

LIVES AT RISK: A STUDY OF TSETSE FLY EFFECTS IN HURUNGWE DISTRICT, ZIMBABWE

BY

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To my sons, Nkosinathi and Luyanda Masuku, and to the people of Chundu Ward in Hurungwe This is for you!

Abstract

Tsetse is prevalent in Africa and continues to emerge, causing socio-economic problems associated with human and animal diseases. In Sub-Saharan Africa, it is estimated that 37 countries are host to the fly. While the biology of tsetse and mechanisms of disease transfer are widely understood, its social aspects remain poorly understood. For instance, it is not known who exactly is affected by the fly, how and why. Nor is it understood how people respond to this phenomenon which has a potential of constraining them. This study arises to investigate this matter. Its specific objectives are, firstly, to find out how different actors' interaction with the ecosystem in pursuit of livelihoods has affected their exposure to the fly and its diseases; secondly, to establish the livelihood effects of the tsetse fly and its diseases and thirdly, to find out how different actors/social groups understand and represent the fly.

In terms of methodology, the study predominantly employed a qualitative approach. The study interviewed local people on how they have been affected by the fly and their perceptions regarding tsetse prevalence and distribution. In addition, and in line with sound ethical practices, participatory research methods were adopted. These included focus group discussions (FGDs) and mapping to identify landscapes hosting tsetse and natural resources linked to livelihoods. The study also employed secondary sources, particularly to understand the history, ethnicity and culture of the people who live in Hurungwe's diseased landscapes. A limited survey, whose purpose was to get preliminary data on various aspects of tsetse and its diseases in the area, was also used.

In relation to the first objective, the main observation is that people's different strategies to satisfy livelihoods in specific areas and times create exposure to tsetse flies and disease. In relation to the second objective, the main observation is that tsetse does indeed affect people and this in different ways. Cattle owners, for instance, lose their livestock each time there is an outbreak, thereby affecting farming through loss of draught power. In terms of the third objective, the observation is that different social groups have varying perceptions on the prevalence and distribution of tsetse and its diseases. The perceptions seem to reflect underlying interests relating to land and livelihoods in a contested territory.

In conclusion, the study confirms that tsetse does indeed exist and that it constrains people's livelihoods. But the study also shows how people use human agency to overcome these constraints so as to continue with their livelihoods. It is this finding which is of interest to the study because it supports the theoretical understanding of man as an agent and not a passive actor left to die in marginal zones. Rather, man emerges as an active contestant, maneuvering their way through difficult circumstances, in some cases winning and in others losing. In terms of recommendations, the study suggests a targeted and inclusive approach that engages local people and other disciplines when dealing with the tsetse menace.

Acknowledgements

This thesis is about tsetse and livelihoods and for it to be completed, there were a number of critical actors who made it possible. And these are the people that I would like to acknowledge here. The actors mentioned here are those who directly and indirectly helped me in the various stages of the thesis, from planting the idea in my mind right up to its submission.

Although locally executed, this work was born out of ideas from a northern university Professor, Ian Scoones, with his team under the Dynamic Drivers of Disease in Africa Consortium (DDDAC), at the University of Edinburg. Prof Scoones shared his ideas with local researchers at the Centre for Applied Social Sciences (CASS), University of Zimbabwe (UZ). Then, I had just completed my MSc Social Ecology degree and was looking for opportunities to further my studies to Ph.D. level. Having done a dissertation on water-related issues for my MSc, I was naturally looking to further my studies in that area. Issues of tsetse and trypanosomiasis were far from my mind. In fact, I was under the impression that the tsetse fly and its diseases were things of the past in Zimbabwe. As I listened to the debates and evidence presented, my attitude changed to curiosity. This was when I became interested, seeing that the work was similar to what I had done for my MSc project in that it involved people and their quest to survive under difficult circumstances.

I saw in the proposed study, an opportunity to take a step further, the transactionalist thinking that I had been exposed to during my MSc studies. After several meetings with Professors Dzingirai and Scoones, I finally started the protracted but exciting journey of producing this work, with these two professors playing an important part in organising the initial thoughts. To Prof Dzingirai and Prof Scoones, I thank you for planting this seed in me and helping nurture it.

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The next stage was to produce a research proposal and this would not have been possible without the staff and students at CASS. To all academic staff at CASS, I thank you for your contributions. To the Chairman, Prof. Mukamuri, in particular, I thank you not only for all the valuable advice given during the presentations but also for agreeing to be my associate supervisor. The comments and the efforts were well appreciated. To Mrs Marere, your administrative support throughout the project was invaluable. I am also grateful to fellow students at CASS, who also commented on the various drafts of the proposal. To Owen Nyamwanza, thank you for enlightening me on relevant theoretical issues.

After the approval of the project proposal, the next stage was to take it to the field. This is where the bulk of the thesis was made and several people contributed to this. First of all, entry into Hurungwe and Chundu Ward, in particular, would not have been possible without the assistance of some key people who also became my gatekeepers. The first port of call was the District Administrator's (DA) Office, where permission was sought to conduct the study. The DA welcomed me to the District and took the liberty to introduce me to the traditional leadership of Chundu Ward at that time.

The support from the DA made it easy to enter the study site and also to approach the Hurungwe Rural District Council (HRDC), under which the study site falls. So to the DA, I say thank you very much. In the Ward, invaluable gratitude is given to the two chiefs that were in charge during the duration of the study. The Acting Chief was not only willing to facilitate my entry into the field, but he also gave me a lot of preliminary data relating to tsetse, sites and areas to focus on. Later, a substantive chief was appointed and he also gave tremendous support to the study. He not only welcomed me into his ward but also offered me accommodation at Chitindiva Primary School to make fieldwork and accessibility to homesteads easier. The accommodation was however not taken due to the prevailing political situation at the time. The chief also defended the undertaking of the study in the area at a time when senior politicians were totally suspicious about it. He encouraged the village heads and the community to open their homes to me. He also assisted with the identification of research assistants. Above all, he provided valuable information on tsetse and its diseases in the area, information that guided the study on which areas to target for various sampling exercises. For all this, I am very indebted to the two chiefs.

Still in the Ward, I would like to thank, Loice Chazungaira, Alois Dakura, Derryl Muputire, Arnold Binga, James Mushawemhuka and Chisauka Mavhaira, the research assistants in the study. For about three months, their days were characterised by going up and down the mountainous terrain of Chundu Ward, collecting survey data. Even with the bicycles that they were given to ease movement, this still seemed an arduous task. In addition, they were received with suspicion and/or impolitely dismissed in some of the targeted households but they endured. Most of all, I thank them for the valuable information on tsetse that they gave me during the data collection exercise. Some of this information gave some direction to the study.

Among the research assistants, there is one, Mr. Chisauka, who I continued to work with even after the survey. In fact, and in a way I had not envisaged, Mr. Chisauka ceased to be a mere research assistant after the survey and became more of a research colleague, one whom I could even bounce some ideas about fieldwork on, right up to the submission of the thesis.

I am deeply grateful to Mr. Chisauka for too many things, all of which I cannot mention here. As such, I will just mention a few. First of all, he introduced and facilitated my meetings with key people in the area. All I had to do was make a call and advise him of the date I will be visiting the area and the people I would like to interview. And on the day, I would, for sure, find all the arrangements for the interviews in place. His assistance made it easy to conduct mapping exercises, draw seasonal calendars and conduct focus group discussions in the area as planned. Secondly, Mr. Chisauka conducted and recorded most of the unstructured interviews for the study. Because these covered several villages, it meant that for about five months he had to maneuver the mountainous terrain of Chundu Ward on a daily basis to make sure that he reached every corner of the ward. Here, I must also commend him for his patience with the respondents, some who viewed him as an enemy while others accused him of political activity. Yet others were too old to understand the questions asked but he patiently explained these to them and managed to get the data required. Thirdly, because of his experience in the area, him being a village head, he was also useful for corroborating data collected through the various methods. Fourthly, I am grateful to Mr. Chisauka for his readiness to assist. He was always readily willing to come to Harare for workshops at short notice to represent the Chundu community. He was also always willing to meet me anywhere to provide any data that may be required, be it in Karoi or the famous 'Elephants Shops'. For that, I am deeply grateful. Lastly, thank you Mr. Chisauka for the settlement maps that you helped me draw and the notes on the settlement history and patterns that you provided. I acknowledge that in assisting me, Mr. Chisauka attracted a lot of hatred, jealousy and gossip from some sections of the community, a situation that put his life and that of his family at risk and for that, I am extremely grateful. Thank you, sabhuku.

Next, I would like to thank the main players in this study, the people of Chundu Ward. For, without them, this study would not have been possible. These people welcomed me into their homes. Sometimes I was offered food, drink and a comfortable place to sit, just to make the interview enjoyable. Obviously, these people had to forego their daily livelihood activities, be it farming, gardening or foraging, just to accommodate me and my questions. I remember a mapping exercise that was conducted in Kabidza while sitting on a rock on a sunny day. Despite the weather conditions, the men and women took time off their busy schedules to come and assist me. There was also a time when a workshop was conducted at Makuti Tsetse Control Offices, several kilometres away from the Ward. The participants were picked up from their homes as early as 5 am and returned late in the evening. I feel very humbled by this selfless support from the people of Chundu Ward. It also showed me that they had interest in the study and were as anxious as I was to find lasting solutions to the problem of tsetse and its diseases. I hope I do not disappoint them in this regard.

After the fieldwork and back at the UZ, I was assisted by several people to analyse and present the data collected. For this, I am grateful to Tariro Hove, Centre for Population Studies, for capturing and cleaning the questionnaire data as well as running some basic frequencies. I am also grateful Lillian Siziba for assisting me with advanced statistical analyses, indicating the limits of the data. Byron Zamasiya also gave me useful advice on analysis of data and presentation of charts/graphs. Without the assistance of these people, the thesis would have taken a lot longer to complete, given my limited knowledge in statistics and busy schedule at the UZ. Still on presentation of data, I would like to thank Jonathan Gava, who converted the spatial imaginations of the people of Chundu produced through social mapping exercises to come up with conventional geographical maps showing areas of resources and animal movements. For that, I am truly grateful. I would also like to thank the DDDAC members for their various contributions to the study. First, I would like to thank the entomologists from the Department of Trypanosomiasis and Tsetse Control (DTTC), Mr. William Shereni and Mr. Learnmore Nyakupinda. Secondly, I am grateful to the data provided by the geographers, Farai Matawa and Professor Murwira, including their maps indicating the changing tsetse habitat over time. To Farai, thank you also for the Chundu Ward map. Data from these two groups of specialists provided some scientific basis and legitimated some of the arguments given in this thesis. I would like to thank the Zambian team, led by Noreen Machila, whose data on the state of tsetse and diseases in Zambia was used to make sense of the situation across the Zambezi. To other members of the consortium, Sallome Bukachi, Anne Waldman, Neil Anderson, Mellisa Leach, Ian Scoones, Tom Winnebah, Anne Wilkinson and Bernard Brett, I thank you for exposing me to collaborative research and for sharing insights on how other zoonotic diseases such as Rift Valley Fever also affect specific livelihoods at specific times. Even if we were all in different countries, we managed to produce papers together, thanks to modern communication technology.

