Fund, the eradication campaign only commenced in 1936. Negotiations were also opened with the Litunga, who on behalf of his people gave the following assurances to the Government:

That cattle which were known to have CBPP would be branded and that every endeavor would be made to kill all branded cattle within a period of five years; that cattle showing symptoms of active CBPP would be slaughtered at once; that every help and cooperation would be given to officers of the Veterinary Services Department working in the Barotse Province.¹⁶

The actual vaccination against CBPP in Barotseland only commenced in 1938 using the Kabete vaccine from Kenya. The vaccination proceeded satisfactory up to the end of the year and African cattle owners expressed general satisfaction at the manner in which inoculations were conducted. They were satisfied that the vaccine was safe, though at first they were skeptical

regarding the protective value of the vaccine.¹⁷ Vaccination continued the following year with success and only five deaths from the disease were reported. The approximate rate of mortality after inoculation was about 0.2 percent. As was agreed by the Litunga all cattle with active cases of CBPP encountered were slaughtered; an exercise that significantly reduced the number of outbreaks.

In 1940, 195, 507 inoculations were given in the Mongu district, about 30, 000 in Senanga and 11, 890 in Sesheke.¹⁸ However, a number of cattle with active cases continued to occur from time to time due to carrier animals, also known as ‘lungers’. Carrier animals were cattle that had survived but still harboured the disease. In 1940, the District veterinary officer for Mongu stated that; “We always have the ‘lunger’ to contend with, unless this reservoir of infection is eliminated, constant breakdowns may be expected”.¹⁹ Consequently the ‘Lunger’ eradication policy was mooted/debated and implemented in 1943. It involved a compulsory sales programme to try to remove all remaining ‘lungers’ as no testing of the cattle was possible in the field in those days. To that effect 5,000 herd of selected cattle were slaughtered at the government abattoir in Livingstone. The disease control methods of slaughter and inoculation worked well such that by May 1944 CBPP was ‘eradicated’ in Barotseland.

In order to prevent the reintroduction of the disease from Angola the Angola-Barotse cordon remained in operation until 1958. But in 1960, fearing the reintroduction of the disease from Angola, the Barotse Royal Establishment re-established the Mashi section of the border cordon and ran it itself, a measure that reflected the local people’s appreciation of the need to protect their cattle from diseases.²⁰

When the Mashi section of the cordon was taken over by the Department of Veterinary Services in 1965, the Barotse Royal Establishment pressed for an extension of the cordon to cover the whole border in order to provide adequate protection for the Western Province's herd. The request was not received favourably by the government. In September 1967 the government, through the Ministry of Agriculture, disbanded the remaining Mashi section of the cordon. The reasons for this were several, but the most important one was that it became pointless to maintain the cordon because government decided to allow Angolan refugees to bring their cattle into the country.²¹

The relaxation of the cattle movement across the border between the two countries as a result of refugees challenge soon proved disastrous as the disease re-emerged in 1969, but remained unreported until April 1970. By May 1970 when the diagnosis was confirmed 150 of the 438 cattle in Nalukanda, south of Shangombo had died. On 8 May 1970 a task force to deal with the disease was established.²² Movement of cattle, even inter-village was prohibited. The Department embarked on a compulsory slaughter campaign within the controlled area, a 30 kilometers zone bordering Angola, from southern Lueti River to Sinjembela. A cordon was established with 154 guards posted at every 1.6 kilometer along the 246 kilometers of the border area.

By early June, 13, 468 cattle within the zone were branded 'Z' to facilitate their identification. Slaughter of infected cattle began shortly thereafter, but with resistance, despite generous compensation as the cattle owners demanded their cattle be treated as was the case with other diseases. The inability of the Department to test cattle and to carry out vaccinations at that point in time however left little choice in the methods by which the disease could be controlled. Postmortem results confirmed that 30 and 40 percent of the slaughtered animals were active

CBPP and 95 percent had some sign of the disease. The slaughter of infected herds continued and nearly 4, 000 cattle had been killed by September 1970 when the programme was abandoned as a result of questions that arose on the value of the policy.²³ During this period 3, 828 cattle were slaughtered and compensation of K199, 999.20 n paid.

During July and August of 1970 it was realized from fresh outbreaks that infection had spread far beyond the confines of the cordon. Active CBPP was discovered almost simultaneously in several areas of Senanga west, including the main Zambezi flood plains used extensively for dry-weather grazing, and also in the Mongu district on the east side of the Zambezi River. The extension to Mongu was especially serious as this meant that the natural barrier presented by the Zambezi against eastward spread of infection had already been breached.²⁴

The re-emergence and subsequent spread of the disease led to change of policy on its control and prevention. Widespread inspections were carried out to identify the extent of the spread of the disease and quarantines were imposed on the infected herds. Where possible, infected herds near to the cordoned area were drove inside the cordon in order to confine the disease to smaller areas. In 1970 the Department started mass vaccinations throughout the province and tests began in October to find the most suitable vaccine. The whole province was put into quarantine on 3rd November 1970, and the construction of a permanent cordon started in October 1970. The first round of vaccination began on 4 February, 1971 using T.1 *lyophilised* vaccine imported from Senegal.²⁵ During the year, 420, 430 cattle were vaccinated in the province, including cattle in areas not affected by the disease.

Reactions to the vaccination varied depending on the presence or absence of the disease. Where the disease was present vaccination of infected animals led to a more rapid development of the

disease and mortality. Initially mortality levels increased following vaccination in such herds but the vaccination brought the active disease under control within three to four months in most parts of the province.²⁶ In Mongu district the situation was different because of resistance to vaccination; a number of animals could not be vaccinated and hence mortality levels remained high. The resistance was based on a combination of suspicion of the vaccine with a lack of awareness of the danger of CBPP. Liangati, Liliachi, Itufa, Lukanda and Kaunga Mashi remained areas of minor *foci* still active by the end of the year, presumably because of incomplete vaccination.

In December 1971 another round of vaccination began and continued until the middle of 1972. This time, Mongu district was the starting point and all the areas where the disease remained or had been active were covered together with buffer areas including unaffected districts of Kaoma, Lukulu and Kalabo. Little resistance to the vaccination programme was met during the second round, only in Sesheke district did resistance continue to manifest, following a high level of negative reaction during the first round of vaccinations.²⁷

Vaccination was followed by an eradication campaign that involved the testing of all cattle for the disease in areas which had been affected the disease and the subsequent slaughter, with compensation, of all reactors or 'lungers', cattle still with active CBPP. The campaign had to wait until the disease was well under control in order to prevent excessive slaughter and compensation costs. Between the later part of 1972 and 1973 the campaign was carried out and vaccination was given to each animal after testing, 450 reactors were found and slaughtered during this period.²⁸ Areas found with high numbers of reactors were covered twice by the programme. In 1974 and 1975 testing and vaccination was extended to the area between the new cordon and the border. Thereafter testing was confined to particular outbreaks and to cattle

moving out of the province or village for sale and out of the buffer zone from to another district respectively.

By 1974 the disease was contained; Huddart the Food and Agriculture Organisation expert engaged by the *Zambian* government in the ‘eradication’ of the disease had this to say:

It is to be emphasised that this is the first time anywhere in the world that CBPP has been brought under complete control in such a short time and on a large scale as here in *Zambia*.²⁹

Although the ‘disease’ was eradicated steps were taken to safeguard the cattle of the Western Province against any possible future movements of infected cattle from Angola. The Department established the *Zambia Angola Cattle Cordon* which ran for 1, 075 kilometers in the Western and North Western Provinces close to the Angola Border to prevent entry of Angola cattle into *Zambia*. The cordon line was patrolled by 95 guards scattered around 43 camps along the cordon. A fence was also constructed from Livingstone to Namwala to prevent the movement of cattle from the Western Province to Southern Province.

Challenges of Foot and Mouth Disease

Foot and Mouth Disease, one of the menace of cattle in the country, was controlled and prevented through various strategies by the Department of Veterinary Services. The strategies included vaccination, zoo sanitary measures, slaughter, stock movement restriction, cattle and cattle products import restriction, quarantine and surveillance. In times of outbreaks, livestock and their products were subjected to restriction of movement and zoo sanitary measures were enforced. Additional measures included establishment of road-checkpoints to curtail movements of cattle. Adequate disinfection measures on people and vehicles passing through road check

points were conducted to prevent the spread of the virus. Sometimes mobile veterinary personnel were posted to affected areas to prevent cattle movements through by- paths.

Other measures included frequent inspection and monitoring of suspected cattle herds and where new cases were found specimens were collected for determination of the virus strain. These measures brought infected areas under quarantine with restrictions at check points. Pickets would not be removed until a month after the second vaccination. Two deliberate vaccinations were generally given to all cattle at risk with an interval of 2-4 months between the two vaccinations.³⁰ The vaccinations helped to control the disease in most African herds.

