TRYPANOSOMIASIS, THE STATE AND LIVELIHOODS IN EASTERN PROVINCE OF ZAMBIA, 1908-1964

BY

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

THE UNIVERSITY OF ZAMBIA

LUSAKA

DECLARATION

I, Nisbert Machila, declare that this dissertation:

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ABSTRACT

Trypanosomiasis was a major problem in Zambia, in particular Eastern Province during the colonial period. For centuries the people of Eastern province of Zambia were subjected to trypanosomiasis. This dissertation examines trypanosomiasis in Eastern Province of Zambia from 1908 to 1964. The dissertation argues that upon the discovery of the disease, the British South African Company expressed fear and great panic and measures had to be taken quickly. It also demonstrates that through the Veterinary Department, B.S.A.Co carried out appropriate measures that were intended to contain and prevent the spread of tsetse flies and trypanosomiasis. The study also argues that the outbreak of the Second World War in 1939 limited the availability of funds for tsetse fly and trypanosomiasis control programmes. This exacerbated the situation. It was not until the end of the Second World War in 1945 that the colonial administration became actively involved in the control of the disease.

This study also demonstrates that the people of Eastern Province of Zambia developed traditional survival strategies and ethno-veterinary medicines to cope with trypanosomiasis in their communities. The Africans largely depended on their knowledge of the environment to control trypanosomiasis. The study explores various mechanisms that the people of Eastern province of Zambia employed for survival during outbreaks of the disease. Colonial intervention through the Veterinary and Tsetse Control Departments also became a major source of ethno-veterinary medicine.

DEDICATION

This dissertation is dedicated to my mother Margaret C. Machila Haazele and my daughter Millar Chipo Malama. To my four sisters Victoria, Christabel, Nchimunya and Buumba and my brother Fitzwell this is for you.

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LIST OF ABBREVIATIONS

AAT	Animal African trypanosomiasis
BSACo	British South African Company
DDT	Dichlorodipheryl trichloroethane
DVLD	Department of Veterinary and Livestock Development
GRZ	Government of the Republic of Zambia
HAT	Human African trypanosomiasis
NALEIC	National Livestock Epidemiology and Information Centre
NAZ	National Archives of Zambia
NRG	Northern Rhodesia Government
RNLB	Rhodesia Native Labour Bureau
WHO	World Health Organization

LIST OF OLD AND NEW NAMES

Old Name	*New Name*
East Luangwa	Eastern Province
Fort Jameson	Chipata
Broken Hill	Kabwe
Abercorn	Mbala
Northern Rhodesia	Zambia
Southern Rhodesia	Zimbabwe
Portuguese East Africa	Mozambique
Nyasaland	Malawi

CHAPTER ONE

1.0. INTRODUCTION AND HISTORICAL BACKGROUND

Trypanosomiasis (**Greek; *trypan-borer, soma-body***) is one of the most important parasitic diseases causing sickness and death in both human beings and domestic animals in sub-Saharan Africa.[1] According to Lambrecht, trypanosomiasis has been in existence for a long time, going as far back as the Pleistocene period.[2] Both human and animal trypanosome infections have serious socio-economic implications such that the disease remains a major obstacle to overall development in the African region.

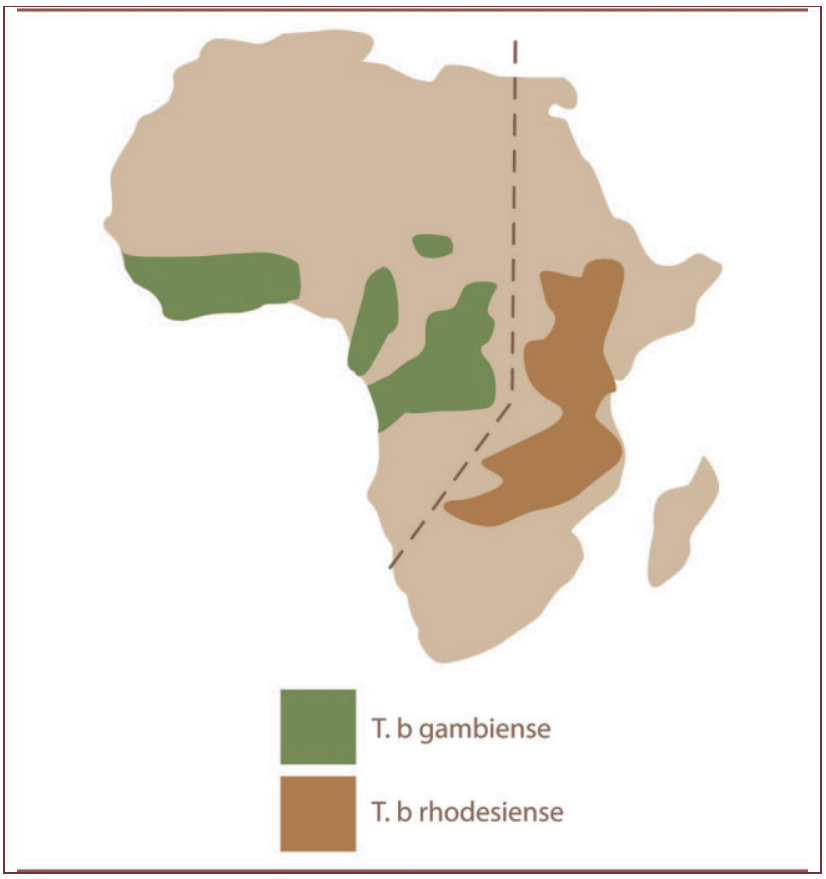
Trypanosomiasis is caused by single-celled protozoan blood parasites of the genus ***Trypanosoma***, transmitted through the tsetse fly bite. The parasite attacks the blood and nervous system of its victims causing human African trypanosomiasis (HAT) or sleeping sickness in humans and ***nagana*** in livestock. The common vertebrate hosts of trypanosomes are large wild animals of Africa which usually do not suffer any pathogenic effects of the disease.[3] Some of these animals can harbour trypanosome infections for long periods of time and act as reservoir hosts from which tsetse flies acquire infections. Once infected, tsetse flies themselves become reservoirs of the parasite because trypanosomes undergo continuing cycles of development within the tsetse fly.

Whereas cyclical transmission involves developmental phases of the parasite within the fly vector prior to transmission via the salivary duct following fly bite, mechanical transmission involves the transfer of the parasites from an infected to a susceptible host via the contaminated mouthpart and without any development stage in the tsetse fly.[4]

There are basically two types of HAT or sleeping sickness. Whereas the Rhodesian HAT, occurring in Eastern and Southern Africa, is caused by ***Trypanosoma brucei rhodesiense*** (***T. b. rhodesiense****)* with more fatal and debilitating consequences and if not treated within 6 months may cause death, the Gambian HAT, is more mild but is also fatal, occurring in Western and Central Africa, is caused by ***T. b. gambiense*** (See map 1).[5] There are various types of animal trypanosomiasis in sub-Saharan Africa. ***Trypanosoma congolense*****,** ***T. vivax*** **and** ***T. brucei*** occur widely in sub-Saharan Africa. Trypanosomes may be transmitted from one human being to another, from one animal to the other and between animals and human beings.

There are over 20 different species of tsetse flies and various groups have particular biological requirements which in turn may be exploited for their eradication or control. For example, ***Glossina palpalis*****,** ***G. tachinoides*** and ***G. morsitans*** species inhabit dry, open parklands which range widely in Africa.[6] It is important to note that only four species have been identified in Zambia and these include; ***G. morsitans, G. pallidipes, G. palpalis*** *and* ***G. breviapalpis***.[7] According to a survey report by Veterinary and Tsetse Control Department published in 1982, ***G. morsitans*** had by far the most wide spread distribution covering about 83, 550 square kilometers of the total land surface of Zambia, with Eastern Province being the major tsetse fly belt, and in particular the Luangwa valley.[8]

MAP 1: MAP OF AFRICA SHOWING THE DISTRIBUTION OF TWO TYPES TRYPANOSOMIASIS



Source: Peter Kennedy, ″The Continuing Problem of Human African Trypanosomiasis (Sleeping Sickness)″, Ann Neurol, 2008,64:116.

There is no known vaccine against trypanosomiasis. Control of the disease for a limited period is by treatment with curative drugs. Control of trypanosomiasis in Africa as a whole is mainly by the use of trypanocidal drugs such as ***Dimidium, Bromide*** and ***Antrycide*** for cattle and ***Antrypol*** and ***Tryparsamide*** for human beings.[9] Other trypanosomiasis control methods include bush clearance and use of insecticides. It is important to note that aerial spraying of insecticide and killing of wild animals perceived to be harbouring

trypanosomes were also used. Although these measures have side effects such as reduction of vegetation cover and an increase in soil erosion caused by bush clearance. In addition the control of trypanosomiasis continues to rely heavily on chemotherapy and vector control strategies. This therapy and prophylaxis depends on the use of drugs which suffer from such limitations as toxicity and with their continued use, drug resistance. Incorrect usage of drugs by livestock owners and the development of parasite drug resistance is a serious problem in most fields of anti-microbial chemotherapy, particularly in the case where resistance and cross-resistance in animals and man have been developing rapidly.[10]

Trypanosomiasis is endemic in Eastern Zambia, particularly in the Luangwa River valley which has a large tsetse fly population, due to a large population of wildlife in game parks and domestic animals. About 60 million people are at risk of contracting HAT in the 37 sub-Saharan African countries including Zambia (See Appendix 2: Figure 2a).[11] The annual direct production losses due to ***nagana*** in cattle alone are between US$6 million and US$12 million in the 37 tsetse-infected countries in sub-Saharan Africa.[12] However, it is important to note that this is an under-estimation considering the enormous indirect losses due to reduction in livestock numbers, use of cattle manure and draught power, as well as increased veterinary expenses. Moreover, at least 10 million square kilometers of potential grazing land is unsuitable for livestock breeding, putting over 46 million cattle, along with millions of sheep and goats, at risk of contracting ***nagana***.[13] In Eastern Zambia about 34 percent of cattle have ***nagana***, mainly caused by ***T. congolense***.[14]

Trypanosomiasis was recognised in Congo and in West Africa in the early nineteenth century but its devastating effects was no realized until about 1901 when it became an epidemic in Uganda. Between 1898 and 1906, an estimated 200,000 Africans died from

trypanosomiasis in Uganda.[15] The Rhodesian colonial administration did not want the disease to spread to the territory. Therefore the administration began to examine the occurrence of the disease. The earliest inquiry into the occurrence of trypanosomiasis in colonial Zambia was conducted by the Liverpool School of Tropical Medicine Sleeping Sickness Expedition to the Zambezi in 1907-1909. It was headed by Allen Kinghorn and Eustace Montgomery.[16] The expedition established a laboratory at Broken Hill (present day Kabwe). From Kabwe it moved to Lake Bangweulu, Luapula Province, Northern Province and in June 1908 it had reached Abercorn (present day Mbala) in North-Eastern Rhodesia. During that time, there were between 8,000 and 9,000 head of cattle found around Mbala and in Chipata, North-Eastern Rhodesia respectively.[17] From 1909 to 1912, the expedition examined cases of trypanosomiasis in Eastern Zambia and the findings showed many positive cases.[18]

The first case of Rhodesian HAT or sleeping sickness in colonial Zambia was recorded in 1908 in Luangwa valley where the species ***T. b. rhodesiense***, mainly transmitted by ***G. morsitan*** and it was first identified by Stephens and Fantham. In 1909 an African youth Chimpeni, died of the disease after reportedly being bitten by a ***G. Morsitan*** in North Eastern Rhodesia's Petauke district.[19] From 1919 to about 1921, Veterinary officers reported outbreaks of ***T. b. rhodesiense*** transmitted by ***G. morsitan*** around *Fort Jameson* (present day Chipata).The disease spread to a number of areas especially in Eastern Province and by the 1930s had reached Tanzania and subsequently Uganda in the 1940s. However, the original focus remained in the Luangwa valley and Zambezi basin. To that effect, Hornby, the then veterinary officer, had been trying to control these outbreaks in the province. Despite these efforts, by the 1930s the disease had spread to Petauke and

Lundazi districts.[20] It is against this development that Leroy Vail suggests that in the 1940s, East Luangwa was one of the most severely affected areas of the country. [21]

The adverse effects of trypanosomiasis have long been known by both the local people in Eastern Zambia and the missionaries. While some Africans might have denied the presence of trypanosomiasis in their areas, it is also true that the disease has always been known to the Africans in areas where it occurs. There are numerous names of the disease depending on location. In Eastern Zambia among the Chewa, it was called ***Ndulu*** while it was referred to as ***Kaodzera*** among the Ngoni.[22]

Available literature on trypanosomiasis reveals that studies on the disease have largely been conducted from scientific and ecological points of view.[23] A few studies have exclusively centered on the policies initiated and implemented by successive administrations to curb the pandemic in African communities.[24] This study, however, provides an alternative framework of analysis by positing the view that, actually, the people of Eastern Province in Zambia developed sustainable traditional strategies to cope with trypanosomiasis in their communities. These indigenous coping strategies, nevertheless, were not only complimentary to those of the state, but were, in certain cases, in conflict.

The purpose of this study is to investigate the prevalence of trypanosomiasis among the African communities in East Luangwa (Eastern Province) during the period 1908-1964. It also shows the shifting trends of the disease in the province during that time. The study further examines the control measures the colonial government used in its quest to

eradicate the tsetse fly and trypanosomiasis and how Africans coped in a tsetse fly infested environment.