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A piece of work like this one usually has casualties. In the case of this thesis, it was my family. My sons, Nkosinathi and Luyanda, had to endure days and nights without me while I was either in the field or holed up somewhere trying to put this work together. But I am happy that they understood and even encouraged me to hold the fort, knowing very well that it was not only for my good but for theirs as well. I also spent less time with my parents because every moment counted for thesis production. I thank my mother for her silent faith in me. Unfortunately, she passed away before this work reached completion. May Her Dear Soul Rest In Peace. And to my father, CK, thank you for being there for me, always.

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Lastly, I thank Prof Dzingirai for his comments on my ideas, some which left me down, saddened and with no will to proceed. But even with these comments, he still steered me on with such comments as 'You have no choice but to finish'. I am also indebted to him for the long hours spent at CASS, trying to figure out how to handle some arguments or data presentation. Prof, I thank you for seeing this through with me, through thick and thin.

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List of Acronyms

AAT	African Animal Trypanosomiasis
AGRITEX	Agricultural Technical and Extension Services
CAMPFIRE	Communal Areas Management Programme for Indigenous Resources
CASS	Centre for Applied Social Sciences
CBNRM	Community Based Natural Resources Management
DA	District Administrator
DDDAC	Dynamic Drivers of Diseases in Africa Consortium
DDT	Dichloro Diphenyl Trichloroethane
DRSS	Department of Research and Specialist Services
DTTC	Department of Tsetse and Trypanosomiasis Control
EMA	Environmental Management Agency
ESAP	Economic Structural Adjustment Programme
FGDs	Focus Group Discussions
FTLRP	Fast Track Land Reform Programme
GIS	Geographic Information Systems
GoZ	Government of Zimbabwe
HAT	Human African Trypanosomiasis
HRDC	Hurungwe Rural District Council
Kariba REDD+	Kariba Project on Reducing Emissions from Deforestation and Forest Degradation
MDC	Movement for Democratic Change
NADA	Native Affairs Departmental Annual
n.d	not dated
PRA	Participatory Rural Appraisal
PV	Protected Villages
RLA	Rural Livelihoods Assessment (RLA)
RRA	Rapid Rural Appraisal
RTTCP	European Union funded Regional Tsetse and Trypanosomiasis Control Programme

SACEMA	South African Centre for Epidemiological Modelling and Analysis.
SPSS	Statistical package for Social Sciences
TTLs	Tribal Trust Lands (TTLs).
UZ	University of Zimbabwe
WHO	World Health Organisation
WINDFALL	Wildlife Industries New Development for All
ZANLA	Zimbabwe African National Liberation Army
ZANU (PF)	Zimbabwe African National Union (Patriotic Front)
ZAPU	Zimbabwe African People's Union
ZIMSTAT	Zimbabwe National Statistics
ZNA	Zimbabwe National Archives
ZIPRA	Zimbabwe People's Revolutionary Army

CHAPTER ONE

INTRODUCTION AND BACKGROUND TO THE STUDY

Introduction

Trypanosomiasis is a zoonotic infection transmitted by the tsetse fly¹ (*Glossina spp*) that affects both animals and humans. It causes Human African Trypanosomiasis (HAT), also commonly known as sleeping sickness, in humans and African Animal Trypanosomiasis (AAT) or nagana in animals, both of which are serious diseases that can lead to mortality if untreated. The fly is considered one of the major constraints to rural development in sub – Saharan Africa, mainly for two reasons. Firstly, it limits animal husbandry and, secondly, it affects crop production as livestock play an important role in providing draught power (Odeniran *et al.*, 2018; Shaw, 2004). In turn, these constraints generate considerable poverty and vulnerability to those communities located in concerned landscapes.

The fly infests about 10 million km^2 of very fertile land (Meyer *et al*, 2018:2), about a third of the continent, cutting across 37 countries stretching from Senegal in the north to South Africa in the south (Mattioli *et al.*, 2004:310). At least half of the populations in these countries suffer from food insecurity even though the infested areas are highly suitable for crop production (*ibid*).

Although considerable effort has been made to clear this menacing fly, it has always re-emerged, and all the time threatening rural livelihoods and causing alarm among communities in those infested landscapes. As regards human trypanosomiasis, Aksoy *et al.* (2017) have reported that between 1990 and 2015, there were over half a million cases of the disease in sub – Saharan Africa. Grady *et*

¹The term will be used concurrently with 'the fly' or simply 'tsetse'

al. (2011:2) also report that in 1995 alone, there were approximately 40 000 new cases documented in the affected African countries, although they also note that it was strongly believed that there were about 300, 000 to 500, 000 additional cases that were not reported or diagnosed, mainly because of poor surveillance. They further note that the cost of surveillance to cover at least 70% of the people at risk, without considering the cost of drugs to treat the cases, would be at US\$ 35 million a year, a figure out of reach for most African countries. The disease disproportionately affects communities mostly in remote rural areas where there are poor or non – existent health systems. In these areas, the severity of the disease is exacerbated by other socio-economic and ecological factors such as poverty, climate change, and political instability which inhibit the establishment of vibrant medical facilities (Aksoy *et al.*, 2017; Grady *et al.*, 2011). In the Democratic Republic of Congo, Angola and Sudan, for instance, wars and civil strife hampered tsetse control operations in the 1990s (Simarro *et al.*, 2008).

Similarly, animal trypanosomiasis has had a heavy impact on the sub – Saharan Africa's rural populations who make up about 85% of the population in the region (Mattioli *et al.*, 2004:310; Vreyson, 2006:4). Of these, at least 80% rely on agriculture for livelihoods and thus, require cattle for draught power (Grady *et al.*, 2011:2). Although attempts to quantify the wide-ranging effects of tsetse have proved to be futile, perhaps because of poor surveillance, it is estimated that three million cattle and other livestock succumb to the disease each year throughout the region while another 50 million face the risk of contracting the disease (Swallow, 2000:2). When quantified, direct (actual deaths) amount to 1.2 billion dollars a year while indirect losses, encompassing loss of potential benefits from farming, exceed this amount (Mattioli *et al.*, 2004: 310).

It is also estimated that African governments spend about US\$ 35 million per year on drugs to deal with the disease but despite this, livestock farmers still lose about three million cattle every year to tsetse fly (Vreysen, 2006:3), a situation that obviously comes with huge socio-economic losses at the community level. With such a scenario, it is no wonder that the highest proportion of people living in poverty in the world is found in Southern Africa, where hunger is also acute with 34% of its population believed to be malnourished (*ibid*). As noted by Karshima *et al.* (2016:2), 21 of the 37 countries endemic for trypanosomiasis are among the 25 poorest nations in Africa. Therefore, the presence of tsetse and the diseases it transmits can, no doubt, be considered as one of the root causes of hunger in Africa. For, it is no secret that hunger can be reduced through sustainable agricultural systems, of which livestock production plays an important role. Yet livestock in these areas is absent or under threat from the continued presence of the notorious tsetse fly.

In Zimbabwe, there are two tsetse species of the savanna group, out of the 31 species and sub – species found in Africa. These are the *glossina morsitans morsitans and glossina pallidipes* (Shereni *et al.*, 2016:1). They infest half of Zimbabwe's area below 1000m (about 200 000km²), where rural poor people are historically located. These areas are ecologically suitable for tsetse flies and, as such, historically unsuitable for livestock production (*ibid*). With donor support, some innovative initiatives have been undertaken to find ways of dealing with this menacing fly, although some experts have called for control methods that deal with host resistance rather than avoidance of the fly (Giblin, 1990). The initiatives have often involved the use of cutting edge technologies, all aimed at controlling or totally eradicating the fly (Scoones, 2016) in a supposedly awesome fashion. These have ranged from techniques aimed at eliminating food hosts for the fly (Gargallo, 2009; Mutwira, 1989) to chemical, nuclear and bait/trap technologies (Scoones,

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2016). The technologies have often seemed to work, but only for a while as the fly has always re-emerged.

Because it continues to exist, the fly affects people (Shereni *et al*, 2016; Dzingirai *et al*, 2016, 2017). In Zimbabwe, mini outbreaks have been common in the last decade (Shereni *et al.*, 2016). While it is known that people are affected, there is considerable lack of information on three issues. Firstly, it is not at all clear how exposure to diseases and fly comes about. Does it come from a pursuance of concrete livelihoods such as agriculture, hunting and foraging? If the mechanism of exposure is through livelihoods, then it opens up additional questions about who exactly gets exposed, where and when. As far as can be ascertained, there is no clarity on this matter with respect to Zimbabwe. Answers to these questions on situated practices are critical if policymakers are to come up with sustainable and effective disease control mechanisms.

Secondly, the effects of the fly and its diseases on people's livelihoods are not clear. There is evidence that they limit livestock production (Matemba *et al.*, 2010; Mattioli *et al.*, 2004) but such evidence, especially in the case of Zimbabwe, is scanty and not updated. Furthermore, it is not clear how the effect on livestock production affects crop production, although preliminary data exists showing how sleeping sickness affects labour availability. Furthermore, there is a very little understanding of how the disease and fly affect foraging and hunting which are complimentary livelihood strategies in most tsetse-infested areas. Thirdly, it is not known how people living in disease zones frame or develop narratives about the fly and its diseases. In this connection, it is not at all clear how these people perceive the fly and the diseases in terms of their prevalence, distribution and control. Preliminary data seems to show that local people have some knowledge of areas where the fly can be found and where the disease is prevalent (Dzingirai *et al.*, 2016). But such knowledge is fragmented, and its implications for policy hardly explored. These questions and others implied form the basis of this thesis. Below, the research problem is formally stated.

Research Problem

While it is known that the fly does exist and that it generally affects people, the situation regarding the mechanism and process of exposure, the precise effects on livelihoods, and the situated knowledge about the fly and its control are matters that remain poorly understood. This is what forms the basis of this thesis, which is based on Hurungwe - a tsetse infested district - as a case study.

Research Question

The study asks the pertinent question of who gets exposed to the tsetse fly and its diseases, how, when and where as well as how affected rural communities frame the fly/diseases. It is from this overlying question that the following objectives are derived.

Objectives of the study

The objectives of the study are to:

- a) find out how different actors' interaction with the ecosystem in pursuit of livelihoods has affected their exposure to the fly and its diseases
- b) establish the livelihood effects of the tsetse fly and its diseases and
- c) find out how different actors/social groups understand and represent the fly and diseases and how these different representations affect tsetse control efforts.