There was no specific vaccination treatment of FMD when it broke out in 1933 in Barotseland and even in the subsequent years because no single vaccine could give immunity to more than one or two strains.³¹ During the 1933 outbreak no treatment was given, the Department only relied upon the control measures of cattle movement restrictions and the inspection of stock. But in the subsequent years, between 1934 and 1960 the method of apthisation was used in which live virus from active cases of FMD was injected into susceptible cattle.³² This method was used successfully in Barotseland in 1934 where approximately 70, 000 herd of cattle were inoculated. However, due to poor vaccines used about 1, 306 out of 118, 520 inoculated cattle died of bacterial infection in Mazabuka area in the Southern Province in the same year.³³

In the Abercorn district, the 1934 outbreak was dealt by the Department by natural dissemination of infection and was finally eradicated in March, 1935. In 1935 the Department in Southern Province attempted a general inoculation by the intramucosal tongue method of all cattle in the affected districts but shortage of staff and interruptions of virus frustrated the effort.³⁴ The Department carried out inoculations in Pemba, Monze, Namwala and Mazabuka districts. The

last remaining focus of infection was in Monze and this was successfully eradicated in January 1936, by the intramucosal tongue inoculation of 21, 117 herd of cattle.

Since 1936 when FMD was eradicated in Southern Province no outbreaks were recorded in the country until 1941 when an outbreak occurred in the Senanga district in Barotseland. Since the infected area was localized, it was quickly cordoned and cattle on both sides of the cordon line were withdrawn. Free movement of stock in the area was prohibited and all cattle within the cordon area were inoculated. In March 1944 an outbreak of the disease was confirmed in the Namwala district in Southern Province amongst 500 herd of cattle at Banamwazi, on the north bank of the Kafue River. Apart from strict isolation and constant supervision of the cattle involved, no treatment was adopted. General measures included the quarantine of the whole district and movement of livestock and livestock products was prohibited for a period of three months.

In 1946 the Department realised that wild game constituted a reservoir of the disease. This was established by tracing the outbreak, at the Central Veterinary Research Station at Mazabuka, to the adjoining African reserves occupied by cattle that had been recently removed from the Kafue Flats.³⁵ The disease was controlled by quarantining infected areas and the inoculation of infected cattle. In 1946 the Department stopped the policy of wholesale inoculation of cattle as experience had shown that provided no movement of cattle took place, infection could not spread and the virus easily died out from inoculated cattle within a few weeks. Inoculations were carried out in 1947 in Central and Southern Provinces, 14, 119 herds were inoculated with virus in the Sala reserve and the disease was eradicated by March. In the Southern Province 8, 235 herds were inoculated and by June the disease had been controlled.

FMD proved elusive to control/eradicate. In 1953 it reappeared in Namwala district, this time in a totally different type; the SAT 1 as opposed to the more common SAT 2 type that characterised the previous outbreaks. This left cattle with no residual immunity acquired from previous inoculations.³⁶ The infected area was cordoned and inoculations were carried out until October when the restrictions were withdrawn, the infection only to be detected in the Mazabuka district two months later; mainly in cattle returning from the dry season grazing on the Kafue Flats. Again the virus strain was SAT 1, the unusual one; SAT 1 is highly virulent. Infection was widespread and inoculation involved over 200, 000 cattle.

Since 1953 no serious outbreak of FMD was recorded, only an isolated outbreak of little consequence occurred at the extreme western end of the Kafue Flats in 1960. Hope began to grow that the disease had been eliminated. This hope was short lived as the disease broke out in Namwala at Chanamabwe on the south bank of the Kafue River in July 1964. The Department of Veterinary Services changed, this time, from applying apthisation practice to using attenuated vaccine and combined it with cordons and cattle movement control.³⁷ The virus outbreak was SAT 2 whose vaccine was readily available on 13 August 1964. This was the first ever recorded outbreak in the country when attenuated vaccine was administered; the results were most satisfactory.

In June 1973 SAT 1, broke out on the Kafue Flats in Mumbwa district in Central Province. The last outbreak of FMD associated with this virus was in 1955. The disease spread to Namwala, Monze and Mazabuka districts in the Southern Province. The disease broke out at the time when there was inadequate SAT 1 vaccine on the world market. The small quantity of the vaccine available was insufficient even to carter for the infected area.

Movement of cattle was restricted immediately the disease was diagnosed. Vaccination campaigns were also immediately introduced. The first round of vaccination was unsuccessful against initiating immunity. The disease soon broke out among previously healthy cattle barely three weeks after they had been vaccinated.³⁸ But the second round of vaccinations brought the disease under control. The secondary outbreak that occurred in 1974 in Namwala was easily brought under control by ring and barrier vaccinations of all cattle considered being at risk.

In 1975 the disease broke out in Kazungula in the Southern Province caused by SAT 2 virus.³⁹ The combination of ring, barrier vaccinations and zoo-sanitary measures were used to control the disease until October when the area was declared free of the disease.⁴⁰ Similar measures were applied in controlling the outbreak caused by type “O” virus in Mbala district in 1976. This disease occurred after 45 years of freedom from FMD in the Northern Province. In the following year 166 calves were vaccinated as a follow-up to the 1976 FMD vaccination programme in Mbala. The Department employed the same control measures in the 1980s with success.

Anthrax

Historically Anthrax in Zambia has been controlled and prevented by annual vaccination of cattle and disease awareness campaigns to cattle owners.⁴¹ Vaccination programmes were regularly carried out by field veterinary staff among subsistence as well as commercial herds. Emergency vaccinations of animals at risk were carried out during epidemics. The public was advised against salvaging Anthrax carcasses for meat as the disease can be passed on to human beings by eating meat with the virus. In the 1913 outbreaks the Department controlled the disease in Namwala while records are silent on what happened in Sesheke. The most plausible reason could be that authorities in the early years of colonial rule showed little interest in the

Barotseland cattle industry as it focused on the promotion of crop production.⁴² In Namwala district the Department was informed and inoculation of cattle was undertaken. But it was somewhat late in that before the disease was contained about 500 herds of cattle had perished.⁴³

In Namwala, as control mechanism, the Department demanded the need for appointment of a stock inspector and introduction of a system of stock movement permits in order to control the movement of cattle. The stock inspector was sent to Mbeza. Cattle purchased from the district were to leave the area by the Namwala-Pemba road, making it the 'territorial stock route'. In 1928 a dip tank was constructed at Mbeza on the route to dip cattle on transit.⁴⁴ As disease control measure, cattle traders were also required to move the cattle to a location of their own within 40 days. These control measures were effective and as a result, the disease did not pose a threat to the cattle industry, not only in Namwala, but in the whole Province as well.⁴⁵

Evidence suggests that in 1930 the number of outbreaks reported had significantly reduced, probably because of the prophylactic measures carried out by stock-owners.⁴⁶ In 1933 four outbreaks were recorded and the disease was prevalent in the Zambezi and Kafue River valleys while in the Fort Jameson district, it seldom ever occurred. During these outbreaks, the Department inoculated African-owned cattle free of charge.⁴⁷

Sporadic outbreaks of Anthrax occurred in Southern Province and Barotseland between the 1930s and 1960s. The Department of Veterinary Services Annual Reports for this period indicated that the practice of annual prophylactic inoculation and the rigorous control of Anthrax outbreaks were effective in reducing the incidence and mortality of the disease. In Namwala district the cattle population increased from 35,000 in the 1930s to over 50,000 in 1947 largely due to annual immunisation programme.⁴⁸

But in 1957, despite successful immunisation programme in Barotseland, in Kalomo, Namwala Mazabuka and Choma districts African cattle owners boycotted the inoculations against the disease.⁴⁹ The boycott was due to the influence from the ANC leaders who spread propaganda that the scheme/programme was designed to kill African cattle. This propaganda was aimed at winning African support as the struggle for independence heightened.

The Department reiterated that the future vaccination against Anthrax and Quarter Evil in the Plateau Tonga reserves would be voluntary. But this policy was short lived as upon experiencing increasing losses from the disease, the Choma Tonga Native Authority, asked the Department to reintroduce annual compulsory vaccinations of cattle in the area.⁵⁰ In addition, the authority introduced a bye-law compelling cattle owners to present their stock for vaccination on demand.

Between 1952 and 1986 the disease did not manifest itself in epizootic form except; a few sporadic cases occurred in some parts of Southern and Western Provinces. This development was attributed to the successful vaccination programmes conducted by the Department. From 1970, there were one to three Anthrax enzootic outbreaks per year in Western Province. Vaccination in this Province was less than 50 percent. This was attributed to a number of factors discussed below.