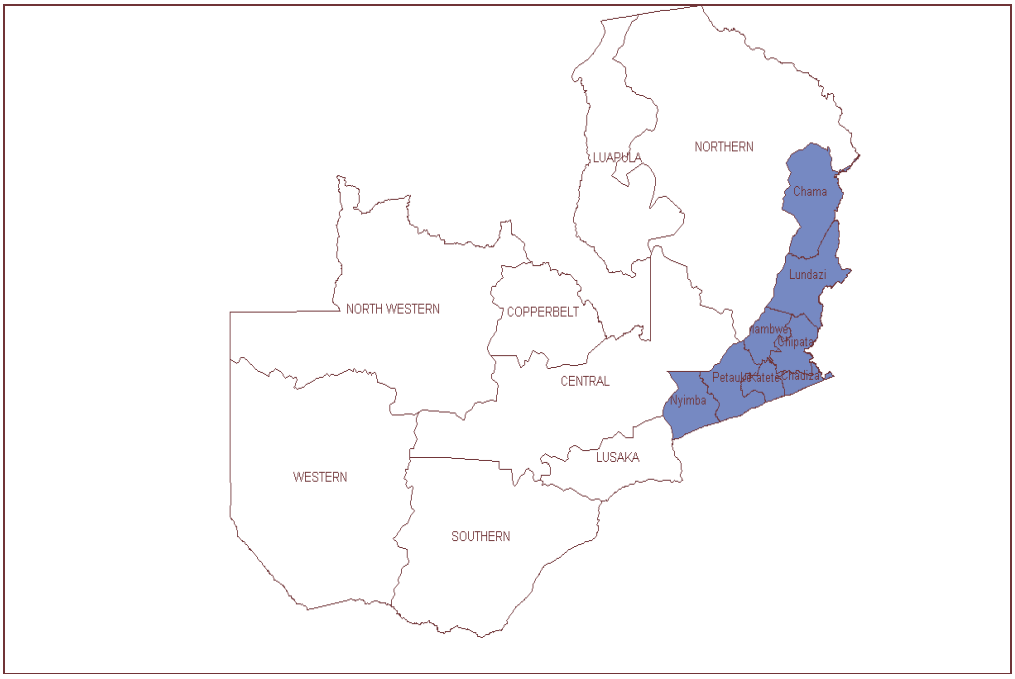
1.1. Area of Study

The study focused on Eastern Province of Zambia (formerly called East Luangwa, under North Eastern Rhodesia). Eastern province is bordered by Malawi to the east and Mozambique to the south and covers an area of 69,100 km^2 which is about nine percent of Zambia's land mass (see figures 2). East Luangwa had three distinctive districts before 1948 namely, Fort Jameson (Chipata), Petauke and Lundazi.[25] Currently, Eastern Province comprises eight districts. These include Chadiza, Chama, Chipata, Katete, Lundazi, Mambwe, Nyimba and Petauke (see map 2). The province was inhabited by the Ambo, Chewa, Kunda, Ngoni, Nsenga, Senga and Tumbuka.

The general picture of Eastern province from 1908 to 1964 was that of a heavy tsetse fly infested area with two ecological zones, the plateau and the valley. On the plateau, the vegetation was that of ***Brachystegia/Isoberlinia*** woodlands and Tsetse fly ***(G. morsitans)*** concentration was usually associated with various drainage systems mainly comprising open grass covered dambos. The eastern tsetse fly belt was associated with the main valley of the Luangwa River. In Petauke and Lundazi districts due to the presence of the ***Combretum/Afromosia*** and ***Pterocarpus/Comretum*** vegetation type, the areas did not form a favourable tsetse fly habitat.[26] Substantial parts of Chipata and Chama districts were heavily infected with the tsetse fly. From Nyimba going westwards, the extensive Muchinga escarpment reaching as far as the Great East Road were inhospitable to the tsetse fly. The tsetse fly was also sparsely distributed around Chadiza, Katete and

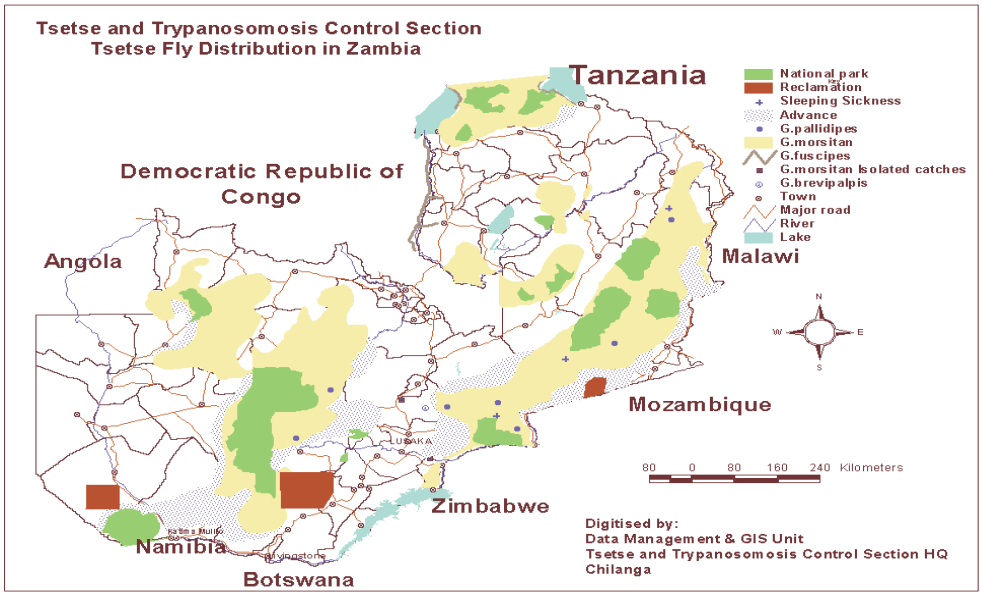
Mambwe. ***G. morsitans*** were the major infestations of trypanosomiasis in the province (refer to map 3). ***G. pallidipes*** **and** ***G. brevipapis*** were also present, but to a lesser extent.

Map 2: MAP OF ZAMBIA SHOWING PROVINCIAL BOUNDARIES AND LOCATION OF EASTERN PROVINCE.



Source: Data Management Unit, Ministry of Livestock and Fisheries Department, Petauke District

MAP 3: TSETSE FLY AND SLEEPING SICKNESS DISTRIBUTION IN ZAMBIA.



Source: Data Management and GIS Unit, Tsetse and Trypanosomiasis Control Section Head quarters Chilanga.

1.2. Rationale

This study is a contribution to the disease historiography of colonial Zambia and the existing body of literature on the subject of trypanosomiasis. The study was conducted in Eastern Province because it was one of the most affected provinces in colonial Zambia by trypanosomiasis from 1908 to 1964. The presence of tsetse flies in the province had negative effects on the socio-economic development of the area under study. It is hoped that the study will stimulate further research on the subject in other tsetse fly infested environments of the country.

1.3. Literature Review

The history of Veterinary Medicine is a comparatively new area of historical enquiry. The study of veterinary history is important as a tool for understanding aspects of human history and often has very significant implications for livestock and human medicine. A critical review of the study of the disease shows that scholars have not done much research on trypanosomiasis in Zambia. However, there has been a growing development in the historiography of African ecological changes. A number of studies have been done on trypanosomiasis in Africa. John Ford's work provides valuable information for the current study. In his study, *The Role of Trypanosomiasis in African Ecology*, Ford positioned humans and trypanosomiasis squarely in the realm of human history. He argued that pre-colonial African communities co-existed with the disease and were protected against it by modifying their environment.[27] The Fordian theory's key assumption is that of tsetse fly eradication as the key to the control of trypanosomiasis. The Fordian theory is significant

to our study as some evidence of trypanosomiasis in Eastern Province supports the paradigm established by Ford.

The Fordian paradigm had the greatest influence on James Giblin. Giblin used the Uzigua case in Tanzania to analyze Ford`s approach.[28] He agrees with Ford over the fact that pre-colonial communities co-existed with the tsetse fly. This work is central to our study not only because it highlights the Fordian theory, but also because of the link made between famine and trypanosomiasis.

A number of studies on trypanosomiasis in Africa have influenced our approach and understanding of the history of the disease in Eastern Zambia. Helge Kjekshus's studies on trypanosomiasis in East Africa demonstrate that pre-colonial East African people maintained an ecological control system throughout the nineteenth century in spite of the intertribal warfare and slave raiding prevalent at the time.[29] He demonstrates that, despite the disruption of the environment by European colonisation and the multiple changes that accompanied this process, Africans understood the epidemic foci to avoid the spread of trypanosomiasis. He highlights ecological strategies such as smoking the cattle, moving during the night or smearing their cattle with lion's fat as a temporary repellant against the tsetse fly. The study thus indicated the extent to which Africans understood and appreciated the extent of the problem and observed technological changes necessary in the fight against the problem. The study provides very useful information on African strategies and measures against trypanosomiasis.

John McCracken reassessed the views by Kjekshus.[30] He argues, using Malawi as a case study, that the impact of colonialism vis-a-vis trypanosomiasis was oversimplified.

Although McCracken argued that the colonial state had no role in the spread of trypanosomiasis, he did not examine the formation of the colonial state and capital penetration processes in Malawi. However, our study investigates whether or not the colonial government and capital penetration progressively altered the ecological balance and facilitated the spread of tsetse fly belts in Eastern Zambia.

Richard Waller is another vital source of information to our study.[31] His article examines the African processes of expansion and their adaptation to the environment. Waller observes that before the arrival of the Europeans, the population of East Africa had begun to assume its present economic and social pattern through adaptation. However, colonial occupation interfered with the spatial patterning of Africans that opened new avenues of accumulation and began to break down the regional systems. The article is central to our study because it reveals various coping strategies adopted by Africans in the wake of trypanosomiasis.

In another study, Richard Waller demonstrates the expansion of the tsetse fly in Maasailand, Kenya, between 1900 and 1950.[32] Waller follows the line of investigation suggested by Ford and examines, in detail, the interaction between climate, vegetation, land and tsetse fly. He argues that, up to the 1890s, the Mara plains were regularly grazed by the Maasai herds, but the general depopulation of the area in the aftermath of the rinderpest pandemic and civil war left the region vacant until after 1900 and allowed the spread of bush cover which was occupied by the tsetse fly. Waller argues that the progressive encroachment of the bush continued until bush clearing schemes and closer grazing forced the fly to retreat. The article provides a basis on which to further investigate the spread of trypanosomiasis in Eastern Province.

Maryinez Lyons' study on HAT in Belgium Congo (present day Democratic Republic of Congo) is another important source to our research.[33] The study is an informative and a well-documented examination of the social impact made by the Belgian methods of controlling the disease. Lyons draws a lot from the Fordian ecological theory. However, she does not consider undomesticated mammals as a reservoir of the trypanosomes but stresses rubber - gathering as a practice which exposed people to tsetse fly. The study is vital to our research as it demonstrates how colonialism led to trypanosomiasis epidemics among the Africans.

An article by D.C. Dorward and A.I. Payne entitled "Deforestation, the Decline of the Horse and the Spread of the Tsetse fly and Trypanosomiasis" is very interesting to our study.[34] It demonstrates that horses thrived on the Freetown peninsula for 60 years but eventually disappeared before 1900 due to the presence of tsetse flies. The three species of tsetse fly that led to the outbreak of the disease in Sierra Leone included ***G. palpalis, G. longipalpis and G. morsitans***. These carriers infected horses and cattle. The study shows that the removal of the forest led to the outbreak of trypanosomiasis in horses. It is clear that the tsetse flies require forest to thrive and spread disease and that bush clearance leads to tsetse fly eradication. However, in this case deforestation led to a decline in the rain forest mammals enabling the tsetse to move to another host, the horse. In this way deforestation led to a horse trypanosomiasis epidemic instead of controlling the disease. In a similar instance, the article by Jill R. Dias examines significant causes and effects of trypanosomiasis in Angola.[35] He notes that the spread of sleeping sickness in Angola was probably related to changes in the Central African disease environment through forest clearance or the shooting of game. The increased number and frequency of trading

caravans circulating over large distances may also have helped in the dispersion of the sickness. The study also shows that many villages suffered wholesale depopulation.

William Y. Osei's study shows that negative environmental events were not necessarily creations of the twentieth century but growing human population and activities, mass poverty, improved information flows and global environmental awareness, sharpened perceptions and interests in environmental change.[36] However, like many environmental historians, he agrees that such influences ignored local human adaptations, innovations, changing human needs and relationships with local environments and the dynamics of institutional and policy frameworks. Such changes were sometimes too abrupt and led to sudden departures from known normal life and new challenges for adaptation. Osei further shows that Africans benefited from the colonial influence on the environment.

Michael Worboys's comparative study of anti-sleeping sickness measures in colonial Eastern and Central Africa is a major source of information.[37] It shows that due to economic, political and administrative interventions, the colonial state did not share or endorse public health recommendations suggested by medical authorities, experts or economic interest groups on how to combat diseases in the colonies. He argues that public health measures consequently differed over time and between colonies.

Trypanosomiasis remains one of the most serious constraints to economic development in sub-Saharan Africa and, as a consequence, related research has been subject to strong social and political as well as scientific influences. Anthony M. Jordan, in his book *Trypanosomiasis Control and the African Rural Development*, provides us with the ecological background to the problems caused by trypanosomiasis such as preventing the

development of extensive areas of potential pasturage and food insecurity of rural areas.[38] The book provides a fair account of the parasites, vectors and hosts, human and animal trypanosomiasis. It also illustrates the trypanosomiasis control methods, drugs, ecology of the tsetse fly and chemical methods of tsetse fly control. Jordan's Chapters on the effects of man on the tsetse fly population show how expanding human populations can in themselves, significantly reduce the populations of the ***G. morsitans*** group, for example, through deforestation and cultivation.

The Study by Lorne E. Stephen has influenced our understanding of trypanosomiasis which causes considerable economic losses in domestic animals in Africa. Lorne E. Stephen has written on trypanosomiasis from a veterinary perspective.[39] He presents trypanosomiasis not as a simple disease but as a large range of diseases, a fact which complicates its prophylaxis treatment and control. The book is not only useful to veterinarians, public health workers, policy makers but it also helps us to understand the nature and control of the disease in Eastern Zambia.

A number of studies on Zambia provided useful information on the subject. Background information about the area of study comes from Leroy Vail's article on '*Ecology and history in Eastern Zambia: the example of eastern Zambia*'.[40] He demonstrates that the impoverishment of Eastern Zambia must be understood from the dual impact of the expanding capitalism and colonialism. According to Vail, before the introduction of colonial policies, the great rinderpest epidemic in Northern Rhodesia had killed off most of the tsetse fly natural host and by 1896 East Luangwa (Eastern Province) was free from the insect. Thus, cattle were raised by the local people successfully. The study shows that later

colonial policies such as native taxation, labour migration, urbanisation and land legislation induced the spread of tsetse fly.