Justification

Sleeping sickness and animal trypanosomiasis have joined the growing number of neglected tropical diseases that continue to cause havoc to some populations in Africa, threatening their livelihoods and hence their survival. In most research that has been done, little attention has been given to the situated practices around tsetse, in particular how it affects communities and how those communities, in turn, frame it. This study is arising to fill this gap. It seeks to provide both scientists and policymakers with information on how tsetse fly comes to affect particular communities located in specific landscapes and at given times. Such situated knowledge is critical in particular because it makes it possible for policymakers to move away from a 'general risky area mentality' to crafting targeted and specific interventions which deal with the problem of the fly in a cost-effective way (Scoones, *et al.*, 2017; Leach *et al.*, 2017; Grady *et al.*, 2011:2).

Theoretical Perspective

The study is largely guided, theoretically, by what is now widely regarded as the transactional theory. The theory is adopted and used to profer a sociological explanation to human behaviour in risky environments. However, the study also acknowledges the need for another approach integrating an environmental and political understanding of environmental and livelihood related problems. Hence, the study also uses, although rather lightly, the political ecology approach to analyse and understand the underlying political, economic and social processes that have generated complications related to environment and livelihoods in Hurungwe. These two approaches complement each other in explaining the complex interaction among individuals, disease, livelihoods and the environment in the study area.

Turning to transactionalism, authors (e.g. Cheater, 1986) say that the theory is traced to dissidents of structural functionalism, which was dominant up to the 1950s and had been exemplified in the work of Parsons (1951) and Radcliffe Brown (1952) in sociology and social anthropology. Structural functionalism was fascinated with the power of structure and society over individuals. Transactional theory, which arguably drew from the Manchester School, presented a contrasting view of an individual, presenting him/her as being creative and resilient in the face of obstacles arising from particular political arenas within which they live (Ritzer & Stepnisky, 2014:126).

Central to transactional theory are five closely linked key aspects or tenets. The first is the stress on the individual or the 'need to acknowledge the place of the individual' (Barth, 1981:2), an aspect that has also been stressed by social exchange theorists. Here, the individual is depicted as a 'choice making, risk-

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taking' (Vincent, 1990:358) or 'goal pursuing' (Barth, 1981:2) individual, with own interests which include the need to survive, materially or otherwise (Homans, 1961). This need is presented as being so strong that even when the individual is faced with circumstances that constrain him, be they economic, political, environmental, social or cultural, they will find ways to negotiate through them so that they continue to survive (Ritzer & Stepnisky,2014). Thus, from this perspective, it is the individual and not culture, as stressed by structural functionalists, which should be seen as an agent of change (Erickson & Murphy, 2013:126). Individuals will use human agency, this being the various ways used by people to view and negotiate the myriad of circumstances they find themselves in, in order to overcome structural limitations (van Dijk *et al.*, 2007:1).

Thus people will always evoke their creativeness, inventiveness and reflexivity as well as the organisations and institutions around them to overcome any structures that constrain their efforts to survive on a daily basis. However, these same authors also show that this dominance by the individual over structure is limited as human agency will always take place within the context of structural formations. This thesis will, therefore, be seized with establishing the extent to which individuals are constrained by rules and institutions in their quest to survive in the diseased terrains of Hurungwe.

But in addition to the quest to survive, Cheater (1984), has included another interest, that of accumulation. Here, the individual is seen as an entrepreneur, seeking profit as he tries to maximise value (Barth, 1966). To this end, all the individual's relations and interactions will be transactional. In trying to maximize profits, the individual will engage in multiple transactions and also initiate new activities, making him innovative and profit-seeking (*ibid*). Obviously, as Barth

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(*ibid*) notes, there will be barriers but the individual will try to manoeuvre their way through these by designing new transactions that will circumvent the barriers (Homans, 1961; Blau, 1964).

For transactionalists, the focus for accumulation may vary but generally includes those goods which form the basis of what is referred to as wealth. Individuals may, thus, have interest in amassing wealth in the form of money or livestock and even people as asserted by Cheater (1984) on her writings on accumulation in an African setting. Even during the planning stage of this study, the mere thought of a valley associated with the risk of death and diseases made it clear that the study would profit from a theoretical perspective that looks at people as individuals with own interests than one privileging social structures. In short, it became clear that a fascination with agency would make a difference to the study. Perhaps the people of Hurungwe, have their own unique and complex set of interests driven not just by the will to survive in a risky environment but also to accumulate wealth.

The second key aspect of the transactional theory is its stress on strategy or what Bailey (1969) popularized as 'stratagems.' This involves the plots, schemes, games and manipulations, all being strategies that people will devise to make sure that they achieve their primary goal to survive and also secure their interests (*ibid*). Some of these strategies are normative, but as Bailey (*ibid*) and Cheater (1984) have pointed out, the rest are often pragmatic. In Idioms of Accumulation (1984), Cheater gives substance to this theoretical concept, pointing out that these are in fact rules designed to beat the system. Individuals wishing to accumulate wealth may, for instance, seek a license to exploit resources. But on the side-lines, they can also supplement this with poaching or unlicensed agriculture in forbidden places which are often beyond the effective reach of the state. In this study, it was puzzling how individuals and their groups in frontier zones went about accumulating wealth in contexts of control, surveillance and protection. Such incidents provided justification for the use of the transactional theory, particularly because of its focus on strategies.

The third key component of the transactional theory is that of competition. Transactionalists argue that there are many individuals/communities that are often located in landscapes of scarce resources (Barth, 1969: 19; Mills, 1956). As a result, these individuals/communities will often be locked in stiff competition, often followed by conflicts over resources or resource wars (Klare, 2002). This argument has also been put forward by Dzingirai and Madzudzo (1999) in Binga and Bulilimamangwe where they observed that there were conflicts over how land for farming and grazing should be used and by who. The resources over which conflicts and competition arise will vary. They may be material or they may be in form of power as demonstrated by the work of Boissevain (1964) and Nicholas (1968) on their works on political factions and micro-politics.

This study focused on multiple groups, or factions, co-existing in one socio-political arena. On the one hand, there are people who have been in the study area for a long time. On the other hand, there are migrants who are descending into the area, lured by the wilderness which they think hides enormous fertility. And to complicate it, there are squatters, those seeking a place to hide from the state. For this study, transactionalism, especially the version associated with Barth (1969, 1966, 1953; Leach, 1954) seemed to shed light on how these groups related to each other in landscapes of resource scarcity.

The fourth component of transactionalism is on the centrality of the state in local level processes. Bailey (1973) and Cheater (1984) argue that almost always,

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community and individual activities occur in state contexts. In this process described as 'encapsulation' by Bailey (1969:149), local intuitions are linked to the state, or embedded in the state which has its own agenda. It is the argument of transactionalists that to the individual and communities affected, encapsulation provides both constraints and opportunities. For example, thepresence of the state, on one hand, may deter pragmatic strategies of accumulation and survival. On the other hand, the presence of the state may provide opportunities, or resources, for social groups to wrestle power and other contestable resources from each other as shown by Dzingirai (1992).

Even during reconnaissance trips for this study, a heavy state presence was visible in Hurungwe in the form of council, state departments and local leadership. It became obvious that transactional theory would provide the best guidance in understanding the extent to which encapsulation limited attempts to accumulate. At the beginning of the study, it was expected or imagined that the Korekore would recruit the services of the state to disqualify migrants and squatters from settling in Hurungwe. But conversely, it was also imagined, that the migrants would also make use of the state and its various autonomous institutions to make permanent claims of citizenship. This, in short, is why the study found this theory to be potentially useful.

A final component of transactionalism and one that is linked to interests and competition is the use of narratives to make possible entitlements to resources. In his later works, Bailey (1983) draws attention to what he calls 'tactical uses of passion', a process where individuals 'cope by falsifying experience' (Bailey, 1983: 13) or use narratives to justify claims to certain resources. He posits that people will falsify information or adopt deception, saying one thing and yet doing

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something different, in order to cope with situations, achieve goals or gain power over their adversaries. He had, of course, touched on these issues twenty years before, in his Orissa works that formed the basis of Stratagems and Spoils (Bailey, 1969). Such individuals may present their opponents as a threat, as evil or as constituting a danger to society (*ibid*). Because this study involved deadly competition over patrimony, it was obvious from the start that it would be saturated with narratives of all sorts, all bent on one thing, this being a claim over resources. The study adopted transactionalism to understand various narratives employed by groups in their struggles over resources. This seizure with understanding narratives and people's delicate interactions with the environment influenced the adoption of a largely qualitative method of research.

The transactionalist theory is complemented, in the study, by the political ecology approach. This approach, which emerged as a reaction to the neglect of political dimensions in human/environment issues, concerns itself with costs and benefits associated with environmental change (Robbins, 2004; Bryant, 1992; Peet and Watts, 1996). Its major tenets are that a) environment – related changes do not affect society in a homogenous way but political, social, and economic differences account for uneven distribution of costs and benefits. In addition, political power will play an important role in generating such inequalities; b) this unequal environmental distribution will inevitably reinforce or reduce existing social and economic inequalities; c)the unequal distribution of costs and benefits and the reinforcement or reduction of pre-existing inequalities hold political implications related to altered power relationships. This approach is adopted to fill the gap arising from the observation that mainstream understanding of environmental change often gives no reference to political and economic processes. And yet, as observed by political ecologists, environmental problems can only be described within the context of political and economic processes that generate them (Peet & Watts, 1996). In a way, therefore, it stresses the importance of putting politics first (Bryant, 1991) in order to appreciate ways in which a status quo in some environmental situations is a product of political struggles and interests. For instance, issues relating to unequal power relations are seen as key in understanding human - environment interactions and the resultant environmental problems. Thus, the various forms in which actors seek to exert control over the environment and over each other and the way weaker actors manage to resist more powerful counterparts are pertinent issues in political ecology. For political ecologists, political power and power over natural resources is shifted from the poor and concentrated in the state and business (Peet & Watts, 1996). As a result, the poor are displaced and further marginalised as they are denied access to common natural resources and are forced to live and work in ecologically marginal landscapes.

It is assumed in this study that the problems related to tsetse and its diseases fall far from being just environmentally related. Rather, they are entrenched in years of political and economic developments that have been experienced in the country, at large and Hurungwe district, in particular, with the district itself being a highly politicised environment in which power relations play a central role.

To summarise, the scholarship in this study is situated in political ecology and transactionalism. For transactionalism, the main arguments are that: a) an indivividual needs to survive and accumulate material and non - material resources; b) an individual is always forming strategies on how to contend and

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contest with rules and/or practices that do not further these interests; c) an individual engages in competitive behaviour in order to survive; d) an individual engages the state in their battles to compete and survive and e) an individual deploys narratives and discourses to disqualify others with whom they are in competition over a scarce resource. The theory has, however, been criticised for downplaying constraints on individualism, be they cultural, historical or environmental (Hedican, 1986). But for this study, and as shall be argued in the last chapter, there is a sense in which it got mileage out of this flexible perspective. The study also invokes political ecology to explain the environmental inequalities associated with various political and economic developments and how these may have affected the communities' abilities to secure livelihoods as well as explain their responses and perceptions of the tsetse/disease situation.