Some Challenges

The Control and Prevention of Anthrax presented a number of constraints. Widely accepted control measures of Anthrax such as vaccinations, public awareness campaigns, quarantine and burying of carcasses were impractical to enforce in the endemic areas of the country. Regulations to control cattle movements between districts and provinces were difficult to implement in areas where other than main roads were used to move cattle. The traditional management system,

exchanges and gifts of cattle, and herding arrangements made it difficult to control inter district movements of livestock and products.⁵¹ Jackals and hyenas presented a problem in moving infected carcasses and hides.

It was also a social custom for people in Zambia to skin, butcher and eat animals that died unexpectedly although villagers understood that such animals could have a serious transmissible illness such as Anthrax.⁵² This situation led to delay in notifying the veterinary office responsible for Anthrax control. Burying or burning of carcasses required extra labour, and in many districts there was lack of sufficient wood for incineration of carcasses, this is true of the flood plain of the Western Province. Other constraints in controlling Anthrax were due to lack of cooperation over vaccination by farmers and delays in diagnosis because regional laboratories lacked facilities for confirming the diagnosis of the disease, specimens had to be sent long distances to the Central Veterinary Research Institute in Chilanga, near Lusaka. Funding problems for vaccination and diagnosis programmes were other constraints.

Quarter Evil

The Department had difficulties in treating this disease because the speed with which it killed cattle usually made individual treatment useless.⁵³ There was generally no opportunity to treat cases, as death occurred within a few hours after the bacterium had been picked up. However, if the symptoms were recognized in the early stages injections of antibiotics like Penicillin and Terramycin proved successful. As such treatment was only effective in the early stages and as a control measure. The Department relied on preventive vaccinations as the cheapest and efficacious measure against the disease. Vaccinations were carried out initially on all young cattle at the time of weaning and were repeated the following year. Where a carcass was found it

was buried and the area around the carcass fenced off to prevent other cattle in the vicinity from eating infected herbage.

The effective control of the disease in Zambia largely depended on the availability of vaccines, and cooperation from the cattle owners. Vaccination campaigns were successful in reducing the incidence of the disease. Veterinary records reveal that mortality was low in most cases, due in no small way to the facilities afforded in obtaining the vaccine at all veterinary stations.⁵⁴ In years when mortality was higher than usual outbreaks were readily suppressed by the use of Aggressia Vaccine. However, when vaccines were unavailable outbreaks shot up.

Before 1930 there were a high number of outbreaks of Quarter Evil among African cattle due to lack of vaccines⁵⁵. Africans were expected to buy vaccines on their own like their European counterpart but could not afford to do so. After 1975 there was also an increase in the number of outbreaks mainly due to very poor vaccination coverage or shortage of both vaccine and transport.⁵⁶ In some areas there was a complete breakdown in the vaccination programme. For instance, in 1977 only 183, 363 head of cattle were vaccinated due to vaccine shortage as compared to 461, 693 in 1974.

Cooperation from farmers was also crucial in the Department's efforts to effectively control and prevent the disease. Records reveal that whenever farmers cooperated the work of the Department was made easier in controlling the disease but found it difficult to control the disease when farmers failed to cooperate. Lack of cooperation by farmers to vaccination campaigns was common during the colonial period. This was because African cattle owners were usually suspicious of colonial development projects⁵⁷ and the rise of Nationalism could have influenced African resistance to veterinary services. Dixon-Fyle observed that the ANC on the Tonga

Plateau engaged Africans in a campaign directed at sabotaging the efforts of the Department's personnel who had the responsibility for inoculating African cattle against disease.⁵⁸

Consequently in several parts of the plateau, during 1957, African farmers under the ANC influence defied instructions from veterinary staff and refused to present their herds for inoculation. In November 1957, Mr. Watmore, the member of Agriculture and Natural Resources, told the legislative Council of two chiefs in the Mazabuka district and one in the Choma district who were 'entirely uncooperative' on the subject.⁵⁹ As a result the incidence of the disease increased on the Tonga Plateau in 1958 due to administration and legal difficulties in enforcing compulsory free vaccination.

The Department began to record success against the disease after 1960 when cattle owners changed their attitude towards inoculation. Confidence in the activities of the Department had spread in Barotseland, Southern and Eastern Provinces. For instance, the majority of cattle owners in Barotseland, appreciating the need for veterinary services, voluntarily and regularly assisted in building inspection kraals.⁶⁰ In the Southern Province the Plateau Tonga Native Authority passed its own order making inoculation compulsory in certain areas. Whereas antipathy was at its height in 1961 in the Chanje and Chipangali areas of the Fort Jameson district, stock owners there changed their attitude towards inoculation and were cooperating with the Department by 1962.⁶¹

Theileriosis

The Department employed four main ways of controlling Theileriosis in Zambia, that is, vector control, cattle movement control, chemotherapy and immunization. All had a part to play and, irrespective of the efficacy of one or other method, effective control could only be achieved by

the efficient integration of all four methods.⁶² Control of the disease was governed by the East Coast Fever Regulations under the Cattle Cleansing Act of 1930 that included quarantine measures and mandatory dipping or spraying of all cattle in traditional areas where the Department had provided such facilities, and in all commercial farming areas.⁶³ However, mandatory dipping and spraying was often flouted by African cattle owners.

a) Vector Control

The use of acaricides to kill the tick vector was the most effective method of controlling tick-borne diseases in Zambia.⁶⁴ Dipping of cattle in arsenic preparations was widely used in the first half of the Twentieth century to control ECF. Intensive compulsory use of acaricides by dipping, supported by legislation on cattle movement did much to keep ECF at an acceptable level during the colonial period.

Plans to introduce compulsory dipping begun in the second half of the 1920s but was only implemented in the 1930s after the demarcation of reserves.⁶⁵ Money was provided by the colonial government in 1927 for the erection and maintenance of dipping tanks for African owned cattle in reserves.⁶⁶ A programme of construction was arranged to embrace the Railway line areas and the reserves in the East Luangwa and Tanganyika Provinces (now Eastern and Northern Provinces respectively). During 1931 over 790, 000 herd passed through the dipping tanks which were erected in various reserves in the undernoted districts:

Fig. 1: Dipping tanks in African reserves

DISTRICT	NUMBER OF DIP TANKS
Kalomo	3
Mazabuka	7
Lusaka	2
Fort Jameson	1

Source: Native Affairs Annual Report, 1931.

The dipping tank erected in the Angoni reserve in the Fort Jameson district, however, met with little success as the Africans in the area resented dipping their cattle.⁶⁷ Africans resented dipping because they never believed that it was free of charge as they were made to pay on other properties they owned by the colonial government.

By 1939 the number of dipping tanks in the territory had increased to 234 but the number of immersion in dipping tanks in reserves fell to 194, 713 in 1939 compared to 387, 131 in 1938.⁶⁸ This decrease was partly caused by the cracking of one tank in the Monze area. The other reason was that unlike European stockowners many African stockowners viewed dipping with suspicion because they thought that their animals would break their legs or abort. Many of them doubted its efficacy and others thought it was a colonial gimmick to kill their cattle. As such many African cattle owners were reluctant to dip their cattle.

However, because of dipping ECF remained confined to the border areas of the Northern and Eastern Provinces in 1948. In the same year six dipping tanks were built in the infected zones. Of these four were built in the Native Authorities of the Abercorn district. This resulted in the

reduction in the degree of tick infestation and in lowered mortality and an increase in cattle numbers. For instance, in Eastern Province cattle increased from 58,741 in 1951 to 79,755 in 1955.⁶⁹ Compulsory dipping was enforced in Abercorn district in 1957.

More dipping and spraying facilities were provided by the Department in Eastern and Northern Provinces in 1961. Dipping managed to control ECF that had broken out in Lundazi in 1960. The incidence of the disease dropped from 30 confirmed cases in 1961 to four in 1962.⁷⁰ However, the number of incidence increased in Northern Province in the 1960s with 1964 recording the highest number of 1, 000. This was mainly attributed to dipping aversion by cattle owners and some dip tanks were put out of action due to politically inspired disturbances.⁷¹ But the number of out breaks reduced in 1967 with Eastern Province recording nil. This marked improvement was attributed to the general acceptance by most cattle owners of the value of routine-dipping of their cattle.⁷²

In the 1970s the outbreaks of the disease increased due to poor dipping management and irregular dipping and non-cooperation from cattle owners. This was especially significant in the Chipata district. The other problem was that the existing manpower and dipping facilities were overstretched by the increasing numbers of cattle. The government through the Department of Veterinary Services responded by constructing 40 dip tanks throughout the Eastern Province and reinforced implementation of the compulsory dipping policy.⁷³ More paraveterinary staff were also trained and sent to the province to beef up the human resource base.