Paul Tiyambe Zeleza's work provides very valuable data on trypanosomiasis in Africa.[41] His study shows that the disruption of the ecological system that kept trypanosomiasis in Luangwa district began from the mid-nineteenth century, firstly through the Ngoni invasions and later European colonial conquest. Due to the Ngoni invasion, the Chewa were forced to crowd themselves in villages to defend themselves. As a result, bush regenerated in areas that they had previously occupied. Trypanosomiasis made rapid headway under such conditions.

Louise White demonstrates that the vampire accusations that emerged in the Northern Province of Northern Rhodesia in the 1930s involved local and colonial ideas about the relationship between wild animals, tsetse flies and authorities.[42] The study demonstrates that the experience of Africans with tsetse flies shaped European ideas about control of such insects, tailored to fit African realities. She observes that neither African nor European ideas on trypanosomiasis were fixed, nor was one untouched by the other.

Mwelwa C. Musambachime's work on the subject is worth taking note of.[43] It demonstrates that colonial policies were critical in shaping the environment in Northern Rhodesia. The policies affected the nutrition of Africans and prescribed settlement patterns which often brought people, tsetse fly disease carriers and unwanted game together in the same habitat. The study demonstrates how the colonial government undermined, suppressed and intimidated Africans through its policies. The study examines the impact of the colonial policies such as land reservation, game laws such as the 1925 Game

Ordinance and suppressive agricultural measures. Musambachime points out that the African societies in Luangwa district adopted new methods of survival through their creativeness, resilience, and innovation. In another study, Musambachime examines the social and economic effects of sleeping sickness in Mweru-Luapula from 1906 to 1922.[44] The study shows that the outbreak of the disease in the area was quickly followed by a rapid disruption of the economic and social life of the Africans as a result of the restrictions imposed on them. He argues that in the quest to contain the spread of the disease, the British colonial administration often acted on fear rather than facts, causing a lot of suffering among Africans.

Another vital source to our study is the work by Wilcocks and Manson-Bahr.[45] The two scientists highlight the treatment of trypanosomiasis. They show that after the 1920s, the most effective drugs against the disease were Samorin® and Berenil. The study further demonstrates a number of control measures, the major ones being removal of the food supply by destruction of game or killing it with insecticides and removal of man from the infected environment. Our research has benefited a lot from this study's control measures. In a similar study Busiku Chizyuka evaluates the efficiency of the currently used drugs to control trypanosomiasis in Zambia.[46] He examines the use of the two anti-trypanosomal drugs Berenil (Dimenazene aceturate) and Samorin®. The source is vital to our study because it gives an overview of trypanosomiasis and the drugs used to control the disease in colonial Zambia.

Oliver H. Kandyata argues that the colonial government through the Veterinary, Game and Tsetse Control Department, carried out appropriate measures that were intended to contain cattle diseases and prevent the spread of the tsetse fly in Namwala district, Southern

province of Zambia .[47] The study demonstrates the conflicting views between Africans and colonists on how to control trypanosomiasis, colonists in favour of game preservation and the other preferring its demise. The study is important to our study. It investigates the limiting factors of the tsetse fly on maize cultivation and animal husbandry in Namwala district of colonial Zambia.

Bennett Siamwiza examines the link between trypanosomiasis and famine in Zambia.[48] He demonstrates that some famines in the early colonial period were caused by sleeping sickness regulations. It is clear, however, that sleeping sickness control measures were minor causes of the famines. In December 1907, it was found that the shores of Lake Tanganyika and Mbala district were infested with sleeping sickness. The study argues that the closure of the Luapula-Congo border running from Isoka through Mbala, Mporokoso and Mansa, created a cordon sanitaria between North-Eastern Rhodesia, Congo and German East Africa (Tanzania) in 1909. The line acted as a barrier between those to its east and west. The regulations had far reaching effects on the Africans such as prevention of trade between these on the Luapula province and Congo.

In discussing health reforms in Zambia, a study by Katele Kalumba is very instructive.[49] The study shows that since 1924 when the British government assumed responsibility for the administration of the country, there was no indication of any formulation of a systematic health policy for Africans. The study demonstrates that the colonial government failed to extend medical and preventive health- care to Africans. This study provides the basis for investigating some ways in which the challenges of trypanosomiasis control can be understood.

1.4. Research Methodology

The study was based on primary and secondary sources which were oral sources, published and unpublished. Data collection was done in the University of Zambia Main Library and the Veterinary Library at the University of Zambia where books, articles, PhD theses, M.A dissertations, Veterinary reports and various documents were consulted. Veterinary reports and maps were also consulted at the Department of Veterinary and Livestock Development (DVLD) in Eastern Province and Data Management and GIS Unit Tsetse fly and Trypanosomiasis Control Section Headquarters in Chilanga. The Veterinary and Tsetse fly Control Department in Chilanga yielded reports, maps and documents related to tsetse flies and trypanosomiasis in Eastern Zambia. Annual reports at the National Livestock Epidemiology and Information Centre (NALEIC) in Lusaka were consulted. The Ministry of Livestock and Fisheries Headquarters was also a major source of information for veterinary reports and related documents. The National Archives of Zambia (NAZ) was consulted for documents such as District Notebooks, Eastern Province Tour Reports and District Annual Reports. The Faith and Encounter Center in Lusaka was used to gather secondary data on trypanosomiasis. In addition, oral interviews in Eastern Province were conducted for information on trypanosomiasis.

1.5. Organisation of the Study

The study is made up of five chapters. Chapter one is the introduction and historical background. Chapter two discusses the role played by the British South African Company in controlling trypanosomiasis in Eastern Zambia. Chapter three investigates the role played by the British Crown administration in its quest to eradicate the disease in the province. Chapter four examines how the Africans coped with trypanosomiasis. Chapter five is the conclusion.

ENDNOTES

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CHAPTER TWO

TRYPANOSOMIASIS AND THE BRITISH SOUTH AFRICAN COMPANY IN EASTERN ZAMBIA, 1908-1924

2.0. Introduction

This chapter investigates the role played by the British South African Company (BSACo) to contain and control trypanosomiasis in Eastern Province of Zambia from 1908 to 1924. It argues that upon the discovery of the disease, the Company expressed fear and great panic and measures had to be taken quickly. The chapter demonstrates how the company induced disease control policies and stimulated the growth of the veterinary department. It demonstrates that the company government through the veterinary department carried out appropriate measures that were intended to contain and prevent the spread of tsetse flies and trypanosomiasis.

2.1. Incidence of Trypanosomiasis

The BSACo took control and administered Northern Rhodesia from 1890. Until 1911, Northern Rhodesia was divided into two territories: North Eastern Rhodesia and North Western Rhodesia. Amalgamation of the two territories into one Northern Rhodesia took place in 1911. In 1924, the BSACo officially handed over the territory of Northern Rhodesia to the British government.[1] One of the greatest hardship in the early years of

company rule was the spread of tsetse flies, which covered vast stretches of the country.[2] Initially the company did not know what to do with the spread of tsetse flies and this caused apprehension, panic and fear in the administration and fast measures had to be taken. A letter dated 21st January 1920 to the Chief Secretary in Livingstone from the Director of Agriculture Mr. L. Aewin, concerning Mr. J. L. W. Fynn's tsetse fly scheme, confirmed the view of the Company over the disease when he stated that:

> I doubt if the situation in Northern Rhodesia justified any immediate expenditure. In this territory almost all European and much of the Native farming operations were carried on the sweet bush, a type of country in which the tsetse flies could not persist. The common habitat of the pest was in the tall tree, short grass; type represented by the Brachystegia and Mopani woodlands….I did not agree that the eradication of the tsetse fly was essential.[3]

Although some colonialists viewed the eradication of the scourge as not being essential, it is also true that others considered the eradication of the tsetse fly important because it was a hindrance to their development. Testimony to the above fact was stressed by Dr. H. Buyst when he observed that trypanosomiasis in Northern Rhodesia was a greater epidemiological, economic, diagnostic and therapeutic problem than was suspected by the BSACo.[4] Given the view that the period between 1890 and 1930 was the unhealthiest period for Eastern Province, it follows, therefore, that the elimination of trypanosomiasis should have been a central theme of the Company's administration.[5] The existence of the disease was known in the province since the beginning of the Company's administration, though it was not until 1910 when many cases occurred. Prior to this, tsetse fly distribution had been considerably reduced following the great rinderpest epidemic of 1896.

The rinderpest epidemic of 1896 had severe effects on the local people. [6] The disease killed most animals and had grave effects on the wealth of the African communities. Livestock, especially cattle, were a major source of wealth among Africans and were used in various ceremonies such as marriages and funerals. Therefore, outbreak of the disease prevented

people from exchanging cattle for food and this caused food shortages and hunger. In 1904, the Ngoni in Eastern Zambia was one of the most affected ethnic groups, such that they neglected the use of animals as a marriage price because of the absence of livestock.[7] On the other hand, the epizootic disease had eliminated most of the tsetse fly natural hosts and Eastern Zambia was free from trypanosomiasis. The consequence was that cattle were kept even in areas where trypanosomiasis and the tsetse fly had occurred in the past.

The outbreak of rinderpest in the province gave the BSACo the impetus to set up policies to mitigate similar diseases. Following this, in 1900 the BSACo held a conference in London for the protection of animals in Africa and the establishment of game reserves was approved.[8] The conference emphasised the conservation and protection of game in African territories. In 1902, the Luangwa Valley game reserve was established to preserve animals.[9] Africans were stopped from hunting animals and owning guns while Europeans with licenses were permitted to hunt. The prohibition of hunting and owning of guns by the local people of Eastern Zambia had several outcomes on their livelihoods. It reduced the well developed game hunting grounds for meat and ivory trade. In addition, it also affected their diet as it deprived them of a source of protein as they depended on wild animals for food. It is very paramount, moreover, to note that these game laws resulted in an increase in game population in the area.

To survive their stay in the province, the white settlers passed expedient land alienation and village settlement policies. In January 1904, a Land Commission met to consider certain questions relating to the natives, the BSACo administration and the establishment of native reserves.[10] In accordance with the recommendations of the Commission, the Reserve system was established. The first reserve to be established was the Chewa reserve

in 1904 on the lower Lutembwe River, south-west of Chipata district. In 1913, efforts were made to create more reserves in the province.[11] The Msandile, Ngoni, Zumwanda and Nsenga reserves were later established.[12] Due to the establishment of reserves, most of the unoccupied areas reverted to bush and formed a new habitation for the tsetse fly, this increased the occurrence of the disease. In 1914, there was a rapid increase in animal population within and outside the reserves, which brought about many problems to the local people and posed a risk to their lives. The animal increases led to the tsetse fly spreading to most parts of the province. This negatively affected the mobility of the local Africans. Confirming the effects of the reserves and the spread of the tsetse flies, A.W. Pim and S. Milligan pointed out that:

> The reserve as a whole could be made to support its full population, but only if this were done after…,driving back the tsetse fly and improving the methods of cultivation. Migration to the best soil is hindered by the tsetse and the absence of surface water, although the area is capable of supporting a considerable population. Although good valley soils are available, they are largely unused owing to the spread of tsetse or scarcity of water.[13]

The end result of the establishment of the reserves was that local people's gardens and crops were damaged by the growing animal population. Above all, the establishment of reserves led to outbreaks of human trypanosomiasis (HAT) in the province. This was very evident in the Luangwa Valley reserve which held 1,000 people, who were anxiously willing to leave the area for healthier places.[14] The Company administration also faced a problem of acquisition of further land for reserves due to little suitable tsetse fly free land in the province. Therefore, it is evident that the spread of the tsetse flies in the province had more to do with the changes in the environment created by the company administration. Elephants raided the local people's gardens and did a lot of damage to the standing crops in a number of areas such as Lupande around Luangwa and Msandile rivers respectively. In an effort to stop this, the administration engaged Mr. H. L. Hall to shoot the them.[15] However, the measure was certainly temporary and proved unsatisfactory.

The high mortality rates due to HAT cases in other African countries such as the Congo and Uganda made the company to come up with measures to control the disease. Much of the worry of the company was as a result of the death of about 200,000 Africans from trypanosomiasis between 1898 and 1906 in Uganda caused by the parasite ***T. gambiense***, carried by the vector ***G. palpalis***.[16] The company feared that the spread of the disease into the province would hinder its income collections through the tax system and labour recruitment. During this time, the company depended much on labour migration for its revenue. It recruited Africans from North Eastern Rhodesia to work in Southern Rhodesian mines (present day Zimbabwe) and the Congo. Serious outbreaks of the scourge outside the territory worried the colonial government in North Eastern Rhodesia who did not want the disease to reach the countryside. The first reaction of the Administration was to determine the extent of the problem, but manpower for the task was inadequate. The Administration appealed to the Colonial Office for assistance. In 1907, the Office contacted the Liverpool School of Tropical Medicine and the Medical Department in North Eastern Rhodesia confirmed the existence of the scourge in the Congo.[17] The Liverpool School of Tropical Medicine carried out research and discovered that the disease indeed existed in Congo from the 1890s. According to Maryinez Lyones, the residents of Northern Congo experienced major disruptions of their social ecology between 1891 and 1930, due to serious outbreaks of trypanosomiasis.[18] These outside outbreaks of the disease worried the Company administration which feared that it would reach the countryside. Under these new circumstances the company administration took a number of steps to stop the spread of the disease. This inaugurated a period of intensive policy implementation. The regulations restricting the movement of natives in the districts were

rigidly enforced. However, these measures were only strictly enforced after 1908 when the disease had widely spread to most parts of the province.[19]