The next section gives an outline of the chapters that make up this thesis.

Outline of Chapters

The thesis is organized into eight chapters, briefly outlined below.

Chapter One: Introduction

This chapter introduces the problem of tsetse in Africa and how it forms the basis of this study. It gives a brief outline of the socio-economic problems associated with trypanosomiasis from macro to micro level. It also provides the research question which is around mechanisms of exposure and situated impacts. Further, it presents the objectives and justification of the study. Beyond this, the chapter presents transactionalismand political ecology theory which form the theoretical basis of the study. Finally, a brief outline of each chapter in the thesis is given.

Chapter Two: A District of Layered Development

The chapter gives an outline of an area that has come to be called Hurungwe (or Urungwe as colonists carelessly called it. It documents a series of layered development initiatives, namely, the creation ofprotected areas, the construction of the Kariba Dam,commercial agriculture in Karoi, tsetse control programmes, war based villagisation, resettlement, CAMPFIRE and Kariba REDD. All these modernist initiatives were envisaged by the state, both colonial and postcolonial, to bring development to the district and its indigenous population. It shows that instead of doing this, the developments created landscapes of disease, thereby exposing rural people.

Chapter Three: Literature Review

This chapter situates the study within the literature on tsetse and livelihoods. Guided by the study objectives, the chapter starts by looking at the literature on the effects of tsetse and its diseases on livelihoods. It documents what scholars have said about tsetse and its diseases and how these affect various livelihood activities such as farming, livestock production and hunting. It also reviews the literature on livelihoods and exposure to diseases, that is, how communities living in tsetse zones expose themselves to trypanosomiasis as they go about their daily livelihood activities. Finally, it reviews what researchers have written on the perceptions and attitudes of the affected communities on causes, distribution and prevalence of tsetse and its diseases as well as control and prevention mechanisms. In reviewing the discourse on tsetse and its diseases, the chapter identifies gaps in the literature at the local and international level, which then form the basis of the objectives of this study as well as provide its justification.

Chapter Four: General Methodology

Chapter Four details the methodological background to the study. The chapter begins by distinguishing between the interpretive perspective, which emphasizes the role of the actor in research and positivism, which emphasizes scientific methods. It also outlines the mixed methods approach adopted in the study, which, owing to the theoretical stance of the thesis, is largely qualitative than quantitative. The use of this mixed method approach is deliberately adopted so that the various methods triangulate each other. To deal with ethical issues and motivate people in this hunting ground for anthropologists, the thesis adopts a design that is participatory. This was also designed to allow participants to feel as part of the study and not just as mere participants. The chapter then briefly discusses Chundu Ward in Hurungwe, this being the specific study area. This is followed by a presentation of the methods used in the study, giving a brief description of each method and how it was implemented triangulated. The chapter then presents a discussion of how ethical concerns were taken care of in the study. Lastly, it places the the study within the larger research project of which it was part.

Chapter Five: Lives at Risk: Tsetse and Livelihoods in Hurungwe

Chapter Five discusses the various livelihood activities undertaken by the villagers in the study area and how these expose the community to tsetse and its diseases. These include crop farming, cattle rearing, hunting and foraging, these being the most viable livelihoods in this terrain impoverished by development through some form of structural violence. The chapter concludes that it is not everyone who is exposed, as exposure will vary across social groups, space and time.

Chapter Six: Effects of Trypanosomiasis in Chundu Ward

This chapter provides evidence of how trypanosomiasis compromises the key pillars of livelihoods in Hurungwe. It looks at the main livelihood activities, namely farming, livestock production, foraging and hunting. Guided by the Sustainable Livelihoods Framework, it shows that these livelihoods fall far from being sustainable as their ability to reduce poverty, provide well - being, cope with shocks and sustain the natural base are questionable. It also shows how each of these livelihoods has been compromised by tsetse. For instance, farming is generally compromised by tsetse through loss of draught power while migrants are specifically affected as they confine their activities only to certain landscapes for fear of being bitten by the fly. In respect to livestock production, the chapter shows that livestock farmers have been the worst affected as they have lost livestock, with some losing entire herds over time to trypanosomiasis. On foraging, it details how families are deprived of forest products, especially during summer when food insecurity is high, as they fear to venture into tsetse infested zones where some forest products will still be available. The chapter further looks at the villagers' response strategies - that is, the various initiatives they have adopted to continue with their livelihoods in the face of the tsetse problem.

Chapter Seven: Social Groups and Perceptions

This chapter discusses three social groups in the study area, the originals, migrants and squatters and how these structure perceptions. It details the evolution of these groups. The original group - the one that considers itself as the owner of the land, is made up of people who moved into the area prior to and just immediately after independence. The second group is made up of people who migrated into the area, up to the mid – 1990s, mainly in search of land either due to resettlement or after being displaced by various development initiatives at

national and local level. The third group is commonly referred to as the squatters, mainly because they have settled in areas deemed illegal by the HRDC. The chapter discusses how each group frames the fly and related diseases. Its observation is that the frames/perceptions are a function of struggle over land and resources. The Chapter ends by showing how the social groups use the state in order to advance their interests.

Chapter Eight: Summary, Discussion, Theoretical Issues and Policy Implications

This last chapter concludes the thesis. Firstly and guided by the objectives, the chapter gives a summary and discussion of the research findings. It shows that people are exposed to disease and the fly as they embark on their livelihoods and that tsetse continues to affect livelihoods, especially, livestock and crop production which leaves people poor and vulnerable. Finally, it concludes that social groups have diverse perceptions of tsetse and its diseases and that these are a function of competition over natural resources.

The chapter then places these findings within the transactional and political ecology perspectives presented in the first chapter. In terms of political ecology, the study shows how people have borne the costs of various political and economic developments, leaving them in zones where they have no choice but to venture into tsetse infested valleys and forests secure livelihoods. Regarding to transactionalism, the chapter shows that individuals are perpetual livelihood seekers, engaging in various activities even in risky environments. They do this in order to survive and accumulate wealth which is translated into various social and political uses. In the case of Hurungwe, the study shows people gathering food in tsetse-infested patches. Further, the study shows that people do compete for natural resources, using the state and various narratives. In the study, it is shown
how some people in Hurungwe use various narratives and the fly as a symbol to make claims over land and natural resources eyed by other social groups including the state. In a way, therefore, the study confirms the ideas advanced by transactionalists over the last 100 years. Even with post-structuralist ideas that view the individual as being constrained equally by both structure and agency, the study shows that individual action and goals will still take precedence over structure in cases where personal survival is threatened. In fact, individual action may, in the long run, influence and change structure. The study also further elaborates recent observations by van Dijk *et al.* (2007) that agency does not always produce positive results but may create problems for those who engage in it.

The chapter ends by giving some recommendations for policy. The recommendations show the roles that must be played by all stakeholders in order to fight the tsetse menace and secure livelihoods in an way that does not destroy the environment. The study recommends that the community should cooperate and be involved with experts in tsetse control. The experts should also be willing to engage the community in tsetse control, give them ownership of control measures and tap into their indigenous knowledge. This will provide for targeted tsetse control operations, concentrating on those patches that are frequented by people for livelihoods. The state should provide resources, infrastructure and equal opportunities for all in the community, regardless of their background, to reduce poverty and subsequent need to venture into tsetse - infested zones to eke out a living.

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CHAPTER TWO

BACKGROUND TO THE STUDY: A JOURNEY THROUGH HURUNGWE

Introduction

The last chapter introduced the study, specifying the problems to be researched, namely, how people get exposed to the fly and its diseases on a daily basis, effects of this exposure on livelihoods and how the affected communities frame the fly and its diseases as well as the implications of these framings on policy.

In this chapter, the thesis provides the political ecological background of the study, through a discussion of various environmentally related developments that came with costs for local livelihoods. First, it gives a history of Hurungwe, the general study site, from around 1890. In this history, the study focuses on the establishment of the district and the colonial vision of the area, as one that could solve national problems resulting in the development and modernisation of indigenous populations. To achieve this, the settler government engaged in some initiatives that were to bring about the envisaged development. This chapter discusses such development initiatives, namely, the construction of Kariba Dam, commercialisation of agriculture, conservation of wildlife and forests, war based villagisation and the tsetse control programme. Also discussed are some postcolonial development initiatives that include resettlement, CAMPFIRE and Kariba REDD. The chapter shows that to the indigenous people of Hurungwe, these developments were often presented with the promise that they will bring modernisation and development to the area and country at large. But instead, they created two problems as will be demonstrated later in the chapter. Firstly, they extended the wilderness area in the district, allowing increased mobility of wildlife. With this came more tsetse and diseases associated with it. Secondly, the developments disenfranchised the indigenous populations from the resources that provided them with livelihoods, pushing them into those disease zones where they were not only exposed to diseases but had to adjust to new lifestyles.

The chapter is divided as follows. In the first section, it gives a brief history of the formation of the district. This is followed by a discussion of various disempowering and disease generating development initiatives that were adopted by the state. The last section concludes the chapter.

Hurungwe: A Background

Hurungwe District is located in Mashonaland West Province, about 240 km west of Harare. It was established in 1944 as Urungwe Province (Rutherford, 2001, 1997), inspired by the colonial government's need to find a suitable destination for European soldiers that would later retire from World War II (*ibid*). The district boasts of large reserves of forests and woodland totaling nearly 13, 140 ha (Dzingirai and Mangwanya, 2015) as well as wildlife that freely roams the protected and safari areas of Mana Pools National Park, Sapi and Chewore Safari Areas. It is these areas that have attracted investors interested in conservation projects, in both flora and fauna, to the area. Some wildlife may also be found within the communal areas. The district is unique in that it has all rural land use categories, namely communal, resettlement, small – and large - scale commercial land. It is administered by the HRDC, located in Magunje. Since its creation, the population has grown fourfold and today stands at 329 197, making the district the largest in the province (ZIMSTAT, 2013).

Hurungwe's Layered Developments

Soon after its establishment in the 1940s, the district was subjected to various development initiatives by the state (both colonial and post-colonial), non – governmental organisations and private companies. These state driven developments were in tune with the trend of the time to modernise what then were regarded as backward societies (Rutherford, 2001). It was also in tune with the mood of the time to use the colonies as sources of luxury and entertainment for the white settlers *(ibid)*. In the post-colonial era, the developments were meant to reverse the colonial inequalities between blacks and whites. These developments include the construction of Kariba Dam, commercialisation of agriculture, conservation of wildlife and forests, war based villagisation, tsetse control programme, resettlement, CAMPFIRE and Kariba REDD. In the sections that immediately follow, the sequenced development initiatives are discussed.