These measures above were successful in containing the disease until the early 1980s when the number of cases began to rise again. In October 1982, the Department engaged the Belgian government and a project was commissioned to control Theileriosis through an intensive

compulsory-dipping program. A further 40 dip tanks were constructed in the province to supplement the existing ones. Despite these efforts the disease continued to be a menace in Petauke district.⁷⁴

The vector control method was also used to control Corridor Disease in Southern Province. The Department made dipping compulsory and free of charge from 1979 to 1986 in order to suppress the incidence of the disease.⁷⁵ However, compulsory dipping was abandoned in 1987. In May 1985 Zambia began experiencing economic challenges forcing government to adopt the International Monetary Fund (IMF) fiscal policies. Subsidies on agriculture were removed hampering the control of the disease.

Farmers began to pay for veterinary services and following this new development, a dipping fee of K0.50 n per animal was introduced in 1987. In 1988, the dipping fee was increased to K1.00 and then to K 5.00 per animal in 1989. The increase of the fee to K5.00 was too expensive for the farmers and therefore most of them stopped dipping their cattle.⁷⁶ Consequently traditional farmers were at the mercy of the disease though commercial farmers remained free from the disease through their own efforts.

b) Cattle Movement Control

Regulation and control of livestock movement was one of the most important means of reducing the spread of diseases.⁷⁷ As a result, checkpoints were constructed in strategic locations on major roads linking the most important cattle producing areas and beef markets in the country. The check points played a pivotal role in preventing movement of cattle from Northern and Eastern Provinces where ECF was endemic to other Provinces. Quarantine stations were also introduced in 1931 to prevent introduction of diseases in Zambia from imported breeding stock. In 1979

there were quarantine stations at Mazabuka, Kazungula and Simonga in Southern Province; Isoka, Mpika and Mbala in Northern Province, Lundazi in Eastern Province; Lukulu in Western and Lusaka in Lusaka Province.⁷⁸

The Department also ensured that movement of livestock was subject to the issuance of stock movement permits by veterinary officers. However, Cattle farmers in Northern and Eastern Provinces usually flouted this measure by moving infected cattle from Tanzania and Malawi respectively. Such acts resulted in ECF outbreaks as was the case in 1960 when illegal movement of cattle from Nyasaland spread the disease to Lundazi. Offenders were charged and fined by the Native Courts.⁷⁹

Cattle movement restrictions were imposed by the Department in Southern Province when Corridor Disease broke out in 1977/78. A ban on cattle trade between infected and non-infected areas was imposed. The Department also designated a specified route in each area with a dip-tank in which all animals on transit from one region to another had to dip.⁸⁰ However, this measure was not effective because of illegal trade and the movement of cattle from one area to another for social and economic purposes using unauthorized routes.⁸¹ As a result the disease continued to spread.

c) Chemotherapy

This method of Theileriosis control was adopted by the Department in the 1980s as a last resort when control strategies proved ineffective.⁸² The Department preferred the integration of the three methods of control namely, immunization, vector and chemotherapy in the control of Theileriosis. This was because the use of each method exploited the breed resistance and maintained enzootic stability.⁸³ Chemotherapy drugs like parvaguone, buparvaguone and

haluginone were effective only when administered early against the disease. The major problem of chemotherapy as a control strategy was the high cost of drugs, which the majority of traditional farmers could not afford. This was because government stopped providing free veterinary services in the late 1980s.

d) Immunisation

Immunisation was developed in the 1970s, provided protection and overcame most of the problems associated with chemotherapy.⁸⁴ This method was used by the Animal Disease Control Project of the FAO from 1983 to 1986 in the Southern Province using *Theileria* stocks from Kenya called ‘Muguga Cocktail’. The initial results of this project were encouraging, but later the disease spread very rapidly causing high morbidity and mortality.⁸⁵ The ‘Muguga’ composed of two Kenyan *T. parva* and one Kenyan *T. parva lawrencei* stocks. These were foreign *Theileria* strains introduced into Zambia; in a country where little or no information on the local strains was available.

In 1982 a massive immunisation programme using local *Theileria* stocks was also carried out by the Belgian Animal Disease Project in Eastern Province. Over 50, 000 calves were successfully vaccinated under this project. However, it was later discovered that immunised cattle were carriers of the infection and therefore, could serve as a source of infection for others.⁸⁶

Bovine Trypanosomiasis

The control of tsetse in Zambia, as elsewhere in southern Africa, went through various phases mostly determined by the development of more effective and economically and environmentally acceptable technologies.⁸⁷ Tsetse control measures in Zambia were largely concerned with Trypanosomiasis in livestock. Tsetse control operations therefore, targeted areas where cattle

formed a major part of the rural economy; in particular the Eastern, Central, Southern and Western Provinces.

Policy in Tsetse Control

The policy aims and methods used in tsetse control changed considerably over time. In the beginning the policy of tsetse control was to maintain the status quo. This was to be achieved through the eradication of fly and provision of land. The other aim was to reduce the incidence of Bovine Trypanosomiasis by eliminating fly in selected specific areas.⁸⁸

In the 1950s the tsetse control measures became ineffective and had minimal effects on the fly belts.⁸⁹ Therefore the policy changed in the 1960s and now aimed to isolate the main fly belts from the cattle rearing areas by creating a fly free barrier or holding lines supported by ground spraying. It was believed that the holding lines were the panacea for tsetse control. The holding lines consisted of a combination of game exclusion measures and barrier bush clearing but there were insufficient funds to create a fly-proof barrier.⁹⁰ Consequently, encroachment by tsetse into cattle rearing areas was inevitable. By 1965, infestations in cattle rearing areas were so extensive that existing ground spraying units had no capacity to clear them. Hence aerial spraying was introduced in 1968.⁹¹ Since then aerial spraying was used regularly.

a) Control by drugs

The use of chemotherapy and chemoprophylactic drugs was the earliest method used by the Department in the control of Trypanosomiasis. Simukoko argued that it was after the discovery of trypanocidal compounds that the Department gained an upper hand against tsetse in many areas in the country.⁹² However, no drug proved entirely effective either as a curative or prophylactic measure. Many drugs tended to induce resistance,⁹³ and for Antrycide it did not

only induce resistance to itself but was liable to do so to other drugs. Therefore, no single drug could offer long protection. Resistance in simple terms is defined as the acquired property of a trypanosome to resist the action of a trypanocidal drug thus making it useless for the treatment and prophylaxis of the disease. In other words the treatment fails despite all precautions.

Bevan and his success in the treatment of Bovine Trypanosomiasis at the beginning of the Twentieth century with Potassium antimonyl tartrate (Tartar emetic) in neighbouring Zimbabwe greatly influenced veterinary officials in Zambia and to adopt chemotherapy as a method of control.⁹⁴ Before this Montgomery and Kinghorn while working at Kabwe had cured syringe-transmitted Bovine Trypanomiasis with 5.0 of atoxyl and recommended further trials of this drug.

Between 1908 and 1920, Tartar emetic and Atoxyl were the two drugs in general use. Due to its toxicity Atoxyl was withdrawn from use in 1912. Tartar emetic was effective against *T. congolense* and *T. vivax* infections but not against *T. brucei*. Veterinary reports in 1928 indicated that the use of Tartar emetic had a marked trypanocidal action. The drug was capable of curing cattle and eliminating Trypanosomiasis from a herd provided re-infection did not occur. For instance it proved effective when an outbreak occurred in 1940 involving nearly 3, 000 herd in European cattle in the Lusaka district. A course of seven injections of Tartar emetic was administered to the whole herd and the cattle was saved. Without Tartar emetic the use of oxen in ferrying goods required for mining operations in the Copperbelt and agricultural development in the Fort Jameson district respectively could have been difficult.⁹⁵

In 1945 Tartar was withdrawn from field use and was replaced with Phenanthridines and Quinaldines. Phenanthridinium's great feature was due to the fact that a single injection sterilized

infected cattle of infection within 24 hours, and experience from veterinary officers indicated that successful treatments were achieved in about 90 percent of cases. African stockowners in Namwala district came to appreciate the value of the treatment with this drug and reported when infection appeared in their herds.⁹⁶ These drugs were particularly valuable in the control of 'herd outbreaks' of Trypanosomiasis transmitted by vectors other than tsetse fly. The problem with these drugs was that they had a low therapeutic cover while swellings occurred at the site of inoculation.⁹⁷

Dimidium bromide replaced Phenanthridinium in 1946 and was effective against *T. vivax*, *T. congolense* and *T. simiae*. It was used as a curative as well as a prophylactic drug and was particularly useful for treating animals travelling through tsetse belts for short periods as the drug had an effective prophylactic period of one week.⁹⁸ Shaw regarded the use of Dimidium bromide as a great success in the control of Trypanosomiasis. For example, in the Namwala district where Dimidium bromide was used from 1946 to 1955 there was a 70 percent increase in the cattle population.⁹⁹ In 1955 the national cattle herd for the first time exceeded one million, there was an increase of over 300, 000 from the 1945 figure.¹⁰⁰ This increase was attributed partly to reduced mortality of cattle in major Trypanosomiasis areas.