In 1908, Allen Kinghorn, under the Liverpool School of Tropical Medicine, carried out expeditions in North Eastern Rhodesia.[20] The company administration in North Eastern Rhodesia feared that if the disease spread to most areas, the labour supply would be greatly affected in the Katanga mines as many labourers would be infected on their way to work. While Kinghorn was investigating the occurrence of the vector ***G .palpalis*** and the spread of ***T. gambiense*** in Luapula province, he discovered the occurrence **of *T. rhodesiense*** around Malawi. Later, the Company administration consulted Dr. Bagshawe, of the Sleeping Sickness Bureau in London, on the measures which to adopt to prevent the spread of the scourge. Dr. Bagshawe advised that a commission be set as soon as possible to investigate the problem. He further suggested that Mr. Llewellyn Bevan, the veterinary surgeon of Southern Rhodesia carries out this important work. However, he was not released by Southern Rhodesia administration. A separate commission from the BSACo was organized by the Royal society in 1910 to investigate HAT and Nagana which were spreading in the province. The commission carried out work at Nawalia in Luangwa in 1912. Later it proved that the major vector was ***G. morsitans***.[21] Kinghorn and Warrington York also carried out research around the Luangwa Valley on the incidence of trypanosomiasis and confirmed that ***G. morsitans*** transmitted the disease in the area.[22]

Between 1911 and 1923 outbreaks of HAT had been reported spreading from Luangwa to other parts of the province.[23] Three cases of HAT were reported by Dr. H. D. Leach around Chippewa in 1911, while the Veterinary Surgeon, Mr. R. L. Hart reported 9 cases around Chipata. In 1914, 8 cases of HAT were reported around Lundazi. HAT first became

more prominent in Lundazi district in 1915, where 11 cases were recorded.[24] Among these 11 cases, 2 cases involved women while 9 were men. Five of these died before the end of the year.[25] The deadly effects of the disease did not only affect Africans. To the contrary, they also had an effect on the European population. In November 1921, James Morrell, a European labour recruiter, contracted HAT near Chitungulu's village and was subjected to Bayer treatment. Bayer, a German drug, was not very effective and no new medicines were discovered during this period. As a consequence, Morrell died in England from tryapanosomiasis in 1922.[26] Furthermore, Dr. Allan Kinghorn reported that the spread of the disease was more widespread than previously known in the Luangwa around Kambombo, Chikwa and Tembwe areas. In 1923 Kinghorn reported more cases of HAT but this time among the Senga. He recorded 1 case of HAT in Chikwa, 4 in Tembwe, 13 in Kambombo and that Katumbi area was heavily infested with the tsetse fly.[27]

Following the increase in the cases of infections, Kinghorn suggested to the Company three measures to combat the disease. First and foremost the company administration needed to segregate the infected people. Secondly to control African movement and lastly that the local people are given permission to destroy game in order to eliminate the tsetse fly habitats.[28] However, all his suggestions were not taken into consideration. The Company opposed Kinghorn's suggestions because their focus was on Labour recruitment through the Rhodesian Native Labour Bureau.[29] The Company was more interested in migrating labour than health of the Africans.

Animal trypanosomiasis infections were known in Eastern Province from as far back as the 1900s. Veterinary officers reported of cattle deaths caused by ***nagana*** around north and upper Lundazi by 1909.[30] Most of the early work on trypanosomiasis in domestic livestock

in Eastern Zambia was done by Allan Kinghorn and Warrington York, members of the Luangwa Sleeping Sickness Commission of the British South African Company. In 1909, R. Eustance Montgomery and Kinghorn reported that trypanosomiasis in cattle appeared to vary considerably in intensity.[31] Other outbreaks were reported in Chipata, Lundazi and Petauke. The two veterinary officers, while at Petauke district in April 1911, observed that in several villages on the main road to Chipata, animals had died from animal trypanosomiasis. Thus an extensive study was carried out around Luangwa valley in 1912. The study showed that there were three types of trypanosomes responsible for ***nagana*: *T. rhodesiense, T. pecorum and T. simiae***. The increase of tsetse fly and trypanosomiasis cases in the province caused some anxiety and it seemed probable, at times, that it was completely dangerous to move cattle to Southern Rhodesia for purposes of trade in the mines. While investigating the incidence of trypanosomiasis in domestic livestock, Montgomery and Kinghorn also examined game animals. It is important to note that animals were obtained in both clean and tsetse fly infested areas. From the 158 game examined, 56 were positive. An extensive survey of trypanosome infection in wild animals in the Luangwa valley was carried out in 1912 by Kinghorn and Warrington Yorke. A total of 124 game animals were examined and 21 were harbouring trypanosomes.[32]

Thus, in 1912 it was generally believed by the Veterinary Department and the company administration that no livestock would be kept in Eastern Zambia, because of the presence of tsetse flies. Thus, cattle were rarely kept. If kept, however, they were made to graze further away from the boundaries of the tsetse fly belts. Between 1911 and 1912, the veterinary surgeon, Dr. J. C. Spillane, visited Lundazi around Magodi. Out of 39 cattle-owning villages, 21 were visited and 11 were found to have been infected with ***nagana***. In 1913 Kinghorn and Warrington Yorke reported of outbreaks of nagana in Chipata. The

disease reached Chikomene village on the Chipata road in 1914 where an infected dog was also found and a medical examination would later show that, in actual fact, it was infected with ***nagana***.[33]

In 1918, about 104 cattle belonging to the North Charterland Exploration Company died of trypanosomiasis, while about 100 of the BSACo's cattle died from the same cause across the Mozambique border in the area adjoining Sinda, Misale and Tele, and 13 were under treatment in Katete.[34] The official reports from 1921 to 1924 reported serious spreads from the Luangwa Valley to the plateau areas of Chipata and Petauke. The Northern Rhodesia Veterinary Report for the year ending 1922 reported outbreaks of the disease around Chipata in the cattle owned by the North ChartLand and Exploration Company. In 1924, the veterinary officers at Chipata reported animal trypanosomiasis outbreaks around the Mwangazi valley, south of the district.[35] Clearly, something had to be done about these outbreaks of HAT and animal trypanosomiasis in the province.

2.2. Efforts to Combat Trypanosomiasis

The discovery of the presence of trypanosomiasis in Eastern Province was a major concern to the BSACo administration. Upon the discovery of the disease, the Company expressed fear and great panic and steps had to be taken quickly.[36] Accordingly, a number of measures were put in place in order to control it. The outbreaks of the disease in Eastern Province required the enforcement of special trypanosomiasis regulations. A number of legislative measures were promulgated to control the spread of the disease.

As a result of the outbreaks of HAT and animal trypanosomiasis in the territory, the company was compelled to provide both medical and veterinary services to Africans. It is

important to note that efficient medical and veterinary services were essential if the company was to effectively carry out its role of trustee. In 1897, the medical department was established to provide health services in the region. In 1899 serious medical services were offered by the BSACo to combat HAT. In 1899, the African Transcontinental Telegraph Company and the BSACo jointly appointed Dr. D. J. Mackenzie.[37] The BSACo also appointed an unqualified man with medical training, a Mr. R. Stewart Wright, to treat HAT. The first appointment of qualified medical officer by the administration was made in 1900 when Dr. J. C. Spillane became the district surgeon at Chipata and Principal Medical Officer for North Eastern Rhodesia.[38] District surgeons had to attend to staff and native employees and to prevent the spread of disease among the natives. In addition, surgeons also carried out research.

Trypanosomiasis research led to a number of discoveries in the early days in North Eastern Rhodesia. The research influenced chemotherapeutic drugs and vector measures intended to combat the disease. Chemotherapy of trypanosomiasis began as far back as 1905. A number of drugs were used to treat trypanosomiasis and control the disease such as Trypan Blue, Trypan Red and Trypasatrol. Nevertheless, most of them had side effects.[39] These drugs were later replaced with Tartar Emetic which was used between 1908 and 1920**.** However, due to its side effects and toxicity it was also replaced with other more effective drugs such as Samorin®, which will be discussed in the next chapter.

In 1907 the veterinary department was created. The functions of the department were broadly defined as those of animal husbandly of which the prevention and cure of cattle diseases were one. Once the colonial administration realised the possibility of the spread of trypanosomiasis, it was compelled to appoint veterinary officers to deal with the disease.

Initially the Veterinary Department consisted of six professional staff who were only stock inspectors under the headship of Arthur Lane. Arthur Lane was the first Veterinary officer to be sent to the North Eastern Rhodesia in 1907 until 1921 when he was succeeded by Captain John Smith, who was in charge until 1933.[40] In order to contain trypanosomiasis, a number of measures were taken by the Veterinary Department. First, it was decided that a stock inspector be hired and a system of permits to control the movement of cattle be introduced. Cattle were to be purchased only on permits throughout the year. Clearly, these measures were intended to contain and control the spread of the disease.

Despite the appointment of veterinary officers to help eradicate the spread of the disease, the Veterinary Department was more concerned with animal husbandry, an activity which it shared with the Agriculture Department. In 1907, restriction on the movement of natives and the regulations regarding the importation and movement of cattle were passed and enforced.[41] The regulation had a number of negative effects on the cattle traders. They livelihoods were affected by the restrictions as they destroyed trade, one of the economic bases for the Africans. The measure caused great financial loss to cattle-owners particularly around Fort Jameson and the company administration was thus compelled in certain instances to make loans to the farmers.[42]

In 1908, the BSACo through the Veterinary Department imposed severe quarantine measures in areas that were affected. The department closed all routes across the Luangwa valley for local people and declared it a severe tsetse fly and trypanosomiasis zone. The area was quarantined under the control of the veterinary services and animals were maintained in isolation with no direct or indirect contact with other animals in order to

prevent the transmission of specified pathogen(s) during the period the animals were undergoing observation.[43]

As result of the spread of the disease in the province, the company felt compelled to appoint more medical and veterinary officers to deal with it. In 1908, Dr. H. D. Leach was appointed to work in Abercorn (present day Mbala) but later moved to the Luangwa Valley. In August 1909, Dr. Frank Wallace Alexander was sent to work in Chipata as the chief veterinary surveyor. In order to enhance the services of the Veterinary Department, health services of North Eastern Rhodesia and North Western Rhodesia were amalgamated under Dr. Aylmer May in April 1909 and his first station of duty was to work in Chipata. In the same year Mr. W.H. Jollyman was appointed bacteriological assistant in the Sleeping Sickness campaign.[44] However, it proved difficult because the two territories had different medical interests. While North Eastern Rhodesia focused on trypanosomiasis, North Western Rhodesia paid more attention to the well being of the Europeans in the territory.

The existence of the disease in the territory was a serious concern for the company administration. Apart from the health problem involved, unless it was controlled, the labour force of the territory could not be utilized. In order to contain the disease and have a continued flow of labour the company administration further proposed to keep open the road in the area from Chipata to Luangwa that was used by Africans travelling to and from Southern Rhodesia. However, travelers had to obtain a free pass of sleeping sickness for the doctors before they could proceed south. The opportunities of sending manpower to Southern Rhodesia suffered greatly. Efforts were made to control the disease in order to enhance the effective flow of labour outside the province. Dr. Standish and Dr. Edington

were sent by the BSACo administration to Fundu (a port on the Luangwa river) to examine the African labourers on their way to Southern Rhodesia. In 1908, Southern Rhodesia also appointed a medical officer to examine labour migrants from Eastern Zambia on their way to work in the mines.

In 1909, the Sleeping Sickness Regulation was passed. According to the regulation no natives were to travel outside the country or to a tsetse fly infected area without permission. This was later followed by the joint campaign restriction movement by Northern Rhodesia, Southern Rhodesia and Nyasaland. In December 1910, the whole area between the western Muchinga range of mountains, from Nyala on the border to the Lusangazi River and Portuguese East Africa (present day Mozambique) and Nyasaland (present day Malawi) was also declared a tsetse-infested area. In 1911, the three countries attempted to restrict the movement of people for it was feared that the Sleeping sickness regulation was belatedly followed, especially where it affected migrate workers.[45] According to the regulation, people from East Luangwa were not allowed to travel to Southern Rhodesia apart from independent workers under Rhodesia Native Labour Bureau (RNLB). Many Africans suffered economically as a result of the Sleeping sickness regulation. This was indeed a drawback on a number of Africans, as Thornicorft observed:

> Elderly Africans were finding it difficult to pay their tax and more so as the sleeping sickness rules prevented eagerness for work except to the young men through the R.N.L.B. for a long period at the mines in Southern Rhodesia.[46]

However, it is vital to note that a number of Africans were able to travel to Southern Rhodesia (present day Zimbabwe) illegally.

The opportunities of selling and buying of cattle outside the province were acutely affected. To boost the number of white settlers' cattle, in 1912, the BSACo established a number of ranches in the province. In Chipata district, 12 ranches were established with a

carrying capacity of 5, 000 heads of cattle. As the disease was reported to have spread on the cattle route to Feira (present day Luangwa), a new route via Petauke was opened. Over 2,000 heads of cattle were taken down safely over the new route.[47] At the request of the Farmers' Association in the province, the administration gave permission to the white settlers to shoot game without payment of license fees. In addition, the company continued the plan of assisting white settlers by renting them breeding stock which was started in March 1908, when it rented out 1,046 heads and the North Charterland and Exploration Company rented 416 heads to farmers.[47]

In 1913, after a year had passed with no serious signs of the disease, it was decided that the Luangwa area be removed from quarantine.[49] This meant that the area was again open for labour recruitment on condition that Africans had to be kept in a medical camp at Fundu for a period of ten days before being allowed into Southern Rhodesia. Under the sleeping sickness regulations, natives were unable to leave the province to seek work outside the country.[50] They were forced to be in possession of passes when travelling around the province.