Establishment of Wildlife/ Protected Areas

The establishment of wildlife and protected areas goes back to the 1920s. From about 1923, the colonial government introduced legislative measures that essentially transformed the district into a massive hunting zone for the colonial elite (Mutwira, 1989). These measures were formalised in the 1930s with the land apportionment processes which allocated much of the land to wildlife. In Hurungwe, the main safari areas created were Chewore and Sapi in 1964 and Urungwe Safaris in 1976, (Dzingirai *et al.*, 2017). Other areas included Marongora, Mana Pools National Parks and Game Reserve, Rekometjie, and several others.

The creation of these wildlife areas came at a cost particularly to the local Korekore and other small ethnic groups located in the valley. To begin with, these new wildlife areas were at the time of designation being used as ahunting ground by the indigenous people claiming allegiance to Chimombe (Mangwanya and Dzingirai, in press). The second cost was more enduring and dramatic as the wildlife areas were created through displacement of communities. A good example of this displacement involves the Mana Pools. This was created through forced removal of local groups that dwelt and eked a living on and along the Zambezi River (Marowa, 2015). These people were initially moved to the present day Rekomitjie and later to the areas above the escarpment. Another example is Chewore Safari area which was inhabited by the Mbaira peoples, who were swept away, again to the frontier areas of Chundu Ward (White, 1971).

While the creation of wildlife areas served the whites well, giving them hunting and leisure spaces, the displacement and disenfranchisement from resources that underpinned local livelihoods had dramatic effects. Firstly, it created massive impoverishment because it took away locals' hunting rights by prohibiting entry into parks and extraction of flora or fauna, even if dead (Mutwira, 1989:259). Secondly, given that the wildlife areas were also targeted for tourism, they also resulted inlarge-scale forested areas which attracted both wildlife and tsetse fly (*ibid*:260).

Construction of Kariba Dam

The second development initiative to affect the people of Hurungwe was the construction of the Kariba Dam which began around 1956. The construction of the dam was funded by the World Bank and other local financiers (Mhlanga, 2009). The development involved the construction of a wall around the dam and installation of some turbines that would produce electricity for the country (Hughes, 2006a). It was triggered by the need to modernise energy sources for the country and also by the need to provide some form of what Hughes (2006b: 825) regards as 'unspoilt nature' or watery wilderness and a shoreline for the enjoyment and leisure of the neo-Europeans. The dam and its surrounding leisure areas covered approximately 5, 277 square kilometres (Hughes, 2006a).

The dam came at a massive cost to local people. Firstly it displaced about 57 000 people, mostly Tonga and Korekore and relocated them to other districts (Dzingirai *et al.*, 2017; Marowa, 2015; Mhlanga, 2009). Of these, 3000 households ended in areas of Hurungwe above the escarpment where colonial officials had used bribery in the form of free chartered flights to convince the traditional leadership that the areas aerially shown were suitable for settlement (Chakawa, 2015). Soon after these flights, people were bundled into trucks and dumped in the forests,which were to become their new homes (*ibid*). Among the chieftainships that were moved to Hurungwe and subsequently reshuffled were Dandawa, Mudzimu, Nyamhunga, Chundu and Matawu (White, 1971). Chief Chundu, whose chieftaincy constitutes the study area of this thesis, was moved to his current location in 1959 (Chakawa, 2015).

The areas to which the people were forcibly relocated were far from what was depicted. It turned out that the areas were dry, and not suitable for agriculture (Marowa,2015:126).Previously, and on the banks of the Zambezi River, the people

had enjoyed riverain agriculture as well as fishing (Mhlanga, 2009). This was no longer possible in these areas of aridity and uncertainty.

Secondly, the new areas that they were dumped in were tsetse infested in contrast to the area in the valley (Marowa 2015: 54). Moreover, the creation of the greater Kariba area created a suitable habitat for tsetse fly. Thus, although the dam benefited the colonial economy through the supply of electricity and tourist destinations for colonial elites, it did not benefit local people. If anything, it introduced the potential of more flies and disease.

Creation of Karoi Farms

Another alienating development for the people of Hurungwe came in the 1930s, with the Land Apportionment Act which reinforced previous laws like the Native Reserve Order in Council of 1898 (Poulton *et al.*, 2002:26). The 1898 Order had seen the creation of reserves for settlement by the native populations only and the 1930 legislation formalized this land segregation between blacks and whites (*ibid*). To the indigenous population, the laws were presented as something that would protect their identity and prevent their extinction or as Ford (1979: 344) puts it, 'protect Africans from the predatory acquisitiveness of white Rhodesians'. But as it later emerged, most of the prime land was set aside for commercial farming, such that75% of the economically productive land belonged to 3% of the population while 23% of land, mostly barren, was shared by 97% of the population in native reserves including Hurungwe (Ford, 1979: 343). Thus, very little land was left for the locals and as Ford (*ibid*: 350) recalls, that land was 'virtually useless.'

From 1940, the colonial government started demarcating land for the creation of Karoi Farms, a commercial farming entity designed to accommodate British ex-World War II soldiers (Rutherford, 1997). These farms specialised in the production of tobacco, maize and cotton. The creation of the farms came with a promise of the benefits of modernization, arising from the employment of locals that was to accompany the establishment of these farms. But all that this development achieved was a disenfranchisement of people. Firstly, the farms were created out of the expropriation of tribal lands, some of which belonged to the people of Hurungwe. As noted by Rutherford (1997:12), 4 600 indigenous people were moved from land designated for this purpose. These people were subsequently grouped into reserves which later formed a greater part of Urungwe.

The creation of the farms and general commercialisation of agriculture came with some notable consequences. Firstly, it heightened landlessness among the people of Hurungwe. Without land, the tribal population was reduced to a labour force for the Karoi Farms (Rutherford, 1997). And as Rutherford (*ibid*: 119 – 122) further notes, the farm workers in Hurungwe faced some of the worst conditions of service in the country. Secondly, it brought people closer to tsetse fly. This is because the colonial government re-ordered settlement of displaced people in ways that constituted a tsetse fly buffer for white people (Mavhunga and Spierenburg, 2007). The new villages would, thus, bear the brunt of tsetse attacks, thereby protecting settler farmers and their livestock. So for the Hurungwe population, this was yet another alienating development that left them poorer and exposed to tsetse flies.But to turn to yet another development programme.

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War-based Villagisation

This was another development to occur in the district. The development came as a result of the war of liberation. The war against colonial rule was waged by the military wings of the Zimbabwe African National Union (ZANU) and Zimbabwe African People's Union (ZAPU), namely the Zimbabwe African National Liberation Army (ZANLA) and Zimbabwe People's Revolutionary Army (ZIPRA) forces. The guerillas relied on the villagers for material supplies, food and information on the activities of the Rhodesian soldiers. As a counterinsurgency strategy, the Rhodesian government introduced villagisation to suffocate this flow of communication and food between the villagers and guerillas (Marowa, 2015: 172). The villages were popularly known as 'keeps' or protected villages (PVs) (Chakawa, 2015: 184), a concept insinuating that the state was protecting people from guerrillas. In Hurungwe, the state was anxious to stop insurgency by the ZANLA forces so it pushed some families that had settled in the war-torn frontier areas back into the settled villages located around Chitindiva Business Centre (Dzingirai and Mangwanya, 2015). It also established shanty settlements, known as 'tangwenas' on the outskirts of Karoi Town to accommodate the people displaced by the war (Chakawa, 2015: 184). Chief Chundu and his spirit medium, Mubaiwa, were alsotaken by the District Commissioner to a PV near Karoi town, ostensibly for their safety from guerrillas (ibid: 200).

The villagisation process was traumatic. To begin with, villagers lost their property. This included their livestock which was abandoned or in some cases shot and killed to provide meat for the soldiers (Hove, 2012: 198). Moreover, villagers' granaries were burnt and defoliants used to destroy their crops in the fields. The new villages were not what the people had been promised to be. In these PVs, people were crowded and mobility was controlled to minimise contact with the

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guerrillas (*ibid*). In addition, there were no proper ablution facilities, giving rise to disease. Without food, the villagers also had to endure hunger in the new villages. So, clearly, the war based villagisation had impoverishing consequences.

Moreover, the villagisation process had consequences on land tenure. It created landlessness as Hurungwe people were forced to leave their customary lands on the periphery of the state to give way to the war effort. The situation of landlessness continued and became worse after the war when migrants from other parts of the country targeted these formerly settled homelands. The frontier areas of Kabidza which were abandoned in the war were to become new homes for migrants,mainly from Masvingo. Lastly, forced villagisation had consequences on the fly. To begin with, it enlarged the zones for tsetse. This is because the areas previously settled experienced re-growth in vegetation and this encouraged a return of tsetse fly. The emergence of the fly was also encouraged by the suspension of control activities necessitated by the war (GoZ, 1998:3).

So in conclusion and contrary to what was promised, war based villagisation brought more challenges for the people of Hurungwe. The challenges were in the area of poverty and continued tsetse presence. But to turn to the related development initiative of tsetse control.

Tsetse Control Initiatives

The history of tsetse control in the district, like in the rest of the country, dates back to the early 1900s. Initially, the fly was wiped out naturally by the Rinderpest Panzootic in 1896 which destroyed its food hosts, including the buffalo, kudu, eland, bushbuck, warthog and bush pig populations (Gargallo, 2009). But within a short time, these food hosts recovered and so did the fly. Concerted efforts by the colonial government to eradicate the fly began around 1919 with some drastic measures, some very destructive to the environment (Scoones, 2016). The measures came in various forms and phases, often overlapping but each with its own targets, advantages and disadvantages.

The first phase started with what Scoones (2016: 60) refers to as the 'scorched earth policies'. These involved extensive bush clearance and destruction of wildlife (Scoones, 2016; Gargallo, 2009; Lovemore, 1994; Ford, 1979). Slaughter teams, or '*Magocha*' as they were locally called in Hurungwe (Marowa, 2015:133), comprised mostly of experienced local hunters led by a white supervisor (Mutwira, 1989:260). Within four years, the areas between Shangani and Gwaai Rivers had been cleared of tsetse through this method (McGregor, 2009). It was then extended to the southern belt, with Hurungwe joining the programme in the late 1920s.

After a slump occasioned by the First World War, control efforts intensified in the inter-war period when outbreaks affected the communal areas in the west, north and east of Karoi and the newly developed Karoi Commercial Farming area (Lovemore, 1994). The control operation now led by the Department of Tsetse and Trypanosomiasis Control (DTTC), battered the fly, nearly defeating it and as one report described it, the fly in the areas around Karoi Farms had 'either been eradicated or reduced to the vanishing point.'²

Although some local people welcomed the campaign, in part because it removed what they felt was a menace, the majority felt hard done by it. To begin with, it destroyed the economy that had supported the local people, mainly the Korekore.

²Report by JK Chorley (Chief Entomologist, Division of Entomology) for the year ending 31 December, 1945. www.sacema.org/uploads/tsetse/tsetse-project-project-annual-report-1945.pdf

This is not an exaggeration because modest estimations say about 750 000 animals (Ford, 1979:322) were killed between 1932 and 1961, alarming even environmentalists (Gargallo, 2009). Local people were, thus, left all the more vulnerable to hunger by this development.