Even on the Tonga Plateau where inoculation against Anthrax and Quarter Evil was strong in the 1950s, Dimidium bromide was still being sought.¹⁰¹ The demand for trypanocidal drugs in 1956 increased to the extent where almost 100, 000 doses were issued, nearly all of which were used on African owned cattle.¹⁰² The results achieved with trypanocidal drugs were a major factor in gaining acceptance of Departmental activities by the stockowners. However, in 1952 and 1954 photosensitization due to Dimidium bromide were reported in most parts of the country. Due to its toxicity, it was withdrawn from general use in 1957.¹⁰³

Afterwards Ethidium bromide was introduced in 1957 and was effective against *T. congolense*, *T. vivax* and *T. brucei* infections, but failed to cure *T. simiae* infections at Feira (now Luangwa) and Chisamba respectively. In the same year Antrycide methyl-sulphate became available for general field use after results from field trials had indicated the drug had a prophylactic effect of at the site of the infection.

From 1972 up to the 1980s, only Berenil and Samorin as anti-trypanosomal drugs were used to control Bovine Trypanosomiasis. Berenil was used in remote areas and where the incidence of the disease was low. Samorin was used in areas near to or within the tsetse belts where the disease was endemic. Samorin was normally applied at two, three or four monthly intervals depending on the intensity of the challenge. The implementation of these drug driven campaigns was, however, fraught with difficulties. Lack of transport and frequent shortages of drugs resulted in prolonged treatment intervals.

Fire exclusion and discriminative bush clearing

Fire exclusion was tried out in Abercorn from 1935 to 1945 to eliminate fly. Veterinary records in 1938 indicated that the fire control scheme was a success in Abercorn as there was little evidence of spread of tsetse fly,¹⁰⁴ and the cattle which had been introduced in 1948 into the area remained in good health up to 1953. Despite its apparent effectiveness, this method was not extensively used due to bush fire risks. There was also a suggestion in Namwala by the District Veterinary Officer G. F. Elliot of the use of systematic burning of grass and shrubs in 1935.¹⁰⁵ This method was used by Africans in the pre-colonial period to control tick borne diseases.

Bush clearing was one of the earliest methods of tsetse control. The idea behind this technique was that when bush was removed suitable resting and breeding sites of tsetse were disturbed and

the fly was unable to find cool shade and proper humidity for resting and breeding.¹⁰⁶ The flies either died or left the area for other suitable sites. Discriminative clearing was widely done for the control of *G. morsitans*.

The Department reported in 1959 that bush clearing had halved the fly density on the East Lusaka front and on the Mumbwa side it facilitated settlement schemes¹⁰⁷. Bush clearing was also done in Eastern, Western and Southern Provinces. In Namwala district where Trypanosomiasis threatened the cattle population the Department devoted its time clearing thick pockets of Musansa bush areas that were known to harbour the fly.¹⁰⁸ People were encouraged to settle in the cleared areas as a way of preventing the regrowth of the bushes. However, bush clearing was abandoned in the 1970s as it led to irreplaceable loss of natural resources.

Game elimination, barrier and fencing

The close association between game, tsetse and livestock was recognized by the colonial government in the 1940s. This resulted in the creation of the Department of Game and Tsetse Control in 1942 which worked closely with the Department of Veterinary Services in the control of Trypanosomiasis. After trials, the method of game clearing or destruction of the main host of tsetse was adopted as a technique for the large-scale control of tsetse in the country.¹⁰⁹ The idea behind this method was that if an area was made free of game animals then the tsetse fly would have no source of food and thus would be unable to live.

Game elimination caused tremendous reduction in fly infested areas. The elimination of game started in Eastern Province and in 1948, 1,046 animals were killed bringing the grand total up to 6,736 since 1943. The efficacy of game elimination was exploited by introducing a barrier clearing of about 910 meters wide along the edge of known tsetse belts in 1949. Game found

crossing from the fly side of the barrier were shot. In 1950 the Game and Tsetse Control Department killed 9, 327 in Eastern Province. In the Namwala district a campaign against game, especially the buffalo started in 1937, and by 1956 some 2, 824 animals had been killed.

The extent of the tsetse belt fluctuated depending on game concentrations and movement.¹¹⁰ Both Namwala district veterinary officials and the Ila associated tsetse distribution with the buffalo. They observed that in places with buffalo concentrations there were many cases of Trypanosomiasis. It was this belief which prompted the Department of Veterinary Services to shooting them without license from 1937 onwards.¹¹¹ In Kalomo district 141 wild animals were killed in 1947.¹¹² Large-scale shooting of game resulted in public opposition and the method was abandoned in the 1960s.

Game fences (Holding lines) were intended to prevent entry of game into cattle rearing areas and the first of these was erected in Fort Jameson district in 1919.¹¹³ In 1952 a game fence in the Msoro area of Fort Jameson was completed. By 1971 the holding line was well established in Eastern Province.¹¹⁴ It consisted of a game control fence between the valley and the plateau. In 1947 the Northern Rhodesia government through the Colonial Development and Welfare Fund constructed a fence bordered by a 1000 metre-wide bush clearing on the north bank from Busanga west of Namwala to the Mumbwa district boundary. The fence was meant to prevent game from going to the Kafue Flats and cattle going into the bush areas. Another fence was constructed on the south bank from Iyanda through Nakalongwe to the boundary of chief Musungwa and Shezenge, and in 1960 it was extended to the Kafue National Park boundary.

Although it was claimed that holding lines had been reasonably successful, their effectiveness as a tsetse control measure was doubted.¹¹⁵ In the 1980s game fences were phased out due to ineffectiveness and high maintenance costs.

Smudge houses and fly pickets

Smudge houses (Fly Chambers) and fly pickets were instituted in 1936 to check dispersal of fly by vehicles and bicycles on all major roads passing through tsetse belts by use of insecticides and fly catching nets. In 1960 the Kafue Basin Tsetse Control Scheme was introduced under the Tsetse Control Ordinance of 1959 and pickets were placed at strategic points on access routes to the Kafue Flats. Fish traders who had been recognized as the main carriers of tsetse fly were required to pass through these pickets on their way to and from fishing areas.¹¹⁶ In 1976 there were 17 fly pickets on the main routes from fly infested areas to fly free areas in the Namwala district.¹¹⁷ Smudge houses were less efficient than fly pickets and were abandoned in the 1960's. Fly pickets were still widespread in the country up to the 1980's.

Planned Human resettlement

Settlements were incorporated in tsetse control operations to assist the measures in force and consolidate any gains made. It worked successfully in Petauke district in 1909 when game and tsetse were driven out of the area due to human pressures of wood-cutting and cultivation. Subsequently cattle were introduced and the population rose from zero in 1909 to 19, 000 in 1949.¹¹⁸ Elsewhere people were encouraged to settle in the cleared areas and cultivate the land as a way of preventing the regrowth of the bushes. People in Musulwe, Chiliabufu and Shimbizyi villages were also moved in 1951 to the area inside the fence on the north bank in Namwala.

Ground and Aerial Spraying

These were direct methods of attack on tsetse based on the use of insecticides. Ground spraying was introduced in the 1950s and was abandoned in the 1970s. In 1960 there was an increasing emphasis on the use of insecticides and this led to the establishment of a spraying organisation, the National Insecticide Unit, in 1963.¹¹⁹ In 1964 fixed wing Aerosol aerial spraying technique was developed at the Tropical Pest Research Institute in Arusha. Aerial spraying was conducted between 1968 and 1978 to clear tsetse from extensive areas in the Southern, Western and Eastern Provinces.

Fig. 2: Aerial Operations carried out in Zambia between 1968 and 1978.

Year	Province	Area km ²	Cost Per Km ² (K)
1968	Western (Senanga)	1600	117.19
1970	Western (Senanga)	1535	150.14
1971	Southern (Namwala)	3055	101.64
1972	Eastern(Chipata) & Southern(Choma)	3700	96.96
1973	Eastern (Chipata, Katete, Petauke)	2970	104.28
1974	No Spraying	-	-
1975	Western (Senanga/Sesheke)	3400	118.52
1976	Southern (Namwala)	1100	282.77
1977	Eastern (Petauke)	2000	265.00
1978	Southern (Kalomo)	2000	288.40

Source-Evison and Khathuria, A review of fixed wing aerial spraying against G. morsitans, 1968-1978.

Aerial operations were successful and reports from the veterinary officers in both the Choma and Monze in 1973 indicated reduction in the incidence of Bovine Trypanosomiasis in the Southern Province. Results from spraying programmes in Petauke, Mumbwa and Kalomo districts also indicated reduction in the incidence and distribution of Bovine Trypanosomiasis in 1978.