In 1920, letters had to be issued which indicated the quarantined areas, for instance, Kambombo was quarantined under instruction from the District Commission.[51] Subsequently recruitment of labour from the province was prohibited and all recruiting licenses were withdrawn, while it became a requirement that all hunters wishing to enter game areas had to obtain permits. This directly affected the supply of labour to the Katanga mines in Congo and Southern Rhodesia. Cordrington, the administrator for Northern Eastern Rhodesia, through the help of Dr. J. C. Spillane, the Principal Medical Officer, prohibited the passage of Africans on the Rhodesian-Congo border due to fear of

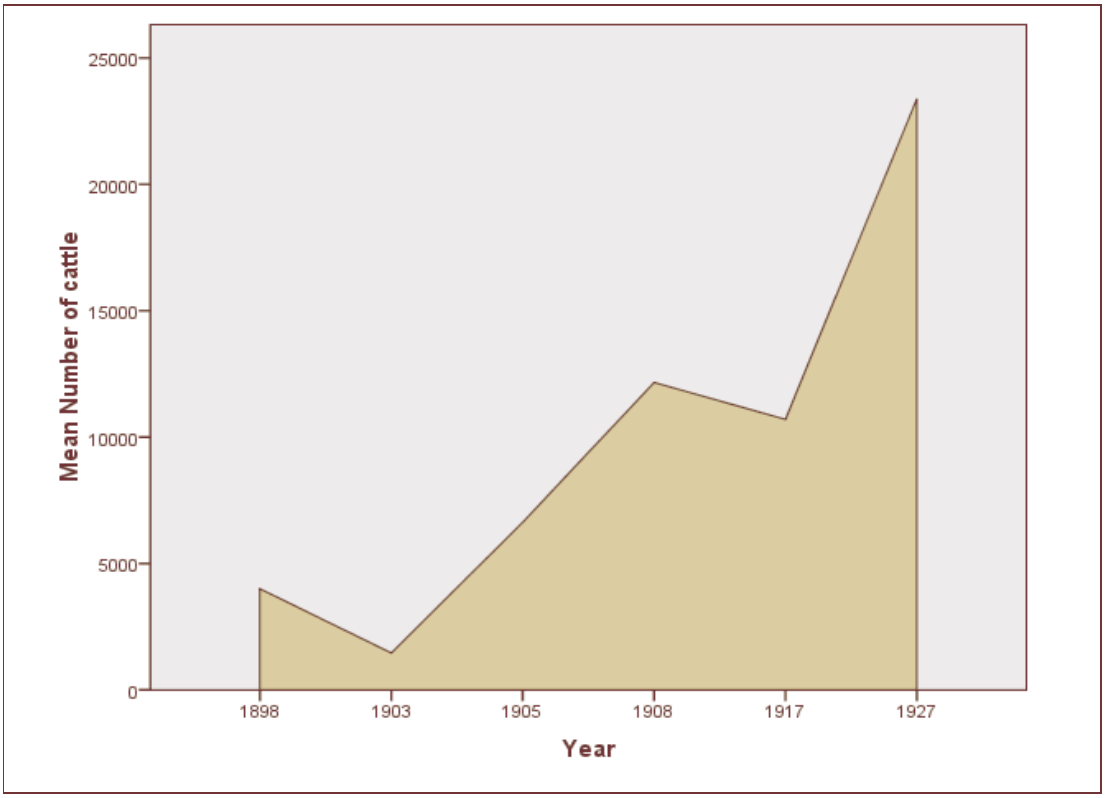
spreading the disease.[52] The second step was to move African families and missionaries that were close to the Luangwa valley which was a main source of tsetse flies in the province. As a result, these trypanosomiasis regulations severely affected Europeans who earned their living through labour exports were severely affected by the trypanosomiasis regulations. African workers were not allowed to travel outside the province.

The BSACo further tried to control the disease by using vector control measures through the usage of targets/traps and through deforestation so as to eliminate vector habitats.[53] This was done to try and reduce the proximity of livestock to the vector and wildlife reservoir hosts. However, none of these methods or their combination ensured absolute control of trypanosomiasis. More importantly, the lack of an effective vaccine against the parasite as a result of its ability to constantly change its surface coat by the process of antigenic variation and rapid evolution of drug-resistant trypanosomes hampered effective control against the disease. The discovery of trypanosomiasis medicines such as Trypan Blue, Trypan Red, Trypasatrol and Tartar Emetic transformed the health of the Africans as they added another dimension to their disease survival strategies. These strategies are discussed in chapter four. As a result of the above measures, there was a slight increase in the growth rate of cattle in the province (see Figure 4).

Figure 1 is a mere estimate of the cattle population in Eastern Province between 1898 and 1927. It is important to note that around the 1900s, the government methods of collecting and analysing statistical information were still crude and the above figures may have been overestimated or underestimated. This was because the BSACo had not properly established itself in the province and had not yet developed a well-organised administrative apparatus. However, these estimates provide some basis for analysis. There

was a decline in cattle population between 1898-1903 and between 1906-1917 due to the rinderpest epidemic and the battles between the Ngoni and troops of the BSACo. The increase in the population between 1917 and 1927 can be attributed to the control measures put by the BSACo Administration.

FIGURE 1: CATTLE POPULATION GROWTH IN EASTERN PROVINCE OF ZAMBIA, 1898 - 1927.



Source: Data Management and GIS Unit Tsetse and Trypanosomiasis Control Section HQ Chilanga.

2.3. Conclusion

This chapter has discussed trypanosomiasis outbreaks on the human population and livestock during the BSACo rule in Eastern Zambia. Initially the company did not know

what to do with the spread of tsetse flies and this caused apprehension, panic and fear in the administration and quick actions had to be taken.The disease inspired the company to establish veterinary policies in the province. It is clear that the company government through the Veterinary Department carried out suitable measures that were aimed at controlling and preventing the spread of trypanosomiasis.

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CHAPTER THREE
TRYPANOSOMIASIS DURING BRITISH CROWN RULE, 1924-1964

3.0. Introduction

This chapter examines attempts by the colonial authorities to contain and eradicate trypanosomiasis in Eastern Zambia during the period 1924 -1964. The chapter is based on the understanding that during Crown rule Veterinary and Medical Services were transformed, with the addition of trained and professional doctors. Furthermore, it demonstrates that the colonial government, through the Veterinary Department, in conjunction with the Game and Tsetse Control Department, established a number of measures to control and contain the disease in Eastern Zambia. However, these measures were hampered by a number of challenges such as the outbreak of the Second World War.[1]

3.1. Incidence of Trypanosomiasis

When the British South African Company (BSACo) handed over control of the country to the colonial administration in 1924, it was generally believed within the Veterinary Department that five-eighth of the country was infested with the tsetse fly.[2] According to Busiku Himapondo Chizyuka, vehicular traffic aided the dissemination of ***Glossina***. Field observations indicated that mechanical transmission by other biting flies played a very crucial role in the spreading of infections. As a result, trypanosomiasis became enzootic in

Eastern Province in the 1930s. Around the 1940s, the province was the most severely affected part of Zambia.[3]

In 1929, 7,536 people were examined by medical officers in Petauke with seven cases found with HAT. 13 other cases were reported in 1929 around areas of Nyakanta, Luwewa, Karonga and Chilongozi in Petauke district. In 1930, medical officers examined a population of 8,733 out of which only four cases were found to have been infected with HAT.[4] In 1931, medical officers in Petauke reported 8 deaths from HAT. Among these, 4 came from Wambo reserve at the villages of Kalanshya, Chimula and Lisati while 3 cases came from the Petauke reserve at the villages of Chiwanga, Sikulumuzya and Nyamuwimbi while 1 case was reported from the Chilinga reserve at Chilawi Village. 5 other cases were recorded in 1931 in the villages of Zambu, Nyamuwimbi, Chimula, Mtandawala and Siriyi.[5]

In each of the above referred to cases, the symptoms reported were swollen limbs and face, inability to keep awake and, in one case, tremors. The symptoms were associated with HAT. It is interesting to note that in the same year, 11 other persons, all residing in the Petauke reserves, were reported to be suffering from HAT. The first indication of any large scale incidence of HAT was found in the District Commissioner's report for Petauke in 1935.[6] The District Commissioner indicated that deaths from HAT began to occur as far back as 1925, but in the period from 1931 to 1935, the number had risen to at least 40.

In 1938, 29 deaths were reported in Chief Mwape's area of the Ambo. Following the medical survey carried out in 1940 in chief Mwape's area in Petauke district and 417 blood slides were taken.[7] The results revealed 11 HAT positive cases. The survey report also

showed that HAT cases were increasing and that 22 deaths were reported in 1940 and 29 cases were recorded in 1939. The number of cases continued to increase throughout 1941 and 1942 but at reducing rates with 1 case in 1941 and 2 in 1942.[8] In 1943, though, there was another increase and 14 cases were recorded from the area of the Lusangashi River in the areas under the jurisdiction of chiefs Sandwe and Ukwimi in Petauke district.[9]

In 1927, the disease broke out in the Mwangazi Valley, south of Chipata district. HAT cases were also reported near the Lupande River on the Petauke-Chipata road, in particular around Msoro Mission. The first HAT case reported in the area was a single European case in 1930 but in 1941 the disease flared up.[10] A lay worker, Mr. Stewart, contracted HAT on his way to Msoro in 1930 and died in Chipata on July 5th of the same year. The discovery of the disease was assisted and made possible by the presence at the mission of a nursing sister, Ms Mills, who was interested in the control of the disease. [11] At the mission station, 22 cases were reported positive in 1941, 30 in 1942, 10 in 1943 and 5 in 1944.[12] From the reported cases in 1941, 8 were males while 14 were female. Clearly, this showed that the source of infection was definitely close to the African villages and was established as being the result of the direct contact between human beings and tsetse flies. In 1944, the number of cases at the mission declined because of the extension of medical services in the area with the help of the active anti-tsetse measures instituted by the Department of Game and Tsetse Control.[13]

Apart from Msoro on the plateau, other outbreak of HAT took place in Chipata where the fly population was thriving and the human population was in a state of flux occasioned by the institution of a resettlement scheme. HAT first became prominent in Chipata district (then Fort Jameson district) in 1930 with 43 cases reported.[14] The incidence of the disease

in Chipata continued to increase between the First and Second World Wars. The disease reached an epidemic proportion in 1942 with 67 cases.[15] Other cases were also reported in 1942 and these included 2 African cases and 1 Indian case were reported from Jumbe in the Luangwa valley. This was followed by 5 other cases in 1943 and 14 in 1944, mostly in the Kakumbi area.[16] The disease also appeared on the plateau in the settlement area north of the Jumbe road, and then became firmly established there for two years. In 1942, only one case was reported, the number then rose to 24 cases in 1943 and 18 in 1944. It is important to note that two European cases were also included in these figures.[17] As a result, the colonial administration through the Game and Tsetse Control Department began to place emphasis on an extensive programme of bush clearing, game shooting and accelerated resettlement of Africans on unoccupied lands.

Thus in 1945, 2 cases were reported from the Kakumbi resettlement area. In 1946, the total number of HAT cases in the Eastern Province was 15, as opposed to 21 in 1945.[18] According to the Health Department Annual Report for 1946, the majority of cases for Chipata district came from chiefs Nsefu, Kakumbi, Mkonga and Sandwe's area, that is, near the Luangwa Valley. The plateau outbreak had come under control.[19] Cases of HAT were also recorded from the Hofmeyer Mission in Nyimba district in 1955, where 8 cases were reported.[20]

In Lundazi district, HAT cases were recorded from at least 1940s.[21] In 1944, 8 cases were recorded. In 1963, most other cases recorded in the province came from the Northern Luangwa, chiefly Lundazi district, where almost one-third of the cases occurred in women and young children. This, it must be emphasised, indicated that HAT was a domestic disease rather than a traveler's affliction as it was in the Southern Luangwa area where all

cases recorded involved adult males. While there was an increase in both HAT cases in other districts in the province, Chadiza did not experience major cases because of the distance from the tsetse fly belt. In 1964, statistical returns by the medical department of Eastern province showed an apparent increase in the incidence of HAT. For instance Chama district recorded 58 HAT cases. These cases came from chief Chibale with 37 cases, Chief Mulilo with 20 and 1 case from Chief Lundu area.[22] Below is table depicting HAT cases in Eastern Zambia.

TABLA 1: PETAUKE, CHIPATA, LUNDAZI, CHAMA AND NYIMBA DISTRICT. HUMAN TRYPANOSOMIASIS CASES IN EASTERN ZAMBIA

YEAR	DISTRICT	NUMBER OF CASES	AREA
1929	PETAUKE	20	Nyakanta, Luwewa, Karonga, Chilongozi
1930		4	Petauke
1931		24	Petauke
1935		40	Petauke
1938-39		58	Chief Mwape□s area
1940		33	Chief Mwape□s area
1941		1	Chief Mwape□s area
1942		2	Chief Mwape□s area
1943		14	Chief Sandwe and Chief Ukwimi
1930	CHIPATA	1	Msoro Mission
1941		22	Msoro Mission
1942		30	Msoro Mission
1943		10	Msoro Mission
1944		5	Msoro Mission
1930	CHIPATA	43	Chipata
1942		67	Chipata
1942		3	Jumba
1943		5	Kakumbi
1943		24	Chipata
1944		14	Kakumbi
1944		18	Chipata
1945		2	Kakumbi
1946		15	Chiefs Nsefu, Mkonga areas
	LUNDAZI		
1921		1	Lundazi
1923		18	Chikwa, Tembwe and Kambombo

1955	NYIMBA	8	Hofmeryer Mission
1964	CHAMA	37	Chiefs Chibale, Mulilo, Lundu

Sources: GRZ, A Survey of the distribution of Glossina SPP and factors influencing their control in the territory of Northern Rhodesia (Zambia), Department of Veterinary and Tsetse control services, 1982.

The distribution of cattle was determined mainly by the incidence of tsetse flies. Much of the human population and nearly all the livestock, including Cattle, pigs, sheep and goats were highly concentrated on the plateau. Cattle was Kept in particular around Chipata and to a less extent in Lundazi and Petauke. The major tribe that kept cattle were the Ngoni. The presence of tsetse flies and animal trypanosomiasis remained concern in Eastern province during the colonial period. It is important to note that, in order to contain the disease measures were taken by the colonial government through the veterinary department. As a result only a few cases of animal trypanosomiasis were recorded and African cattle population continued to increase (See figure 2). In 1928 cattle was reported died from trypanosomiasis at Mpuzuzu village in the Angoni reserve in Chipata district. In 1929, E. H. L. Poole, district commissioner for Petauke visited 29 villages in Chief Mzenje area. He noted that very few cattle was kept owning to the presence of tsetse flies in the area.[24] In 1931the Tour report for Petauke also shows that no cattle was kept at Soka, Kandembo, Nkungwa, Mkwana villages and along the Lukusashi River owning to the presence of tsetse flies. Natives in the lower Lukusashi River complained of the loss of over 60 pigs in 1931 from trypanosomiasis.[25] According to the Veterinary Report of 1931, the number of native cattle showed a sudden decrease in 1931. In 1930 the cattle population was 3,106 but it reduced to 2,738 in 1931.[26] The report shows that trypanosomiasis was partly responsible for this decline.