Another control method adopted by the colonial government was villagisation. This tsetse control operation was disastrous to local people as it uprooted them from the so-called risky places, which in fact were their traditional homes. Further, it transplanted them in unfamiliar places where it was difficult to make a living and where they were to live in compacted villages. Whole lineages that were moved from Mana Pools and Rekomichi were settled in areas above the escarpment where, as shown before, agriculture was difficult and where survival was only possible through an intensified exploitation of nature. In other instances, they were deliberately relocated to tsetse intense zones so that they could clear the land for agriculture and settlement, thereby destroying the thick vegetation that housed the fly. As explained by officials from the Department of Research and Specialist Services (DRSS) in a letter to the Secretary of the Trypanosomiasis Committee,

If the land is suitable, the villager will clear the bush and plant crops, cut wood for fuel and burn thicket for grazing, he will harry game and his goats, (and later cattle) will continue to hold down the thicket. In this way, an area free of tsetse has been established.³

³Quoted from an article entitled 'An Examination of the Nature of the Returns from Tsetse Control Hunting in Zimbabwe in 1919 through 1958 by Graham Child and Thane Riney. <u>www.sacema.org</u>/tsetse-archives

So this deliberate creation of villages in tsetse-infested zones exposed the local people and their livestock to tsetse and disease while protecting settler interests.

Fencing is another tsetse control measure introduced by the colonial government. Through this method, the government erected game fences with fly belts at strategic points, after a law was passed to empower the government to control traffic leaving fly areas.⁴ These fences prevented wildlife from invading and importing disease into settled areas, commercial farms and communal areas.Fences restricted movement of people and whenthe nationalist war emerged in the 1970s, people became openly hostile to game fences and seized the moment to vandalise those fences around them.⁵ And during this time tsetse control operations became difficult to maintain and the tsetse belt started expanding again. It was during this period that aerial spraying emerged to complement control operations organised around game fences. In this chemical revolution, the colonial government used organochlorines, DDT and dieldrin to control the fly (Scoones, 2016).

While the chemical revolution was successful such that by 1975, the countrywide tsetse situation was said to be satisfactory, the use of DDT affected people. In Hurungwe, it killed birds, insects, worms and other creatures that had survived the game slaughters and which were central to livelihoods (Wilson, 1972). The Korekore were alarmed and were joined by environmentalists, who wanted to see an end to this form of control (Gargallo, 2009). The people were only saved by the worsening war situation which made Hurungwe and the Zambezi Valley, a battleground

⁴Undated report titled 'Tsetse Fly: Traffic Control' by Rupert W Jack, Chief Entomologist <u>www.sacema.org</u>/tsetse-archives

⁵Report prepared by Boyt, 20 July, 1978 titled Trypanosomiasis: the need to modify the approach to the control of nagana in the face of changed political and security situation. www.sacema.org/uploads/tsetse/TGI/tsetse-general-17.pdf

pitting guerrilla forces against the settler army, and thus halted the tsetse control operations.⁶ But the reprieve meant, rather cruelly, that tsetse was the victor, putting back the country's war against tsetse fly by 20 years⁶. By independence in 1980, the fly had encroached into the previously cleared areas (Lovemore, 1994).

At independence, then, Hurungwe was a diseased or broken region⁷, where the new class of civil servants would not want to operate in⁸. The tsetse limit line had extended beyond the 1945 limit, covering more settled areas (Figure 2.1).



Fig 2.1 Tsetse Boundary Limits (Scoones et al., 2017)

⁶Dr Bill Boyt, Chief Veterinary Officer (Trypanosomiasis) quoted in The Herald of 3 March, 1977 <u>www.sacema.org</u>/tsetse-archives

⁷Annual Report, 1984-1985, Department of Tsetse and Trypanosomiasis Con trol <u>www.sacema.org</u>/tsetse-archives

⁸ A Review of Tsetse and Trypanosome Control in North and North Eastern Zimbabwe, 1980-1998. www.sacema.org/uploads/tsetse/tsetse-project-reprint-1457.pdf.

And perhaps in a bid to improve the lives of a lot of practitioners in the district, thegovernment resumed tsetse control throughout the northern belt. The new government immediately adopted a progressive eradication policy using a variety of methods which included ground and aerial spraying and odour baited insecticide-treated target system (Torr *et al.*, 2005). Ultimately, it was through the European Union-funded Regional Tsetse and Trypanosomiasis Control Programme (RTTCP) that tsetse was almost eliminated (Lovemore, 1994).

While there is no doubt that the operations reduced the tsetse menace, local people were done by this operation. As part of the control operation, people were forbidden from keeping cattle, which measure created poverty among them. And because the people could not transform it, Hurungwe became much wooded than other parts of the country, attracting wildlife which not only raided crops that people grew but also re-introduced disease. Donors were tired and abandoned tsetse control in the district around 1998-1999 (Scoones, 2016:65). But there was a renewed interest again and discussions about the use of nuclear technology to obliterate tsetse were in the air (*ibid*). So various tsetse control programmes have come and gone and there is not one that has successfully dealt with the problem except to worsen the situation of the local people. But to move on to another development, land resettlement.

Land Resettlement

The land resettlement programme came in two phases, formal settlement and the accelerated resettlement phase that became known popularly as '*jambanja*' (Cliffe *et al.*, 2011:907).

Formal resettlement

As indicated above, the lull in tsetse outbreaks due to the intensive tsetse control programmes led to yet another alienating development for the Hurungwe populations. This was the land resettlement programme which saw the post-colonial state shuffling large numbers of people mostly from overpopulated districts of Zimbabwe into planned villages (Chimhowu, 2002; Chimhowu and Hulme, 2006).

This development was instigated by the postcolonial government in a bid to balance some racial inequalities arising from the colonial era. Palmer (1971) documents how discriminatory laws during the colonial era saw the white minority occupying about 40% of the prime agricultural land in the country while about seven million communal farmers shared only 42% of marginal unproductive land in the Tribal Trust Lands (TTLs). Because of this, the communal areas became so crowded that by 1980 they carried two and a half times more farming units than its capacity (Riddell, 1980:3). It was because of these land imbalances, together with the abject poverty that existed in rural areas that made land redistribution a priority in the post-colonial government.

Thus, at independence, the new government planned and executed a land resettlement programme whereby land was purchased from white commercial farmers on a willing buyer – willing seller basis. The acquired land was then redistributed to selected poor households (GoZ, 1988). Although resettlement was a

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good development in itself, it benefitted some people but created problems for others. In Hurungwe, two wards, Nyamakate and Nyangau, were targeted for this programme. Yet there were households that were already settled in these areas. The setting aside of land for resettlement meant that these households had to relocate to make way for this development. So in the end, these households had to be displaced to make way for the planned resettlement. It was because of this short-sightedness on the part of the state that over 2000 families were displaced from Nyamakate (Chimhowu, n.d).

The scheme also created problems for those already settled in Chundu Ward. To these indigenous populations, the resettlement programme was presented as a tool to help fight tsetse through the destruction of the thick forests that provided suitable habitat for the fly. It was also argued that the newcomers would bring new farming and modern ways of living to the district. However, in the end, there were more newcomers than envisaged and the locals found themselves losing vast tracks of land to the settlers, including some land which they had set aside for inheritance by their children and grandchildren. They also lost forests which not only supported livelihoods through foraging but were also considered to be highly sacred (Dzingirai and Mangwanya, 2015).

While one arm of government was busy planning organised resettlement in communal lands, another, mainly the local traditional authority was also busy encouraging informal settlement which did not involve acost to the state (Chimhou, n.d.). Although some migrants carved land for themselves, chiefs were also on standby to provide places where homes and fields, locally known as 'makombo', could be marked (Chimhowu and Hulme, 2006:9). There are reports that some of the traditional leadership benefitted from land transactions, some selling it and others demanding gifts as a condition of settlement. It was through this method

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thatthe frontier areas, like Kabidza, and Mahwau in Chundu Ward came to be settled (Chimhowu, n.d.).

So in the end, the resettlement programme alienated the locals from their land and resources. But it also brought people, particularly those displaced, into closer contact with the fly as the more than 2000 people who were displaced by the planned resettlement went into the areas of Kabidza and Mahwau, where tsetse remains a problem to this day (Chimhowu, n.d).

Fast Track Land Reform Programme

The second form of resettlement programme, the Fast Track Land Reform Programme (FTLRP) started in 1999. Popularly referred to as '*jambanja*' this was an accelerated land reform programme, whereby government forcefully took over white-owned farms. On the surface, the main aim of the FTLRP was to indigenise the commercial farming sector, which was still in the hands of a few white farmers (Moyo, 2004). But in reality, they were being punished for supporting the newly formed Movement for Democratic Change, which was fast gaining support against the ruling ZANU (PF) party (Dzingirai and Mangwanya, 2015).

The programme saw war veterans, accompanied by thousands of villagers, violently occupying white-owned farms. Those farmers that resisted occupation were victimized, beaten up and in some instances, killed (Moyo, 2004). Although the idea behind the initiative was to settle landless black peasants on grabbed land, the programme created yet another problem. It displaced farm workers, whose future, it seems, was never considered during the orchestration of the exercise. Mashonaland West, where Hurungwe lies, had the highest number of gazetted farms (1489), employing over 10 000 workers and all these were displaced, with

only 2% being absorbed by the new resettlement scheme(*ibid:* 19). The rest found themselves stranded, with nowhere to go.

In order to hide away from the war veterans, the majority of the farm workers sought refuge in surrounding communal areas (Moyo, 2004). They settled themselves in those areas referred to by Scott (1998: 40 - 41) as 'non - state' places, these being areas so remote that even the state cannot reach. The same period also saw some political refugees moving into the district after having been chased away from their homes where they were believed to be members of the political parties campaigning to take over the ruling ZANU - PF party in the run-up to the 2000 elections (Dzingirai and Mangwanya, 2015). The economic meltdown that followed, peaking during the hyperinflationary period of 2008, resulted in further settlements by desperate migrants, eager to eke out a living through farming in the fertile zones of the district. For the original settlers of Hurungwe, this meant that they had to lose more land to the newcomers. For the displaced newcomers, this meant that they had to settle on the margins of the districts where there was still some land. But because they did not have many resources, they had to survive on illegal hunting and foraging in tsetse-infested areas (Dzingirai et al., 2017). Later they hooked on to agriculture, producing the lucrative tobacco crop, and to access land for this they had to venture into the untouched but tsetse infested landscapes that stretch into the Zambezi Valley.