Conclusion

The chapter showed that indeed successful control of cattle disease depended on a number of factors that included among others availability of qualified veterinary officers, finances and drugs and cooperation from cattle owners. These factors were crucial in ensuring that the Department of Veterinary Services contained cattle diseases. The main methods of disease control employed were testing and slaughter, vaccination, compulsory cattle dipping, restrictions on cattle movement, quarantine and sensitization. The chapter showed that some control and preventive measures changed over time due to developments in scientific innovation. The chapter established that the Department played a key role in containing cattle diseases despite encountering a number of challenges.

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CHAPTER FOUR

CONSTRAINTS IN CATTLE DISEASE CONTROL AND PREVENTION

Introduction

The Department of Veterinary Services was successful in controlling contagious cattle diseases but could not eradicate them completely due to a number of challenges. This chapter discusses these challenges faced by the Department of Veterinary Services. The chapter suggests that the challenges of cattle disease control were complex and embedded in cross-section of factors that included socio-political, economic, environmental and cultural issues. Inadequate funding, lack of sufficient specialised veterinary personnel and lack of cooperation from stakeholders were the major constraints. The chapter argues that the Department overcame some challenges but failed to do so on others.

Lack of Cooperation from cattle keepers

The success of the Department's activities against diseases control depended largely upon the cooperation from cattle owners. Unfortunately there was a punctuated lack of cooperation from the latter especially during the colonial period. This was mainly as a result of African suspicion of colonial intentions on African development and the rise of African Nationalism after the 1940s. Africans resented veterinary services at the beginning of colonial rule on suspicion of European intentions.¹

The Tonga's suspicion of European intentions with regard to cattle was doubtless a spillover from their experience in land alienation. Their perception was grounded in the fact that the whites were prepared to expropriate anything of value. As a result some cattle owners did not

readily give information on cattle diseases that attracted the attention of veterinary officers. Magoye district Officer, J. H. Venning, reported in 1921 that all chiefs and headmen in Monze district denied any knowledge of an Anthrax outbreak, “probably because they resented any possible interference with their stock.”² This also obtained elsewhere in the country. In 1928 Veterinary Officers complained that the attitude of some African cattle keepers was to conceal rather than to report diseases.³ When a disease occurred amongst their stock it remained unreported until such time when it would be most difficult to eradicate.

Dipping and inoculation in the late 1920s and early 1930s were met with suspicion and as a result were not quickly embraced by African cattle owners. In 1930 Chief Singani of Choma district adamantly opposed dipping on grounds that the government was “desirous not of increasing his cattle but of depriving him of them.”⁴ In 1931 cattle owners in Sianjalika and Siamusonde chieftaincies in Mazabuka and Monze districts respectively refused to dip the cattle on suspicion that they would be taxed, since guns, dogs, and scotch carts had recently been taxed.⁵ They also feared that their cattle would break their legs or abort and believed that their ancestors never dipped their animals but the cattle had done quite well.⁶

The chiefs resolutely rejected European proposals in the 1930s to make them report of cattle sickness as mandatory.⁷ The reason was that death of cattle sometimes occurred after inoculations and chiefs Singani and Mwanachingwala saw no need of making cattle reporting mandatory. However, it is necessary to stress that Africans were suspicious, not intransigent. They adopted a practice when it had proven efficacious to their satisfaction. In 1934 all cattle were being dipped in the Siamaundu chieftaincy near Pemba in Southern Province.⁸ By 1945 dipping was largely practised wherever dipping facilities existed.”⁹

Inoculation of cattle was initially opposed by Africans because they doubted its efficacy. Later it was opposed because the African National Congress used it to win political mileage. The Lozi were the first to resist inoculation of cattle when it was introduced in 1915 following an outbreak of CBPP. The Indunas and members of the royal family who had lost a large proportion of their herds refused to cooperate in inoculating the surviving cattle. It took some efforts from Mackinnon, the Resident Magistrate, to persuade them to cooperate and allow the inoculation campaign to begin.¹⁰ Unfortunately the inoculation was poorly managed and resulted into a large number of cattle dying. This confirmed the initial suspicions the Lozi had against inoculation of the animals; they refused to cooperate in subsequent inoculation campaigns until 1934. Reporting on the attitude of the Lozi with regard to FMD eradication campaign in 1934, McArthur stated that “at first some Native cattle owners were rather suspicious as to our intentions, but their fears were soon dispelled and now that the inoculations have been successfully completed and the disease eradicated, their confidence is assured.”¹¹

Lack of cooperation was widespread. In 1934 the Veterinary Officer in the Eastern Province complained that the Africans were too impatient for the inoculation treatment against Trypanosomiasis to be of real benefit. As soon as any improvement was shown after the first injections they lost interest and the treatment was not completed.¹² A similar situation occurred in 1940 in chief Sianjalika’s area in Mazabuka district when the Livestock Officer, despite prolonged persuasion, cattle owners refused to have their animals inoculated against Anthrax. Unfortunately for the cattle owners the disease broke out few weeks later, killing a lot of their cattle.¹³

The African cattle owners even refused to separate health cattle from the infected ones, making it difficult to control CBPP, particularly among the Lozi who practised communal grazing of their

stock. Not “until separate herding is made compulsory, there is little hope of success in dealing with this disease”, observed the Livestock Inspector in 1918.¹⁴

In Namwala district disease control measures were at first difficult to effect because the Ila refused to have their cattle inoculated because some cattle died as was the case in 1915 in Western Province. In 1958, a headman at Mbeza wrote a letter to the Livestock officer of Namwala district that:

Our cattle die everywhere, and we have very less (sic) milk due to the fact that calves die. All these troubles are caused by your inoculation to our cattle. While before you came to inoculate our cattle, we had a lot of cattle in our area. But from the time you brought your inoculation, our cattle are decreasing, a great number die in a year.¹⁵

The prominent Ila Nationalist, Mungoni Liso, reinforced Ila cattle owners resistance against cattle vaccination. Unfortunately, within six months there were heavy losses of unvaccinated cattle in chief Nalubamba’s area. 4, 203 cattle died, and of this number over 1, 000 were lost in the Mandondo area among 11 owners, forcing headman Mandondo to ask the District Commissioner to have cattle in his area inoculated. About 3, 890 cattle were immediately vaccinated against the disease and suddenly cattle stopped dying. In April 1958 cattle owners in Mbeza also asked for vaccination against the cattle.¹⁶

In the 1950s the ANC embarked on an anti-inoculation campaign on the Tonga Plateau to win African support against the Federation regime. The campaign aimed at sabotaging the efforts of the Department’s personnel tasked with the responsibility of inoculating African cattle against disease. African farmers were urged by ANC organisers against putting their animals at the disposal of unscrupulous officials who had been instructed to sterilise their cattle.¹⁷ Farmers were

told that the white men wanted to kill all their cattle so that Africans would only need land for growing maize. It was alleged that white men from Southern Rhodesia, now Zimbabwe, and South Africa would then take over fertile portions of the former grazing lands. The ANC was exploiting the deep seated distrust for the administration which existed in the area, a feeling that dated back to the first two decades of the Twentieth century when a number of African farmers were evicted from their lands.

Although several Africans farmers were skeptical of the Congress' prognostications (prophecy), some believed them and supported the movement's call for a boycott of the inoculating teams. In November 1957, M. Watmore, a member of the Agriculture and Natural Resources, told the legislative Council of chiefs in Mazabuka and Choma districts who were 'entirely uncooperative' on the subject.¹⁸ Farmers in Kalomo district with few exceptions also boycotted the inoculations and were adamant in their refusal.¹⁹ The politically inspired opposition continued in the early part of 1958 especially in the areas of chiefs Singani and Mapanza in the Choma district.

Dipping in Northern Province was also politicised in the 1960s. In an attempt to control ECF the Department provided dipping and spraying facilities. However, there was apathy to dipping and offenders were charged and fined by the Native Courts, an issue which led to the rapid politicisation of cattle dipping in 1961.²⁰ Africans influenced by political activists reacted by destroying dip tanks. Consequently 25 herd of cattle died because they could not be dipped against ECF. Thereafter the perpetrators cooperated with the Department. Almost at the same time Africans in Eastern Province opposed dipping by burning down spray-race crushes.²¹ They also opposed inoculation of their cattle against Trypanosomiasis. Although a number of cattle had died from the disease by the end of 1961, the attitude of the farmers remained unchanged until after independence in 1964.

After independence some cattle owners were at times reluctant to take their cattle for dipping. The 1966 veterinary records indicated that control of diseases in Northern Province was still difficult mainly due to lack of cooperation by some cattle owners in ensuring regular dipping of their cattle. The numbers of cattle dipped dropped from 81, 000 in 1965 to 68, 000 in 1966.²² A survey carried out in Eastern Province during the first eight months of 1978 revealed that only 22 percent of cattle were dipped, leaving 78 percent at the mercy of ECF. This made it difficult to control the disease.²³

Lack of cooperation was also expressed by farmers in their failure to stop illegal cattle movement. Siame pointed out that the Department found it difficult to control Corridor Disease in Southern Province. This was common during the drought years when most of the farmers exchanged cattle for grain.²⁴ Illegal cattle movements spread infected ticks to previously clean areas and cattle in those areas suffered heavy mortality. However, it is worthy to point out that after independence cooperation by cattle keepers improved as most of them had appreciated the value of disease control measures implemented by the Department.