In 1950, the Game and Tsetse Control Department killed 9,327 animals believed to have suffered from animal trypanosomiasis for control purposes within the tsetse perimeter and in 1952 a game fence in the Msoro area of Fort Jameson was completed. Despite these measures and the employment of several field officers in supervising the work of bush clearance, particularly in the two settlement areas at Chipangali and Rukuzuie, in 1958 it was noted that the province had suffered from 1,465 recorded cases of animal trypanosomiasis resulting in 312 deaths. Although the major case of animal trypanosomiasis in the province was pathogenic trypanosome T. Congolense, a marked rise in the incidence of infection with T.Vivax was recorded from 15 per cent to 28 per cent in 1963. This occurred at a time when the drug in general use was Antrycide, known to be less effective against T. Vivax than T. Congolense. After 1964, animal trypanosomiasis caused by the spices of T. Congolense was recorded in Chipata, Lundazi, Katete and Petauke. Chipata recorded 4 cases, Lundazi with 12 cases, Katete with 3 cases and Petauke with 34 cases.[27]

3.2. Efforts to Control Trypanosomiasis

In order to contain and stem the spread of tsetse flies and curtail the impact of trypanosomiasis, the colonial government through the Veterinary and the Game and Tsetse Control Departments put in place a number of regulations through the enactment of acts and policies. Subsequently, vector control and chemotherapeutic treatment strategies were used. Nonetheless, these measures were at certain times in conflict with the expectation of Africans as they appeared to hinder their sources of livelihoods.

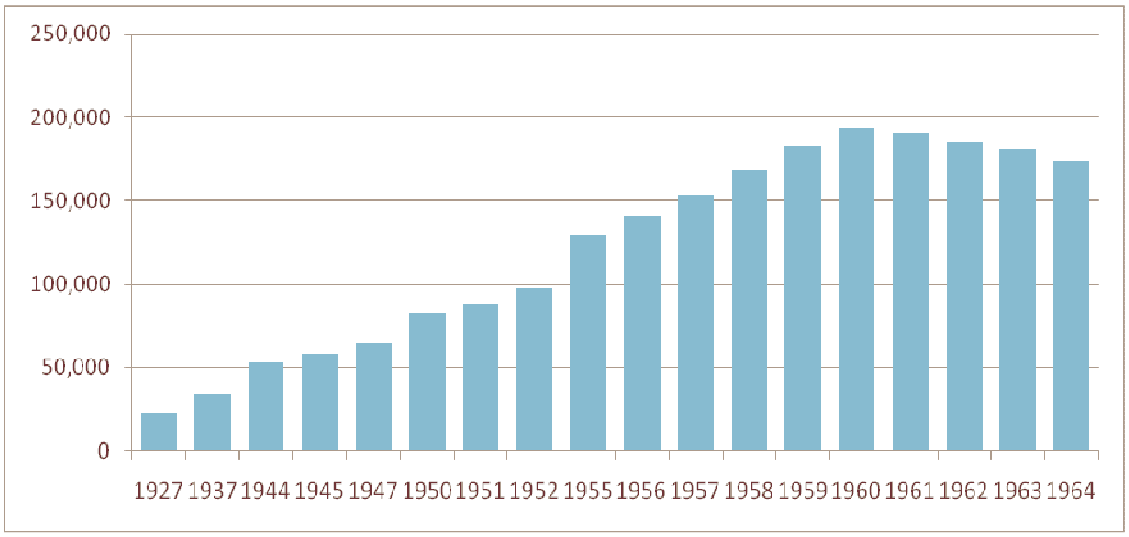
It is a well known fact that tsetse flies, transported by whatever means were transported be it by human beings, game, or motor transport, were carried over long distances and

affected not only animals but also people. In the early years of the occurrence of the disease, tsetse fly control measures were limited to the avoidance of contact between people and the fly. After the Great East Road was constructed in 1929, tsetse flies began to spread to many parts of Eastern Province because of migrating workers.[28] As observed by Joseph Phillip Mtisi, a number of migrating labourers from Chipata and Petauke were going to Lusaka and later the road was used by many labour migrants going to Southern Rhodesia.[29] The picture that one draws is that African workers were a major source of the spread of trypanosomiasis. To avoid the introduction of the fly carried by both African workers and motor vehicles into settled areas and into areas inhabited by Africans owning livestock, a barrier at Luangwa River was placed across the Great East Road in 1930.

In 1941, the Tsetse Control Act of 30th December under Chapter 249 of the Laws of Northern Rhodesia was passed.[30] The Act aimed to control and prevent the spread of tsetse flies. In addition the Act prohibited the travel or movement of persons, domestic animals and vehicles to, from or within a tsetse fly area or a tsetse fly control area such as the Luangwa Valley which was a major source of tsetse flies in the province. The Tsetse Control Act also provided for the inspection by officers at tsetse control pickets and check points of persons, domestic animals and vehicles for the purpose of detecting the presence of tsetse flies, and regulated except under licence the performance of any specified act whether within or outside tsetse fly control areas for the purpose of controlling the spread of the disease to human beings and livestock. The measure was aimed at controlling trypanosomiasis through the control of tsetse flies. However, it negatively affected trade in cattle as Africans were not allowed to move any livestock for fear of spreading the disease.

In order to contain the further spread of tsetse flies the colonial administration opted to maintain a strict control over the movement of game and retained it within its habitat. Thus, there was need for a department that would control the movement of game countrywide. Accordingly, the Game and Tsetse Control Department was established in 1942.[31] The department's priorities were to control and preserve the populations of game. It also instituted a number of tsetse schemes with the main objective being that of protecting cultivated land, controlling vegetation which formed the habitat of the fly and the prevention of the spread of tsetse fly by traffic. In 1943, the population amounted to 654,000 head of cattle, 93,000 sheep and 38,000 goats with a few hundred pigs.[32] Cattle were the most important domestic species in Northern Rhodesia and of the 654,000 head in 1943, Africans owned 520,000 while Europeans owned 134,000 (See figures 2-3 respectively). However, efforts by the departments were hindered by the outbreak of the Second World War. Efforts to control the disease by the Veterinary Department suffered a serious setback because of the war. The war demanded more resources and any developments had to wait until after the end of the war. Soon after the end of the war in 1945, the livestock population of Northern Rhodesia proved inadequate to supply the territory with its requirements of livestock products and was to remain relatively static for many years.[33]

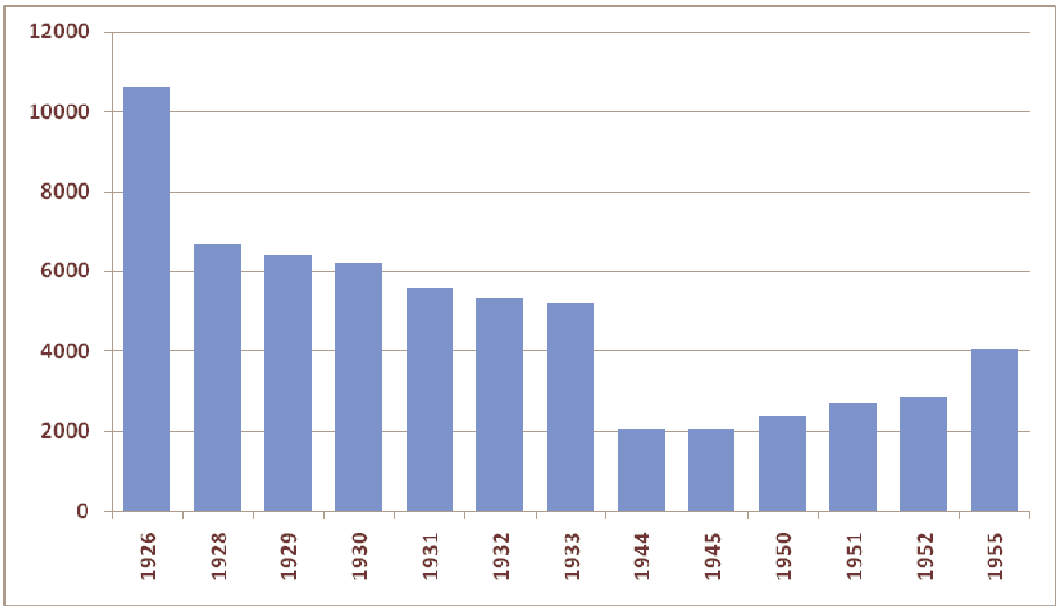
FIGURE 2: INDIGENOUS CATTLE POPULATION GROWTH IN EASTERN PROVINCE, 1927 -1964



Source: NRG, Department of Veterinary Services Annual Reports, 1927-1964.

The cattle population was insufficient to meet the expanding needs of the territory for meat. In order to have an adequate supply of meat in the country, there was an urgent need for research and the institution of measures to combat the spread of the tsetse fly and trypanosomiasis. For this reason, the Veterinary Department reviewed the livestock situation because the presence of the tsetse flies prevented the keeping of cattle in many parts of the territory. It was against this background that the Veterinary Department drew up a Development Plan for the Livestock Industry in 1945.[34] In general, the plan provided a broadly balanced picture of the livestock industry and its problems and set out measures precisely for disease control, livestock improvement, improved management and better marketing. These measures were designed to reduce the spread of the tsetse flies, the spread tsetse flies and a continued increase in the African cattle population.

FIGURE 3: EUROPEAN(EXTOIC) CATTLE POPULATION IN EASTERN PROVINCE, 1926 – 1955.



Source: NRG, Department of Veterinary Services Annual Reports, 1926 -1955

Figure 6 above notes the steady decrease in the European cattle population from 1926 to 1944, followed by a modest increase after. Among the reasons for this was a corresponding decline in the number of settler cattle ranchers in the province. It is important to note that the number doubled between 1951 and 1955. This may be partially explained by effective tsetse fly and trypanosomiasis control measures towards and around independence. In 1945 the figure was 58,343 while in1960 it increased to 193,737.[35] This trend was attributed to the better management skills by the Veterinary and Game and Tsetse Control Departments. In addition, increased manpower and disease control programmes implemented by the crown government played a major factor in the increase of cattle population.

It's important to note that the greatest obstacle to the development of the Livestock industry in the colonial era was the spread of tsetse flies. From 1947 onwards the Veterinary and Game and Tsetse Control Department established measures to protect

existing stock population against the tsetse fly.[36] Firstly, it was essential that game be controlled by fencing off the area to protect and prevent game from re-occupying the area and later to prevent cattle from being infested. An additional measure to hasten the elimination of the fly from within the areas to protect cattle from the disease was selective clearing of sites favourable to the breeding of the tsetse fly and withdrawal of stock from infected areas until rendered safe.

In 1948, the Game and Tsetse control Department started establishing national parks so as to control the movement of game. It prohibited or controlled the number, species and gender of animals that could be hunted through an elaborate system of licenses that had evolved since the first BSACo game laws. The department also outlawed various African methods of hunting, including the use of pitfalls, snares, poisons, bush fires, spears and nets. In addition, all trade in game meat was prohibited, except for the barter of a legally procured animal between Africans in the same area. These measures were reported to have given positive results in Eastern province as HAT and Nagana cases were brought under control by the 1950s. In 1953, the livestock industry recorded successful improvements in the tsetse fly elimination schemes in Chipata and Luangwa Valley.[37]

In 1959, the Tsetse Control Act of 30th December 1941 was amended and was later transformed into Act number 13 of 1994.[38] According to this Act, any person who contravened any regulation made under the Act or failed to comply with it was guilty of an offence and was liable to a fine not exceeding three thousand kwacha penalty units or in default of payment to imprisonment for a period not exceeding six months. The Ordinance was not intended to obstruct people from going about their trading affairs but merely canalised travellers and traffic along specified routes, where they did not

endanger livestock by carrying flies and where disinfestations were done by tsetse control staff. In 1954 onwards, the colonial government felt that the control of the tsetse fly and the disease was best done when tsetse fly areas were clearly identified and declared. To that effect, the Government notice number 215 of the 1954 Act under Cap 249 was passed.[39] By the said Act, Chipangali in Chipata district was declared a prone tsetse fly area. Its boundaries were from the junction of the Mchenche stream to its source near the Chipata-Lundazi district to the point where the Chipangali and Rukuzi Rivers start. No animals or persons were allowed to travel to and from this area. In addition, no livestock trade was allowed in the area.

In 1960, the Game and Tsetse Control department in conjunction with the Veterinary Department increased emphasis on vector control.[40] The departments recommended the use of tsetse targets, tsetse traps, deforestation so as to eliminate vector habitats, reducing the proximity of livestock to the vector and wildlife reservoir hosts and treatment by insecticides (see appendix3, figures 3b-c for details). However, eradication was only economically feasible in small discrete patches of infestation. To achieve a great reduction in tsetse fly density was not easy, thus there was need of a knock-out punch. Therefore, the Game Fences method was adopted which was intended to prevent entry of game and tsetse fly into the cattle rearing areas. The first of these was created in Chipata district in 1919.[41] In 1963, the number of game fences had increased.[42] However it is doubtful how much effective the fences were in preventing the spread of tsetse fly. As a result, some areas began to phase them out due to ineffectiveness and high maintenance costs. Any game found crossing from the tsetse fly belt was killed. Later barriers were reinforced by clearing the infested areas.

The approach towards the control of trypanosomiasis by the two Departments changed to that of isolating the main tsetse fly belts from cattle rearing areas by creating a tsetse fly free barrier or holding line. However, it is important to note that there was little coordination between the activities of the Veterinary and Game and Tsetse Control departments because each section had its own priorities with little room for coordination. While the Veterinary section dealt with animal health problems, the Tsetse Control section dealt with vector control. The assumption behind the game exclusion control method was that if an area was made free of game animals, tsetse flies would be deprived of food and therefore would not survive. However, there were arguments and counter arguments about the usefulness of killing of game animals as it was both destructive and wasteful. While Game exclusion worked very well in Eastern Zambia. To enhance the elimination of tsetse flies through the game exclusion, the colonial administration opted to build a game fence. The major aim behind the creation of game fences around the country was to check the wondering of the animals into cleared areas and to prevent entry of game and the attendant fly into cattle rearing areas. The most commonly used fence was 1.9m high with seven stands of tensile steel wire. In 1963 a total of over 1,449 kilometers of game fence had been constructed along the tsetse fly belts flanking the livestock-rearing areas of the country.[43] The game wire was supported by spraying within the settled areas as it was believed that the holding lines were the panacea for tsetse control. Although it was claimed by the Colonial government that game fences had been reasonably successful, their effectiveness was doubted by the Veterinary and Tsetse Control department as a control measure. As a result after independence game fences were phased out due to ineffectiveness and high maintenance costs.