Communal Areas Management Programme for Indigenous Resources (CAMPFIRE)

CAMPFIRE was yet another development initiative in the area. With most of the district cleared of tsetse, the HRDC took advantage of the abundant forests and wildlife to make revenue for itself. It latched on to the Community Based Natural Resources Management (CBNRM) development programmes that were trending in the late 1980s to early 1990s (Ngwerume & Muchemwa, 2011). In Zimbabwe,

CBNRM initiatives had started in 1978 with the introduction of the Wildlife Industries New Development for All (WINDFALL), a programme through which local communities were to benefit from elephant culling operations (Murombedzi, 1994:52). The programme, however, failed due to a complex bureaucratic system that led to delays in the disbursement of funds to communities, coupled with a lack of local participation in decision making and absence of wildlife ownership by the community (Martin, 1986:10-11).

In the late 1980s, CBNRM initiatives were resuscitated through the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE). The programme was introduced in Hurungwe and other wildlife-rich districts in Zimbabwe. Besides being an income generating project for the local councils, the programme was also inspired by the post-colonial government's concern over the killing of wildlife by communities living outside game parks (Bird and Metcalfe, 1996). The killing of wildlife was a way of protest against colonial conservation policies that created game parks, which not only displaced communities but also cheated them of their livelihoods as they were not allowed access to forest products in these protected areas (Mangwanya and Dzingirai, in press). Furthermore, the wildlife was notorious for destroying crops, livestock and terrorising the people (Bird and Metcalfe, 1996). So wildlife was considered a pest and it had to go. The decimation of wildlife continued after independence as people took advantage of a relaxed monitoring system (ibid). So in a bid to find ways of conserving wildlife without displacing people, and with support from international conservationists, philanthropists and western donors, the government introduced this communitybased wildlife management programme.

The programme was set to benefit the local population through utilization of wildlife (Murombedzi, 1994). Benefits were to include monetary dividends for individual households and community developments such as boreholes and clinics (Ngwerume and Muchemwa, 2011). To the locals, the project was presented as a commercial initiative, which would benefit them both at household and community level. But in a sad turn of events, the HRDC started to rezone the district in an effort to enhance the project, creating buffer zones where people were already settled, as was the case in Chundu Ward. Those falling in the east of the buffer zone were, henceforth, defined as 'squatters' and instructed to vacate (Bird and Metcalfe, 1996). Since then, the HRDC has been engaged in legal battles with the settlers in a bid to remove them. For instance, in 1997 the villagers were served with eviction orders. About 71 families, who had been declared squatters had their homes burnt after which they were loaded into homes and taken to an area just outside Karoi (Chimhowu, n.d). But some heeded the call and had taken refuge in the nearby villages, only to resurface when the dust had settled and opened up new areas of settlement in the frontier (*ibid*). This legal battle has been going on for a long time, with the latest eviction letters having been issued in August 2015 (Mangirazi, 2015). However, in these subsequent cases, the villagers were allowed to stay after intervention by human rights lawyers.

So from the onset, CAMPFIRE displaced the locals from their land, alienating them from their resources and livelihoods. In addition, the promised dividends were short lived. Table 2.1, below, shows the income realised by the district from the programme. It is from these figures that some revenue was paid to individual households.

Table 2.1 Hurungwe Rural District (HRDC) CAMPFIRE Revenue, 1992-

<u>1999</u>

YEAR	INCOME (for entire	INCOME (for
	Hurungwe District)	Chundu Ward)
1992	464 427 (84 730)	231349 (38 791)
1993	480 503 (69 638)	188 007 (27 248)
1994	679 524 (80 896)	137 239 (16 338)
1995	664 496 (71 451)	207 929 (22 358)
1996	623 365 (57 719)	202 278 (18 729)
1997	604 866 (50 829)	185 292 (15 571)
1998	1 740 945 (44 620)	337 332 (8 808)
1999	2 099 129 (43 561)	503 344 (10 443)
TOTAL	7 357 246 (503 444)	1 974 770 (158
		286)

Source: Hurungwe Rural District Council CAMPFIRE Reports (US\$ equivalent in brackets)

In Chundu Ward, for example, these were paid only twice to individual households in 1991 (not captured) and 1992 (Ngwerume and Muchemwa, 2011). Thereafter, funds were diverted to communal projects such as boreholes, construction of clinics, schools and roads (*ibid*), even though this also eventually stopped. In diverting or retaining the funds, the HRDC, faced with pressures to finance its operations and pay salaries, cited various legislations and policies that gave it the mandate to do so, especially those provisions that empowered it to use the funds for administrative and management purposes (Dzingirai *et al.*, 2019). So the programme ceased to provide an alternative source of income for the individual households.

Furthermore, stray animals became a cause of concern as they encroached into settlements and destroyed crops and no compensation was proffered to the affected communities (Mhlanga, 2009). The outcomes of CAMPFIRE were, therefore, far from what the locals envisaged or were promised. Besides being rendered homeless by the project, they found themselves restricted from accessing land and forest resources around which most of their livelihoods were organised.

The conservation project also had consequences for tsetse. To begin with, it allowed the movement from protected areas into the villages, bringing with it, tsetse and trypanosomiasis (Mangwanya *et al.*, 2016). Secondly, it encouraged wilderness places, for purposes of trophy hunting. These, in turn, attracted wildlife, and with it, the tsetse fly (*ibid*).

Kariba Carbon REDD Project

The last and more recent development was the introduction of the Kariba Carbon REDD Project. The project, sponsored by Carbon Green and a consortium of former white commercial farmers and sport hunters who lost their farms through the fast track land reform programme, seeks to generate revenue through carbon credits over a period of 30 years (Dzingirai and Mangwanya, 2015). The company is based in the United Kingdom, with a presence in Harare, where the main representative is a retired police officer, deliberately chosen to assist in controlling people. The project promises to create value from protecting forests by minimising deforestation and degradation and then selling carbon credits through international offset schemes, raising about \$50 million (Kapfumvuti, 2014). The benefits are to be shared among various actors that include the community (30%); HRDC, (30%);

leaseholders, 10%; and the balance to the investors (Dzingirai and Mangwanya, 2015).

Besides the main monetary benefits, the communities are expected to benefit from livelihood enhancing projects such as bee-keeping, plantation of woodlots and wildlife utilisation.⁹ But as previous development initiatives, the project has generated considerable disappointment from the local population even before reaching its full implementation (Kapfumvuti, 2014). For instance, it has not been clear how the communities will share the benefits arising from the project. It is also not clear where the communities will get the markets for their products, such as honey, and the skills to undertake the various projects. Above all, the project is seen as limiting access to arable land for agriculture as well as restricting access to forest products (*ibid*). While all these are fears, the project has already failed to appeal to communities through a monopoly of revenue. To date, the communities have not received direct payment for the sale of carbon, although the local authority says that it invests revenue in rural development (Dzingirai*et al.*, 2019).

Furthermore, the project has expanded forest areas. Now, according to project reports, the communities are more forested than ever before⁹. The thick forests have in turn restructured the mobility of wildlife, centering it towards settled areas. This combination of thick forests and wildlife has provided suitable habitat for the fly and as the project grows it is likely that the tsetse menace will grow with it.

⁹See Project Monitoring and Implementation Report, pg. 6. <u>www.v-c-s.org/wp-</u>content/uploads/2016/10/CCB_IMP_REP_902_28SEP2016.pdf

Clearly, all the developments presented here served only to advance the interests of powerful players, be it the state, commercial farmers or safari operators while robbing the local community of their livelihoods and pushing them into tsetse zones. In a way, the chapter demonstrates a major point raised by political ecologists that costs and benefits associated with environmental change will vary along social, economic and political lines. For the developments brought no benefits but only costs to the community, costs that further entrenched the existing inequalities between the coloniser and colonised, in pre-colonial Zimbabwe and the rich and poor in post-colonial Zimbabwe.

Chapter Summary

Clearly, Hurungwe District has been characterized by some layered developments that have had an effect on its present state. The development initiatives did not live up to their expectations of developing and modernising the people of Hurungwe but have, instead, pushed them into poverty, a poverty which motivates them to develop strategies for survival linked to the environment. The developments have also created a rich habitat that supports not just wildlife, but tsetse. The district, thus, holds a vulnerable population that has been pushed to the margins by structural political and economic factors over time. And in order to survive, the communities have been left with no choice but to venture into certain zones, infested with tsetse and wildlife, in order to sustain their livelihoods. In the end, there has emerged a vicious cycle where the activities of the community drive tsetse prevalence and incidence while at the same time the mere presence of the fly restricts livelihoods. This study, therefore, concerns itself with all these three things, - tsetse, people and wildlife and how these interact with each other across time and scale.

CHAPTER THREE A REVIEW OF LITERATURE

Introduction

The tsetse fly has been around for over a hundred years now. Because of this, much literature has been produced and public debates undertaken as various authors, academics, public sector officials and non – governmental organizations all get seized with this insect, considered in many policy documents as a menace. Many scholars have written about various aspects of the fly, including its origins and distribution (Spinnage, 2012; Ford, 1979), epidemiology (van de Boscshe *et al.*, 2010; Brun et *al.*, 2010) and history of control measures (Scoones, 2016). This chapter looks at what various authors have written about the effects of the fly atcommunity level, mechanisms of exposure as well as the attitudes and perceptions of communities living within tsetse fly zones. In the end, it attempts to identify gaps in this literature, which gaps then justify the execution of this study.

Effects of the Tsetse Fly and its Diseases

There are two competing narratives on the effects of the tsetse fly, the poverty narrative and the protectionist/socio-ecological narrative. As described by Grant *et al.* (2015), the first views tsetse as a major threat to livelihoods of rural communities living in tsetse belts. The second, the protectionist narrative, antithetically views the fly as playing a functional and supportive role to people and their livelihoods. From the perspective of the latter narrative, the fly is considered far from being a menace, but a resource, protecting local interests, both social and ecological (*ibid*). This view is also dominant among ecologists.

The effects of the fly are presented here in the context of these two narratives, starting with the poverty narrative. It must be noted that in general, more literature concentrates on the effects of animal trypanosomiasis than sleeping sickness. This could be because, over the years, cases of sleeping sickness have been reduced to a mere minimum in most affected countries or as some authors have noted, there could be underreporting (Lutumba *et al.*, 2005; Fevre *et al.*, 2008a; Sindato *et al.*, 2008), immunity by local communities (Black *et al.*, 2001; Ford, 1979) or misdiagnosis (Katsidzira and Fana, 2010; Odiit *et al.*, 2005). The next section details the effects of the tsetse fly and its diseases from the viewpoint of the poverty narrative.

Poverty Narrative

The narrative, supported mainly by non – governmental organisations, farmers and some sectors of government, posits that the fly is at the heart of poverty. It places emphasis on livestock and its role in the rural economy. From this perspective, trypanosomiasis has a direct impact on livestock productivity and livestock management as well as indirect impacts on crop agriculture and human welfare (Swallow, 2000). The loss of cattle is seen as creating poverty and that, as this poverty increases, livestock numbers are further diminished (Grant *et al.*, 2015). Thus, loss of cattle to trypanosomiasis is seen as a major driver of poverty in rural areas. Advocates of this narrative, therefore, believe that it is in the interests of rural communities to clear the land of tsetse so that they can expand areas of crop farming and cattle rearing (*ibid*). This argument is not new as Richard Burton, as far back as 1860, after recognising the threat posed by the fly on humans and domestic animals, envisaged a day when an insect-eating bird would exterminate the fly thereby making it 'the greatest benefactor that central Africa ever knew' (Burton, 1960, quoted in Spinnage, 2012: 856). The effects of the fly on various rural livelihoods are discussed below.