Financial Constraints

Financing the operations of the Department of Veterinary Services posed a major constraint from its inception. Availability of funds depended on political and economic factors prevailing at a particular time in the country. During the BSAC rule the Department found it difficult to implement livestock disease control measures because the company was not interested in agriculture development, hence did not finance the industry. In 1909 it only had £ 78, 000.²⁵ The expansion of mining on a large scale in the 1930s was rapidly overtaken by the effects of the depression. The Department of Veterinary Services like other government departments at the

time was financially constrained. Plans to eradicate CBPP were halted until 1936 when funds became available.²⁶ Routine activities like inspection of cattle could not also be undertaken.

Government revenues continued to be small and even further declined in with the outbreak of the Second World War. Developmental activities had to wait and in consequence expenditure after the war in 1946 on services other those concerned with maintaining administration was very limited. In 1946, £ 145, 000 was set aside for African Education, £ 65, 000 for agriculture, £ 49, 000 for veterinary services and £ 213, 000 for health services.²⁷ After 1948 however, the Post-War Development Plan began to gain momentum with the availability of money for substantial control of cattle diseases.

The decline in the copper prices in the mid-1970s had a devastating effect on the Zambian economy. The resulting economic decline meant reduced funding to the Department of Veterinary Services. Since 1978 the control of cattle diseases posed a challenge to government due to shortage of funds to buy *acaricides*, *trypanocidal* drugs and to carry out aerial spraying. A number of dipping tanks were constructed between the 1970s and 1980s; but this did not help to improve the situation as the subsequent years. The 1982 veterinary records indicate a continued increase of the tsetse and Trypanosomiasis situation due to lack of funds to maintain the control programme.²⁸ Shortages of *acaricides* were reported in the country in 1983 leading to stoppage of dipping facilities later in the year.²⁹ The situation worsened in 1985 as the result the government adopting the IMF financial policies that removed subsidies on agriculture activities.

Institutional and Logistical challenges

Throughout most of the period in this study the Department of Veterinary Services faced challenges of unavailability and inadequate laboratories, scarce and erratic supply of veterinary

drugs, inadequate human resource and transport. The problem of laboratories jeopardised the work of the Department. During the early years of colonial rule veterinary officers constantly complained of inability to obtain accurate laboratory diagnoses within Northern Rhodesia as a result of lacking such laboratories.³⁰ Blood and pathological specimens were often sent to Johannesburg and took time to get them back, resulting in considerable anxiety to the veterinary officers and delayed action to eradicate diseases.

Despite laboratory services becoming available at Mazabuka Research Station and Central Veterinary Research Institute (CVRI) at Balmoral in Chilanga, the veterinary officers continued to face the challenge of distance. Transporting morbid specimens from the remote places to laboratories was almost impossible³¹ and when finally reached the laboratory their condition would have been spoiled to yield desired results. The lack of adequate and easily accessible laboratories was only eased when three regional diagnostic laboratories were established, one in Chipata in the Eastern Province, the other two in Mongu and Ndola in Western and Copperbelt respectively, during the Second National Development Plan. Four more regional laboratories were established in Luapula, Northern, North-Western and Central Provinces, and seven district laboratories in Kalabo, Kaanja, Isoka, Livingstone, Chisamba, Petauke and Lundazi were established during the Third National Development Plan (TNDP). The opening of the Samora Machel School of Veterinary Medicine at the University of Zambia in 1986 greatly contributed towards addressing the vexing challenge of accessing adequate diagnostic laboratory services in the country.

The Department was also constantly facing shortage of medicines in disease control and treatment. The TNDP recognised that most of the diseases in the country could best be controlled by vaccinations.³² However, failure to carry out these programmes was due to difficulties in

obtaining vaccines from abroad. In 1966 the Department's Central Stores experienced considerable difficulties and delays in obtaining the drugs necessary to maintain an efficient service since importations from Rhodesia had been stopped. Although the country began to produce vaccines in the 1980s, they were inadequate.³³ Veterinary officers complained that it was pointless to rush to investigate disease outbreaks when there were no drugs.³⁴ Apart from facing the challenge of drug shortages, the Department also faced a problem of drug resistance in diseases such as Bovine Trypanosomiasis. This caused the Department to change drugs from time to time.

Shortage of veterinary personnel was also a serious challenge that hampered effective disease control. For instance, from 1907 to 1924 there were only seven qualified veterinary staff. This explains why control of CBPP was difficult in Barotseland in 1915. Venning lamented that the disease could have been stopped if there had been a veterinary officer stationed in Barotseland. Shortage of staff forced the Department to engage unqualified staff to inoculate cattle but due to their poor management of vaccines mortality shot up.³⁵ This led to the abandonment of the inoculation campaign and in 1925 it was reported that no work whatever had been done to control the disease until staff and money became available. In 1928 financial conditions rendered any increase in the staff impossible and the number remained at a total quite insufficient to accomplish work which was supposed to be undertaken. There were still large areas, in which cattle were found, which did not receive any veterinary supervision.³⁶

The financial stringency precipitated by the recession led to retrenchment of some African supporting staff in 1933. The unfortunate effects of retrenchments were that routine duties formerly performed by African clerks and capitaos had to be carried out by District veterinary officers and, as a result, a less amount of systematic touring of African areas could be

undertaken.³⁷ This hampered effective disease control as disease outbreaks took time to be known by the veterinary officers and by the time control measures were taken the diseases could have caused serious mortality.

There is no doubt that the reduction in staff and consequent curtailment of systematic tours of inspection in African and European areas, rendered necessary by the financial stringency, had a serious effect on the efficiency of the Department. It can be stated that had normal routine duties of the staff been unrestricted much subsequent expenditure and dislocation of agricultural activities in 1934 due to diseases of stock could have been avoided. Had the adage 'prevention is better than cure' been applied control of FMD which was a major challenge to the Department in 1934 could have been avoided.³⁸

Shortage of staff and transport was a common feature during and the Second World War period. In 1946 staff and transport difficulties continued to hamper the full execution of the work of the Department. The staff position had not permitted the Department to take a very active interest in the African owned cattle.³⁹ Fortunately training of African veterinary assistants began and by 1959 the authorized staff establishment had been filled. This eased staff shortage and the African veterinary assistants did a lot to control diseases in African areas.

After independence the challenge of transport continued with the Unilateral Declaration of Independence (UDI) getting its toll. On 11 November 1965, Ian Douglas Smith proclaimed a UDI in Southern Rhodesia (now Zimbabwe). The Zambian government interpreted UDI as a moral affront to African freedom, independence and dignity as well as a grave danger to the country's national security.⁴⁰ In response the government opposed the white supremacist illegal regime in Rhodesia. Smith retaliated by closing the Zimbabwean border to Zambia and this had

far-reaching economic consequences as Zambia exported and imported via Southern Rhodesia. Essential commodities like fuel had to be air lifted and this led to serious fuel shortages. In 1966 veterinary records indicated that the execution of the Department's field work during the year was limited to a marked degree by shortages of transport and petrol.⁴¹ The problem was most acute in the Western Province where shortage of fuel presented a handicap in the control of CBPP in the early 1970s.

A worsening situation in Departmental transport was mentioned in the veterinary reports in 1977⁴² and in the 1980s transport shortage continued to be a constraint in the operation of the Department.⁴³ The motorised transport situation of the Department was not healthy, in spite, having had received 26 Land Cruisers under the Japanese grant aid. Non availability of spares coupled with inadequate funds for repair of the vehicles made the situation worse. The transport situation in terms of bicycles for the field staff at camp level was unsatisfactory as well.

Inadequate staff made control of diseases difficult too. Lombard and Tweedie observed in 1974 that the Department of Veterinary Services was short-staffed and it was not possible to carry out many of the routine veterinary work.⁴⁴ Similarly Rennie highlighted in 1981 that veterinary assistants were widely scattered and could not manage to visit areas outside their immediate vicinity. Mweene also observed that one of the major obstacles that hindered efficient disease control was the lack of sufficient specialised veterinary personnel.⁴⁵ This was in apparent reference to the control of viral diseases like FMD.

Geographical Challenges

Zambia's landlocked geographical position allowed diseases to easily enter the country. Zambia's borders were constantly threatened by diseases such as CBPP, Rinderpest, European

strains of FMD, ECF, and African Swine Fever, to name the most dangerous ones.⁴⁶ Unfortunately poor communication by neighbours in alerting Zambia allowed diseases to easily spread into the country. Shandomo pointed out in 1976 that poor communications led diseases to cross the borders.⁴⁷ For example, the FMD outbreak in 1976 in Northern Province was a result of poor communication. This disease broke out in the Sumbawanga region of Tanzania at the end of 1975 and early 1976 but the Tanzanian officials never informed Zambian officials on this. As a result no precautions could be undertaken by Zambia to prevent the disease coming into the country.