In 1963, the Northern Rhodesia authorities adopted the Stock Health Act, Chapter 252 and later Notice 497 of 1964. The Trypanosomiasis regulation Cap15, Section 15, government Notice 444 of the 1963 Stock Act was also passed.[44] The regulation indicated that no person was to move any stock into or outside or through any specified areas without a permit issued by a Veterinary officer or person authorised by a Veterinary officer. Any person who did not follow the regulation was guilty of an offence. The Act outlined the Veterinary district to include: Lundazi, Chipata and Petauke. According to the Act no stock was to be moved into or outside a veterinary district without a permit issued by a Veterinary officer or other person authorised by the director and if any person failed to obey the Act, that person was guilty of an offence. In addition, the Act required that all cattle inspectors informed the public, in cases where trypanosomiasis broke out.

In 1964/65, extensive and costly control measures were commenced countrywide.[45] These aimed at regaining control of all the tsetse fly-belts in the country, the major ones being Luangwa, Lower Zambezi basin, Lake Bangweulu and Luapula basin. The first measure taken was to abolish game elimination due to reduction of game in the province. Game elimination had started in 1949. Certainly, these measures were aimed at controlling the spread of tsetse flies and prevention of occurrence of the disease. However, none of these methods or their combination provided absolute control.

3.3. Direct and Indirect Control Methods

The control of trypanosomiasis in Northern Rhodesia was done by the use of chemotherapeutic drugs, vector control and through government policy. The invention of advanced and potent drugs such as Samorin® by the Veterinary department later gave the colonial government a firmer command of health and the disease. A number of drugs were

used to try and control the disease. Nevertheless, most of them had side effects. For many years after the 1920s, the most effective drugs against trypanosomiasis were Suramin® and Tryparsamide, often given in consecutive course.[46] Suramin®, Tryparsamide and Potassium Antimony Tartrate were very safe drugs, but produced optic atrophy, thus they were replaced by other effective drugs. In 1932, Antimosan and Naganol were introduced in Northern Rhodesia while Phenidium was introduced in 1944. However, they were replaced by Dimidium Bromide between 1946 to 1955, because they were ineffective.[47] It is important to note that Potassium Antimony Tartrate continued to be the principal drug employed in the treatment of trypanosomiasis and extensively employed by the farmers to treat the disease due to the comparatively high prices of Antimosan, Naganol and Dimidium Bromide. The Stock Inspector for Chipata district noted that Potassium Antimony Tartrate was used indiscriminately by farmers. He pointed out that:

> In the Fort Jameson district (Chipata), cattle are utilized for general farming and transport purposes and for the production of the tobacco crop. A large portion of the district is infested by tsetse fly and cattle can only be kept alive and working by regular injections of Potassium Antimony Tartrate and other trypanocidal drugs.[48]

In 1957, Dimidium Bromide was replaced with Ethidium Bromide because of its toxicity. Ethidium Bromide was later replaced with Antrycide Methyl-Sulphate. Antrycide Methyl-Sulphate was also replaced with Prothidium in 1958. Prothidium was widely used for some time but due to high cases of cattle deaths in Eastern Zambia, the drug was withdrawn from public use. The drug was very expensive for Africans hence in 1964 its application met a lot of resistance in the province. In 1958 Berenil was introduced but was also replaced by Samorin® in 1967. From 1967 to date, the two drugs have been used to control trypanosomiasis in Zambia.[49]

At the time of independence in 1964 over 6o percent of Zambia was exposed to trypanosomiasis limiting animal production. Direct and indirect control methods were also

enforced by the Veterinary and Tsetse Fly Department. This was aimed at controlling the spread of the flies into cattle rearing areas as a part of a programme for the prevention and control of trypanosomiasis in cattle. A number of tsetse fly traps and pickets were placed around Eastern province. Some pickets were put up on the Great East Road at Mambo turn off in 1960.[50] While this aimed at finding out the tsetse fly population, inspections and surveys were carried out mainly in Petauke, Nyimba, and Katete, Lundazi Chama and Mambwe districts. Between 1960 and 1961 the highest catches of tsetse flies were recorded at Moomwa picket in Chipata district when 30,000 and 20,000 flies were caught.

In 1964, aerial spraying a new intervention measure was introduced to control the spread of tsetse flies. Control of tsetse flies by aerial spraying was first studied in East Africa using aircrafts. Fixed sequential aerial and ground spraying was first used against ***G. morsitans*** on a large scale in Eastern Zambia and other tsetse fly belts around the country such as the Kalomo-Choma belt in 1964 using **Dichlorodipheryl Trichloroethane** (**DDT**) techniques respectively. These chemicals were brought from the Tropical Pest Research Institute in Arusha in 1964 but were used in later years.[51] The technique involved application of the insecticide by atomizing it into an aerosol during the flight of fixed wing Aircraft. In 1972, about 3,700Km^2 was sprayed in Chipata district, while in 1973 about 2,970 Km^2 was sprayed in Katete, Petauke and Lundazi districts.[52] The development of these drugs had given colonial government a firmer control of trypanosomiasis. Later, the colonial government reviewed the use of such chemicals. In 1982, the applications of these chemicals had side effects with deaths recorded amongst insectivorous birds, monkeys, squirrels, bats, fish and invertebrates. Aerial and ground spraying control methods were stopped because of the side effects on the nature. Spraying destroyed species including

wild game, birds and insects. It also negatively affected the food security of the Africans who depended on the bush for food.[53]

3.4. Conclusion

The crown governments control measures towards tsetse flies and trypanosomiasis took the form of veterinary policies and direct control. Tsetse flies and Trypanosomiasis continued to be one of the main constraints to the development of Eastern Zambia. The chapter also underscored the crown government's extensive control measures enforced from 1925 to 1964 to protect human beings and livestock from trypanosomiasis. It argues that the outbreak of the Second World War affected the functioning of the veterinary department as it limited the financial position. It was not until 1945 that the administration became actively involved. This was because after the war the financial position of the government greatly improved as a result of the end of the financial demands of the war. Along with the improved revenue situation came a reassessment of government policy and national planning. The Veterinary department throughout the Territory increased emphasis on control by the use of chemicals for the treatment of trypanosome infections.

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CHAPTER FOUR

THE EFFECTS OF TRYPANOSOMIASIS ON AFRICAN LIVELIHOODS AND INDIGENOUS COPING STRATEGIES

4.0. Introduction

This chapter examines how the indigenous populations dealt with the scourge in Eastern Zambia. It examines the coping strategies employed by the local people in Eastern Province to control trypanosomiasis. It argues that the people of Eastern Province had knowledge of their environment and made attempts to control trypanosomiasis. The people transformed their environment in order for them to fit into the existing struggle against the disease. As a result, they endeavoured to coexist with the tsetse fly and trypanosomiasis. They modified the environment through their creativeness and innovation and employed various forms of adaptations in response to the challenges posed by tsetse flies and trypanosomiasis.

4.1. Impact of the Disease on Communities

The impact of the disease on the rural economy in Eastern Province in particular was enormous. The disease had a number of effects on human welfare and agricultural production. The presence of tsetse flies also meant the absence of cattle and other livestock products among the Africans. Due to exposure to the tsetse fly, the people of Eastern Zambia had problems rearing cattle. In areas which were very highly infested with tsetse flies, it was difficult for farmers to use oxen for ploughing.

Several domestic animals that were kept in tsetse fly infested areas were at a great risk of death from trypanosomiasis. This was a serious setback because the people of Eastern Zambia traditionally greatly valued their cattle. In fact, cattle were always regarded as their bank and currency or medium of exchange. Cattle were also used for marriage payments (dowry) and just as a source or prestige in that the more animals one had, the greater his recognition in the society.[1] As a result importance was always attached to the quantity of stock than to its quality. The effect of trypanosomiasis led to poor growth rate of cattle and emaciation normally resulted in low meat and milk production. Infected livestock became less productive in terms of fertility, quality of meat and infected oxen could not work for a long period of time. Considering that domestic animals, mainly cattle, were a major source of protein through meat and milk, the implications of trypanosomiasis on food security during the colonial period cannot be overemphasised.

Domestic animals such as cattle were also used for draught power. The draught power by oxen in particular was critical for cultivation of crops by farmers as well as transportation of goods and people from one place to another. As such, the loss of cattle due to trypanosomiasis had serious repercussions on animal draught power and the general well-

being of the local people in Eastern Zambia. Apart from the loss of oxen, it was also reported that the few imported breeding herds that had been started as well as native cattle, were all wiped out. As such, the market for livestock and other trade goods shrunk drastically, resulting in the costly importation of livestock products such as milk and beef. What this meant was that, for a while, meat requirements in the country were met through imports, sometimes from as far away as Botswana, at very high prices.[2]

In addition, due to fear of being infected with human trypanosomiasis (HAT) the local people of Eastern Zambia were forced to relocate and live in relatively smaller, infertile and unproductive areas. A.W. Pim and S. Milligan and observed that:

> An additional problem is furnished by some hundreds of natives who when pressed to move into reserve No.5 preferred to join some kindred villages in the Luangwa Valley. They are reported to have suffered severely from Sleeping Sickness and were very anxious to leave the Valley for some healthier areas.[3]

The disease, further, had a great effect on migration and human settlement and re-settlement patterns. It was widely accepted by both Africans and the British South Africa Company (BSACo) administration that the tsetse fly immensely affected land use. The infested areas became a hindrance to development. Above all, most infested areas contained resources desirable for economic development such as game, fruits and minerals. The presence of tsetse flies and trypanosomiasis affected animal movement and human labour within and outside the province. Local communities failed to migrate for better and new jobs due to fear of getting infested with HAT.

The connection between trypanosomiasis and food security during the colonial period cannot be underestimated. The disease undermined agricultural production by killing cattle and other domestic animals in Eastern Zambia. The scourge robbed herders of their main

form of wealth. The disease also prevented people from exchanging livestock such as cattle for food. It is a well known fact that domestic animals and wild game were a major source of protein through among Africans. The loss of such important animals' protein was enormously felt among the Ngoni and the Chewa who were major cattle-keeping ethnic groups. The people depended on domestic animals or ***nyama*** for proteins.[4]

4.1. Traditional Coping Strategies

Modern veterinary medicines were often not readily available during the colonial period because they were either too difficult to obtain or too expensive for the poor Africans. Under these conditions, the people of Eastern Zambia used traditional strategies. These are sometimes referred to as ethnoveterinary methods. These strategies provided an alternative to modern medicines for treating trypanosomiasis. Early missionary reports show that Africans understood and developed a relationship between trypanosomiasis and their lives. Helge Kjekhus testified to such a relationship in East Africa. He noted that the cattle keepers of Tanganyika would deliberately drive their herds into the ungrassed tsetse fly bush gambling that the possible death through fly-infection constituted a better risk than the certain death from famine.[5] This was because of their ability to predict various variations of their environment. It is important to note that almost all traditional methods used to contain trypanosomiasis were through the control of the tsetse fly.

The presence of tsetse flies in Eastern Zambia threatened the survival of the human beings and was an obstacle to domestic animal keeping and livelihoods. However, the Africans knew and understood the relationship among tsetse flies, wild animals and the environment. Traditional traps were also used to catch the tsetse flies. The African

societies had indigenous knowledge systems that provided insurance against hunger and diseases.[6] This was done as a provision for the control of the disease and prevention of the spread of the tsetse flies around the province.

African communities consisted of localities of dense population around which effective barriers of cleared grounds could be maintained against tsetse flies. Sometimes they cleared the land to isolate the wild animals from the villages near the tsetse belts.[7] Similarly other African communities that kept cattle explored and knew these localities and evaded them during herding time as noted by R. F. Burton:

> …largely by the help of fire, they cleared the land and isolated the wild animals and their accompanying tsetse flies to unattractive jungles or badlands that formed the boundary zones between the settlements of the larger peoples or tribes. The cattle keeping peoples seem to have explored and known these localities and evaded them when herding.[8]

Furthermore, tsetse fly eradication through creating farming fields was used as a traditional coping strategy. It is important to note that the distance that a tsetse fly can cover in flying is solely dependent on the closeness of shrubs/bushes, thus the more bush clearing the less the tsetse fly can cover.[9] Therefore Africans deliberately established a number of farming areas as a traditional method to control the tsetse flies and trypanosomiasis. The disease was controlled by the re-settlements of human or animal population at risk. The environment was modified by settlement to such an extent that the tsetse fly would not survive. Such tsetse fly infested areas were only opened up for emergency grazing during times of drought and famine. In 1962, a number of bushes were cleared in Petauke district around Mumbi Village.[10]

The African communities made use of the technique of smoking out tsetse flies. Fire was also used to scare off and kill the tsetse flies. Thus fires burnt in the cattle kraals during the

nights to generate a very strong smell from which the cattle received a certain degree of protection. The Ngoni burnt cow dung in cattle kraals at night so that the smoke would drive away the tsetse flies. The smoke from the fire in the cattle kraals generated a very strong smell and hence acted as a repellent against tsetse flies. This was also evident in Kenya where the outer coat of a fresh neem (Azadirachta indica) seeds was pounded until the Kernels produced oil. The oil was smeared around the animal to act as a tsetse fly repellent. Lion's fat was also used as a temporary repellent against tsetse flies and sometimes to heal the wounds resulting from tsetse fly bites. Lion's fat was regarded as a sure prevention of the tsetse flies.[11] It was smeared around the cattle and sometimes around human beings bodies to repel the tsetse fly especially during migration time.