The borders were also porous making illegal migration easy. It is well known that when borders were made there was no consideration of tribe or ethnic relations. As a result there were instances where a group of relatives would be divided, with some in Zambia and others in another country. For instance, people who live along the border with Tanzania are either Namwangas or Nyikas on both sides. Surely many of them are relatives regardless of the boundary.⁴⁸ These related people continued to visit each other and sometimes came with livestock. A case similar to this is the refugee factor. Some of the refugees had livestock and diseases were also introduced in such cases, for instance, CBPP was reintroduced into Zambia in 1970 by the Angolan refugees.⁴⁹ Diseases were also introduced because of smuggling. This was common in Northern Province where smuggling was done across the Tanzanian-Zambian border.⁵⁰ Therefore uncontrolled movement of livestock from a disease affected area to a free one was one of the fastest means of spreading both infectious and contagious diseases.

In addition, because of her geographical position Zambia was not spared from the impacts of the liberation struggles that were obtaining in neighbouring countries in the 1970s and 1980s. Scudder wrote that by 1973 cattle numbers increased in all areas of the Gwembe Valley due to

effective tsetse control operations. Unfortunately after 1975 the necessary surveillance and control operations ceased due to the combined impact of the war for Zimbabwean independence and the economic downturn in Zambia.⁵¹ Zimbabwe got her independence in 1980. Similarly it was reported in 1981 that tsetse and Trypanosomiasis control operations in Senanga and Sesheke districts continued to be hampered by the adverse security situation imposed by the Namibian liberation war.⁵²

The Wild Game in the Kafue Flats

The Kafue Flats despite being a haven for grazing cattle was a source of diseases. Cattle and wild game mingled on the plains during the dry season grazing. As a result diseases from wildlife easily spread to cattle.⁵³ Ghirotti and others noted that the high concentration of wild and domestic ruminants grazing together in the flood plains during dry season was a major determinant in diseases prevalence among the cattle in the Kafue Flats.⁵⁴ For instance, it was discovered that FMD and Corridor diseases were transmitted to cattle from buffaloes. Most FMD outbreaks recorded in the Kafue Flats occurred during the dry season when transhumant cattle came in close contact with migratory wild buffalo. Thus the association of cattle and wild game complicated the epidemiology and control of cattle diseases on the flats.

The physical nature of the Kafue Flats too generated diseases like Anthrax. During the rain season the flats get flooded and the organic deposit remaining after the subsidence of the water provided a medium favourable for the growth and development of Anthrax *bacilli*. To compound matters whenever the cattle diseases broke out it was difficult to control them because of the absence of roads in the area. Existing 'tracks' were appalling and hampered the use of motor transport which was so essential during such times.⁵⁵ Handling facilities were also non-existence.

Conclusion

The chapter analysed the challenges the Department of Veterinary Services faced in disease control. These included inadequate number of trained veterinarians, inadequate and erratic funding and poor communication, frequent unavailability of drugs, high cost of drugs, lack of cooperation by farmers and few diagnostic laboratories. The chapter argued that whenever farmers failed to cooperate higher incidences of diseases with higher levels of mortality were recorded. The same was true when there were shortages of drugs. Lack of cooperation by African cattle farmers was more acute in the colonial period but lessened after independence. The financial challenge was the major factor that affected the Department's efforts in disease control.

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CHAPTER FIVE

CONCLUSION

The purpose of this study was to examine the role the Department of Veterinary Services in the control and prevention of contagious cattle diseases from 1907 to 1990. It focused on the control and prevention of Contagious Bovine Pleuro-Pneumonia, Foot and Mouth Disease, Anthrax, Quarter Evil, Theileriosis and Bovine Trypanosomiasis. The study had three objectives. It aimed to investigate the incidence and geographical distribution of selected contagious cattle diseases in Zambia. It also examined how the Department controlled and prevented outbreaks of contagious cattle diseases. Lastly, it assessed the challenges faced by the Department in the control and prevention of cattle diseases in Zambia. The main argument of this study was that the Department of Veterinary Services managed to control and prevent contagious cattle diseases. It did this through annual vaccinations of cattle, use of acaricides, slaughter of infected cattle, ban on illegal movements of cattle, quarantine of infected herds and many more. Although the Department was successful in its role of controlling and preventing diseases it faced a number of challenges.

Disease was one factor that significantly affected cattle production in Zambia. The nature and epidemiology of cattle diseases varied from one region to another. While some diseases were endemic in some regions others were sporadic in nature and never occurred in other regions. The study established that Theileriosis was endemic in Eastern and Northern Provinces while CBBP only affected cattle in Western and Southern Provinces in 1915-1944 and 1969-1974. Foot and Mouth Disease was common in Western, Southern and Northern Provinces. The cattle in Western and Southern Provinces were often confronted with Anthrax and Quarter Evil. The

study revealed that all major cattle diseases save for Bovine Trypanosomiasis were introduced in the country during the colonial period. Bovine Trypanosomiasis was common in Northern Eastern, Western and Southern Provinces. The study discovered that border areas were susceptible to diseases due to trans-border movements of cattle.

The study established that control and prevention of cattle diseases was executed according to the prevailing economic, political and social conditions in the country. During the early years of colonial rule state veterinarians were few and far between, and resources were limited. For instance, lack of veterinary officers in Western Province when CBBP broke up in 1915 rendered it difficult to control. Because of little political will the traditional farming sector in the early years of the colonial period received relatively few resources, but with the need to protect the commercial herds of the settler farmers from major epidemics, a certain minimum level of resources and protection had to be provided to African farmers. Construction of dip tanks to control tick borne diseases was embarked in Southern and Eastern Provinces in the late 1920s. Serious measures were also put to stamp out CBBP in Western Province and annual vaccination to prevent Anthrax, Quarter Evil and Foot and Mouth Disease were intensified in the 1930s.

After 1945 there was increased funding to the Department of Veterinary Services through the Colonial Development and Welfare Fund. The reasons for this increase were many however; the main one was that meat was an important component of the food rations provided to African families on the Copperbelt. The state was compelled to support the African livestock industry basically because the settlers were unable to meet the increasing demand for beef and as way of avoiding the expensive importation of slaughter stock from Bechuanaland. This period also saw a remarkable improvement in the political will of the colonial authorities. Africans participation

in the Second World War on the side of the Allied Powers impressed the British government and in a way wanted to show appreciation to Africans by embarking on developmental projects.

The study elaborated that increased funding and good political will enabled the Department to draw up a development plan that reviewed the livestock industry and its problems. In this plan the Department set out measures for disease control, livestock improvement and management. More efforts in form of ground spraying and game fencing were put to control Bovine Trypanomiasis in the Eastern, Southern and Central Provinces. Annual vaccinations against Anthrax and Quarter Evil were also vigorously continued. These measures yielded positive results as heavy mortality from endemic diseases reduced. Although political activism propagated by the ANC for farmers to boycott inoculation campaigns in the 1950s did adversely affect the work of the Department, farmers continued having confidence in the work of the Department once the veterinary control measures proved effective.

The study established that after independence veterinary services were expanded especially through the increase of the number of veterinary staff based in the villages. The new government also sought to increase the off take from the traditional herds to stem the rise in beef imports caused by a decline in production by large-scale commercial farms some of whose owners left the country and rising urban demand. As a result more funds were provided for cattle improvement schemes and disease control. The study has shown that new control measures like aerial spraying meant for total eradication of tsetse flies were embarked on and yielded positive results. Farmers in many areas where Bovine Trypanosomiasis was endemic like in Namwala district were now able to increase their herds and their agricultural yields through the use of draught power. Disease surveillance and diagnosis was also enhanced through the establishment of the Central Veterinary Research Centre at Balmoral in Chilanga and other regional

laboratories. More dipping tanks with the help of foreign cooperating agencies were also constructed to control tick borne diseases. In 1982 local production of vaccines also began. Though not enough it helped to alleviate the problem of shortages of vaccines and the delays involved in importing drugs.

The study argued that complete free diseases status could not be attained due to a number of challenges that were encountered by the Department of Veterinary Services. These ranged from lack of cooperation from cattle farmers, inadequate and erratic funding, shortage of staff and transport, few diagnostic laboratories and porous borders. These hampered effective cattle disease control and prevention. The study singled the challenge of funding as the major factor affecting disease control. Lack of funding was common through the period under review but became appalling from the mid-1970s. Consequently disease control and prevention measures were almost brought to a halt. Mortality from contagious diseases especially Bovine Trypanosomiasis and Theileriosis increased in the 1980s.

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