Advanced beyond the use of smoke and cow dung, some people in Eastern Zambia used herbal medicines as a cure against trypanosomiasis. The people of Eastern Zambia relied on a whole range of traditional practices to keep their livestock healthy from trypanosomiasis. Traditional health enthnoveterinary medicines such as medicinal plants were used by Africans to treat trypanosomiasis. ***Muhota (Psorospermum Febrifugum),*** a traditional herb was used against infested wild animals.[12] It was worn on ones hair tied to the animal or worn around the body of a person. Many of the plants used to prepare indigenous medicines did in fact contain valuable active ingredients against trypanosomiasis. African traditional herbs were used to treat and prevent the spread of the tsetse fly and the disease. Such herbs were used among the people of East Africa. John Kirk wrote on such measures in East Africa. He pointed out that:

> The tsetse fly avoids human excrement, so the natives told us, and we have found it true, and they say that cattle have been passed by day through tsetse fly country when smeared with a composition containing this. Native doctors have an herb to which they attribute a similar effect, but they never assert that it will save all.[13]

The use of local practices and ethno medicine to treat human beings and their livestock for various diseases including trypanosomiasis has always been an African tradition. People of Eastern Zambia employed traditional medicinal plants and African skills of management to control, prevent and treat trypanosomiasis.

The people of Eastern Zambia developed traditional systems that enabled them to adapt to their local environments. This was the same in most parts of Zambia where Africans faced similar problems. Direct responses were employed depending largely on how severe the disease was. Temporary migrations within and outside the province acted as a survival strategy for the people of Eastern Zambia. To a large extent, the ecology and environment of the province shaped the livelihoods of the people. Thus the local people, of Eastern province in times of severe outbreaks of trypanosomiasis, migrated to non tsetse fly infected areas. It was their ability to interpret the environment that enabled them to prepare for epidemics which they referred to as ***chigodora***.[14]

The local people of Eastern province kept animals away from places that were heavily infested with tsetse flies during the hot part of the day. Thus animals were grazed in plains far away from bushes, especially during and after the rainy season when tsetse flies were numerous.[15] They grazed their animals in plains far way from bushes, especially at the end and after the onset of the rainy season. Animal and human movements were restricted from infected routes. Tsetse fly areas were well known by the people of Eastern Zambia. When going through tsetse fly belts, they travelled in the night to avoid tsetse bites. The limits of the tsetse fly infected areas were well known to the Africans and they made sure that they passed through these districts after sundown. Therefore, the people of Eastern Zambia created barriers to control the scourge and sometimes removed their villages from

dangerous areas to non tsetse fly infected ones.[16] While others stopped keeping livestock for survival due to spread of the tsetse flies and fear of out breaks of trypanosomiasis for a short period of time and resorted to illegal hunting of game. Unfortunately, such a survival strategy later became a criminal activity.

4.2. Conclusion

The chapter has demonstrated, by and large, that despite the challenge of tsetse flies and trypanosomiasis, the people of Eastern Zambia remained reasonably self-sufficient and developed survival strategies to cope with trypanosomiasis between 1908 and 1964. The chapter has also established that, over time, the people of Eastern Zambia developed, over time, a number of ethnoveterinary methods to try and eliminate trypanosomiasis. They understood and exploited indigenous knowledge to face the dangers of diseases and were able to control it through their traditional methods. Local people resorted to their traditional survival strategies such as hunting game, use of herbs/charms, fire, bush clearing, farming and traditional repellents. Thus Communities of Eastern Zambia maintained an ecological control system throughout the nineteenth and twentieth century in spite of tsetse fly and trypanosomiasis outbreaks.

ENDNOTES

1. Interview, David Mweemba, Department of Livestock Development, Nyimba District, 14/11/2010.
2. Interview, John Mbewe (Ex Tsetse fly control guard), Mumbi Village, Petauke District, 13/10/2010.
3. A.W.Pim and S. Milligan, Report of the Commission Appointed to Enquire into the Financial and Economic position of Northern Rhodesia (London: HMSO, 1938), p.62
4. Interview, Dr. C. Mubamba, Department of Livestock, Petauke District, 12/10/2010. See also Leroy Vail, "Ecology and History: the example of Eastern Zambia" Journal of Southern African Studies, Vol 3, No 2, April 1977. See also Kenji Yoshida, ″Masks and Transformation among the Chewa of Eastern Zambia″, Seri Ethnology Studies, 31, 4, 1992.
5. Helge Kjekshus, Ecology, Control and Economic Development in East African (London: Heinemann, 1977), pp.52-79. See also W. Gilges, Some African Poison Plants and Medicines of Northern Rhodesia (Manchester: Manchester University press, 1974), p. 398.
6. Chewe Mebbiens Chabatama,″Peasant Farming, the State and Food Security in Northern-Western Province of Zambia,1902-1964″, PhD Thesis, University of Toronto, 1999.
7. Interview, Maclean Phiri (Ex-tsetse control Guard), Sasu Tsetse Control Camp. Chipata District, 25/10/ 2010.

8. R. F. Burton, ″The Lake Regions of Central Equatorial Africa″, Journal of Royal Geographical Society, XXIX, pp.1-454. See also John Ford, The Role of Trypanosomiasis in African Ecology: A study of the Tsetse Fly Problem (Oxford: Oxford University Press, 1971), p.234.
9. Mubamba, interview cited.
10. Mbewe, interview cited.
11. Kjekshus, Ecology, Control and Economic Development in East African, p. 55. See also Maira Keengwe and Isaac Bekalo, Ethno Veterinary Medicine in Kenya: A Field Manual of Traditional Animal Health Care Practices (IIRR: Nairobi, 1996), p. 127.
12. W. Gilges, Some African Poison Plants and Medicines of Northern Rhodesia (Manchester: Manchester University press, 1974), p. 398.
13. John Kirk, "Tsetse fly of Tropical Africa″, Journal of the Linnean Society, V111, pp.15-56.
14. My personal observation while in the Field Research in Eastern Zambia during the months of October-November, 2010.
15. Mweemba, interview cited.
16. Phiri, interview cited.

CHAPTER FIVE

CONCLUSION

The study examined trypanosomiasis in Eastern province of Zambia from 1908 to 1964. The study mainly aimed at investigating the prevalence of trypanosomiasis among the communities of Eastern Zambia. It also aimed at showing the shifting trends of trypanosomiasis in the province. The study further set out to examine the control measures the British South African Company (BSACo) used in their quest to eradicate the tsetse fly and trypanosomiasis in the province and how the Africans coped in a tsetse fly infested environment.

Various conclusions have been drawn. Trypanosomiasis has been discussed in the content of BSACo and how it tried to contain the disease in Eastern Zambia from 1908 to 1924. It argues upon the discovery of the disease, the Company expressed fear and great panic and measures had to be taken quickly. It argues that the company government through the veterinary department carried out appropriate measures that were intended to contain and prevent the spread of trypanosomiasis. Company policies undermined the economic life of

the Africans as they were deprived of access to food, travel, trade and employment outside the province.

Incidents of trypanosomiasis led the colonial administration to formulate policies that could help contain the movement livestock diseases in the territory. However, due to the rising cases of trypanosomiasis, the Game and Tsetse Control Department was established in 1942. The department aimed at controlling and preserving the populations of game and the prevention of the spread of tsetse fly. During the Second World War trypanosomiasis control measures were hampered owing to limited resources to control the disease by the government, which were channeled to the war. It was not until 1945 that the administration became more concerned with the veterinary issues. Thus, the Northern Rhodesia Livestock Society was established. At the same time the Veterinary Department throughout the territory increased emphasis on control by using chemicals in the treatment of trypanosome infections.

Furthermore, the study has discussed a number of effects trypanosomiasis had on the people of Eastern Zambia. Trypanosomiasis has long been a major challenge to livestock and human health in Eastern province of Zambia. The effects of the disease on the rural economy and development in Eastern Province were diverse. The presence of tsetse flies meant the absence of livestock such as cattle. In addition, the people were forced to move from the fertile land due to fear of being infected with human trypanosomiasis and were forced to relocate and live in relatively smaller, infertile and unproductive areas.

The study has established that the colonial government in its quest to control the spread of the disease embarked on the use of chemotherapeutic drugs mainly by the Whites.

However, the invention of advanced and potent drugs later gave the colonial government a firmer command over the disease. These drugs became important to the Africans. Certainly they impacted on the cattle growth and development which increased towards the end of the colonial era. This study also shows that the introduction of chemotherapy in Northern Rhodesia added a great value to the control of trypanosomiasis. From 1967 to date, Berenil and Samorin® were used to control trypanosomiasis in Zambia. In addition **Dichlorodipheryl Trichloroethane (DDT)** aerial and ground spraying was used against ***G. morsitans*** on a large scale in Eastern Zambia. The use of these chemicals had severe side effects with deaths recorded amongst insectivorous birds, monkeys, squirrels, bats, fish and invertebrates. Thus by 1980s the application of these chemicals such as **DDT** was stopped.

Lastly this dissertation has demonstrated that the people of Eastern Zambia possessed traditional knowledge to control trypanosomiasis. The people transformed their environment to fit into the existing struggle against trypanosomiasis. They protected themselves from the disease by modifying the environment through their creativeness, resilience, and innovations. They relied on a whole range of indigenous methods to protect their animals from the disease. They employed various forms of adaptations and innovations in response to the challenges of trypanosomiasis outbreaks. The people remained reasonably self-sufficient and developed survival strategies to cope with trypanosomiasis outbreaks between 1908 and 1964. This study shows that the people of Eastern Zambia developed a number of traditional control measures in their effort to contain and control trypanosomiasis. They used a number of traditional survival strategies such as hunting game, use of herbs/charms, fire, burning cow dung and bush clearing and African repellents, which helped the Africans to survive in times of the disease.

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Dr. Mubamba, C: District Veterinary Officer: Department of Livestock and Fisheries, Petauke District, 12/10/2010.

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APPENDIX

Appendix 1a: Table Showing African Cattle Population in Northern Rhodesia 1927-1964

YEAR	POPULATION
1927	23,278
1937	34,363
1944	53,316
1945	58,343
1947	64,528
1950	82,755
1951	88,216
1952	98,024
1955	129,671
1956	141,520
1957	153,325
1958	168,833
1959	183,260
1960	193,737
1961	190,709
1962	184,835
1963	180,798
1964	173,807

Source: NRG, Department of Veterinary Services Annual Reports 1927 -1964

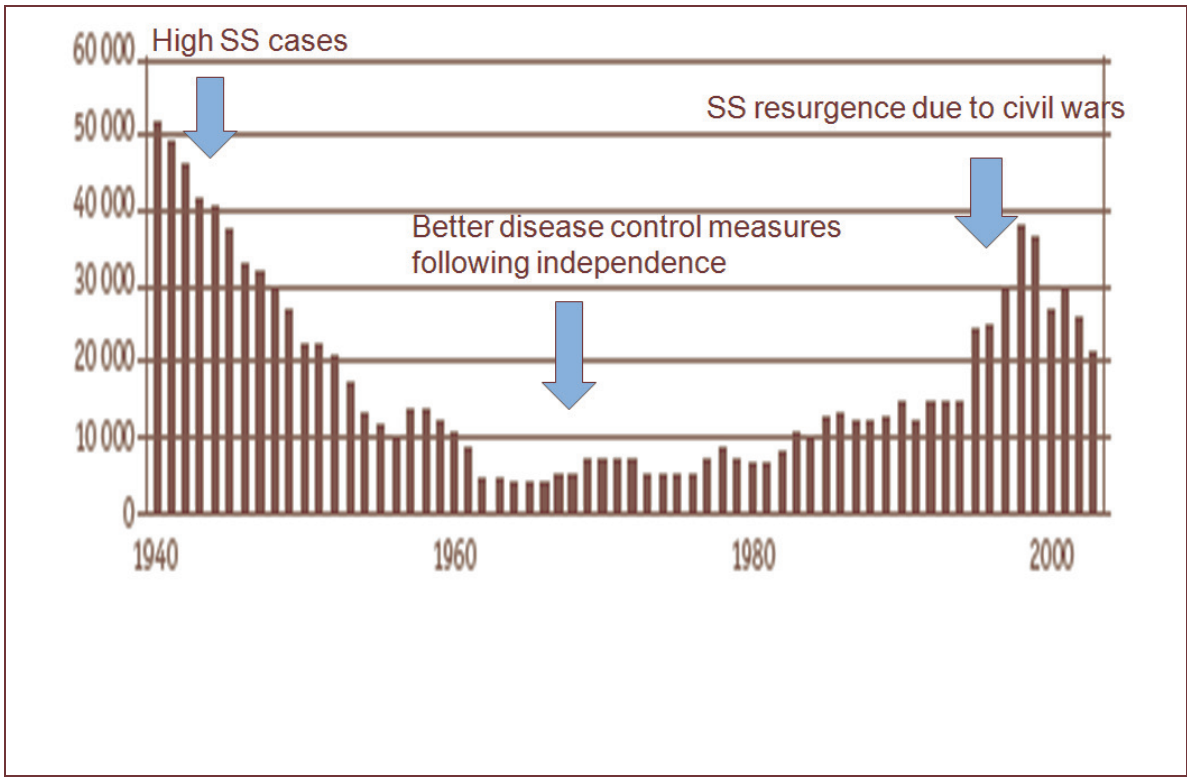
Appendix 1b: Cases of Human Trypanosomiasis in the Northern Rhodesia for the Years 1925-1973.

YEAR	Number of HAT cases in Zambia for the years 1925-1973
1925-1934	82
1935-1944	626
1945-1954	608
1955-1964	652
1965-1973	1604

Source: NRG, Department of Veterinary Services Annual Reports 1925 -1973

Appendix 2: Sleeping Sickness Cases in Africa.

Figure 2a



Source: World Health Organization. "Human African Trypanosomiasis (Sleeping Sickness): epidemiological update", Weekly Epidemiology Review, 2006, pp. 71-80.

Appendix 3: Pictures during the field trip in Eastern Province

Figure 3a: Cattle infected with Trypanosomiasis

Cow with animal sleeping sickness/*nagana*:Eastern Province

Thin/Loss of condition/Delibitated

Figure 3b: Pictures show demonstration of the tsetse fly trap, net and bush clearing.

Figure 3c: Picture showing tsetse control target