Livestock as Assets

Loss of livestock as assets is one of the negative effects of tsetse highlighted by the writers under the poverty narrative. According to Thornton (2010), keeping livestock is a major risk reduction strategy for vulnerable rural communities in Africa. So important are cattle that farmers invest proceeds from farming, trading and remittances in them (Feldmann *et al.*, 2005; 2001; Scoones, 1992). In Zimbabwe, Dzingirai (2004) also documents a complex reciprocal process where cattle are used as a form of investment/saving. In this case, he shows cattle owners offering draught power and cattle products to those without, the understanding being that the recipients will reciprocate one way or the other in future. Livestock has also been shown to mitigate the effects of crop failure (Welburn *et al.*, 2006). And as Swallow (2000) has shown, crop failure is a common feature in Southern Africa because of frequent droughts, thus making it essential to invest any proceeds from good harvests in other assets.

Scholars have shown that tsetse threatens this investment in cattle as assets. For example, Spinnage (2012), using the case of Uganda, documents how in 1921, 150 cattle were introduced in the shores of Lakes Edward and George but by 1923, they had all succumbed to trypanosomiasis. Under such circumstances, it, therefore, becomes futile to invest in cattle. Swallow (2000), further notes that so strong is the impact of the disease that most farmers are reluctant to invest in large numbers of cattle for fear of having them all wiped out by tsetse diseases. For Swallow, trypanosomiasis directly affects livestock farming in hot spot areas in two ways. Firstly, it limits viable production of livestock. Evidence to support this observation comes from a study carried out in the tsetse-infested moist sub-humid regions of Nigeria where Hursey and Slingenbergh (n.d) found that cattle were virtually absent in the region. This was despite a high population density and crop production in this area. In his other work, Swallow (2000) provides further evidence for this point. He shows that the number of livestock held by farmers in the Central River Division of the Gambia varied according to whether they lived in low, medium, or high trypanosomiasis risk areas. The average herd size was lowest in high-risk areas, twice as high in medium risk areas and four times as high in low-risk areas. Also in a similar study in the same country, Doran and van den Bossche (1999) found an average of 49 cattle per owner in tsetse-free zones compared to 32.4 cattle per owner in tsetse-infested areas. The conclusion in both studies was that tsetse, at the very least, constrains production of cattle in particular landscapes.

The second point Swallow (2000) makes is that tsetse limits the range of cattle that farmers can keep. In many instances, they are forced to keep only those breeds that are resistant to tsetse. Evidence for this comes from Ethiopia, where Rickwood (2001) notes that the Surma Tribe in Omo Valley depends on poor breeds of cattle that have become resistant to trypanosomiasis in tsetse-infested regions. As he further notes, farmers have been forced to keep large numbers of drought-resistant zebus, when in fact they prefer small and manageable herds of cross breeds.

Kamuanga *et al.* (1999) also support this observation that tsetse constrains livestock production. They show how tsetse caused a high livestock mortality of 63% in Burkina Faso in 1993/1994. The mortality only reduced to 7% in 1996/1997 after trypanosomiasis control was introduced.

In Zimbabwe, authors have also shown the fly to be a menace to livestock production dating back to pre-colonial times. Ford (1979) shows how, in early

Rhodesia, tsetse affected not only the poor indigenous population but also the white commercial farmers. Cripwell¹⁰ and Cockbill¹¹ have also documented that the same disease caused heavy stock losses in the then Rhodesia, leading the government to evacuate people or destroy infected cattle. This caused serious losses to farmers despite being granted compensation by the state¹⁰. Additional evidence on tsetse impacts comes from Masona (1987). He shows how animal trypanosomiasis affected the cattle industry in pre-independence Zimbabwe, reducing the habitable area from 153 247 square miles to 144 800 square miles. This also reduced the area of one beast from 65 to 53 acres, thereby affecting the number of cattle that farmers could keep. In Omay Communal Lands, Murombedzi (1994) observed that domestic stock consisted only of goats and sheep. Those who had cattle had to send them to tsetse-free areas for safe keeping. Nyambara (1999) also documents how trypanosomiasis in Munyati, a frontier area to the Zambezi Valley, affected cattle in the 1980s to a point where 15 – 20 cattle deaths were recorded every month.

Livestock also has socio-economic functions. It gives social status to its owners as it is widely considered a form of wealth (Bettencourt *et al.*, 2015). Having a large herd of cattle, for instance, commands respect, status and power in most rural settings. It also forms a crucial part of bridewealth in African societies. Lack of it, therefore, puts prospective grooms in a difficult position. In Zimbabwe, for instance, Nyambara (1999) has shown how tsetse flies prohibited people in Gokwe district from keeping cattle, depriving families of the asset required for bride price. He notes that because of lack of cattle, there arose a practice referred to as

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http://www.sacema.org/uploads/tsetse/TG1/tsetse-general-45.pdf
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¹⁰See Cripwell, A. (1952) 'Statement made at Hurungwe Reserve on Sunday, August 10th 1952 by Provincial Native Commissioner on Government Policy in Regard to Trypanosomiasis and Evacuation of Cattle'

¹¹ See Cockbill G. F. The Control of Tsetse and Trypanosomiasis in Relation to Wildlife in Rhodesia. Departmental Presentation to the Commission of Enquiry. www.sacema.org/uploads/tsetse/TGI/tsetse-general-39.pdf

'kutemaugariri', (Mabeza, 2015: 91) where a prospective son - in - law has to live with his bride's family for a period that could last, in some cases, up to 15 years. During that period, the son in law did menial tasks like working in the fields as a form of bride price payment.

Livestock has also been shown to play an important cultural role in rural communities. They are often used in traditional ceremonies, such as the installation of ancestral spirits and can be given as sacrifices during rituals (Bettencourt *et al.*, 2015). In a way, therefore, they also strengthen social networks among rural communities.

Thus from the poverty perspective, tsetse deprives people, especially rural communities of the various benefits of livestock. It is a menace that should be removed for rural livelihoods to prosper and reproduce themselves. The next section considers the effects of trypanosomiasis on crop production.

Crop Production

Those who advance the argument that tsetse is risky also, logically, extend their views to small-scale crop production, where trypanosomiasis is seen as presenting the most indirect impact (Swallow, 2000). As Welburn *et al.* (2006) note from work in West Africa, farming in rural areas is heavily reliant on cattle through theprovision of draught power. Okello *et al.* (2015) further note that animal traction is important in rural areas mainly because of its cost-effectiveness and labour saving for the small-scale and subsistence farmers who have little or no access to mechanization. Grady *et al.* (2011) agree with this, noting that, without the provision of draught power, the amount of land tilled will be greatly reduced and so will be the yield. Thus, draught power enables farmers not only to expand the area

under cultivation but also to increase yields of existing crops and better still grow a different mix (Randela, 2003; Adenisa, 1992; Francis *et al.*, 1999; Shumba, 1984).

Furthermore, Shumba (1984) notes that most rural communities rely heavily on rain-fed agriculture and that timing is very important if one is to get high yields. Failure to access draught power on time can, therefore, reduce yields. As he noted in his study in some communal areas of Zimbabwe, delays in planting could result in yield losses of up to 1-3% per day. Murindagomo (1997), working in the Zambezi Valley, also agrees with this observation, noting that in the Sebungwe region, availability of draught power and timeous planting more than doubled the amount of cotton crop planted, a crop attractive to the state and entrepreneurs but nevertheless detested by spirit mediums who connect it to ecological changes.

For these scholars, tsetse is dangerous. This is because when a beast is affected by trypanosomiasis, it loses weight, becomes progressively weak and unproductive and eventually dies if left untreated (Oyda & Hailu, 2018; Oluwafemi, 2008). An infected beast, therefore, becomes economically useless to the farmer, who then has to contend with a reduced plot, using manual labour or hiring draught power/tractor. For many in rural areas, hiring draught power is beyond reach. A tractor would even cost more. As Okello *et al.* (2015) found out in their study carried out in Tororo District in Uganda, hiring oxen costs US\$ 19/acre, while a tractor and manual labour cost US\$36/acre and US\$14/acre, respectively. While manual labour seemed the cheapest option for the poor, they found that it had a low daily output and would end up being more costly in the long run (*ibid*). The best option for rural farmers is draught power and failure to gain easy access to it obviously limits the amount of land farmed for many poor households. From the foregoing, it is clear that reduced farmland leads to reduced yields and eventually, food security is threatened within the rural community. Poverty then becomes rife.

This argument is also made by Steinfield (1998) in the Zambezi Valley of Zimbabwe where he related the size of cattle holdings to maize area and maize yields to farms in semi-arid and sub-humid zones of Zimbabwe. He found a strong relationship between cattle holdings and maize area and between cattle holdings and yields, giving clear evidence of the importance of livestock ownership and access in crop production. His point is that tsetse limited land-holding and production. In Gokwe, another partly tsetse-infested area, Nyambara (1999) found out that villagers did not have sufficient draft power due to the tsetse menace, which prohibited the keeping of cattle in the area. Villagers ended up using manual labour, drawing from own families and the as yet unmonetised Shangwe communities (James, 2008), which was not very efficient. The villagers were also not able to hire oxen/tractors because of the high expense involved. Hiring a herd, for instance, cost between Z\$500 to Z\$1 500 for a herd and this was beyond the reach of many at that time. A similar observation was made by Murombedzi (1994) who noted that for many years up to the mid-1970s, the tsetse menace prohibited the displaced people of Omay Communal Lands from keeping cattle. The failure to access draft power led the villagers to use manual labour for tilling theland, resulting in food shortages especially among villagers without off-farm income.

Kristjanson *et al.* (2004) have further demonstrated the role of unproductive land and loss of livestock in reducing income and generating poverty in their study of tsetse affected communities in Kenya's Western and Nyanza Provinces. Their results revealed that 38% of the households studied admitted that they were not making use of their land which they attributed to theloss of livestock through the tsetse fly. In their conclusion, they indicated that poverty could be reduced by improving the agricultural capability of the community. This could only be achieved through effective control of AAT and the tsetse fly (*ibid*). The negative impact of trypanosomiasis to farming is also demonstrated by Hursey and Slingenburgh (n.d) who, using data on Togo from FAO, showed that while the number of cattle increased with the amount of land under cultivation, the relationship between cropping and cattle became weaker with increased exposure to trypanosomiasis. Another study which was done in the Ghibe Valley of Ethiopia in 1995 (Swallow, 2000) echoes these results. The results of the study showed that households within the tsetse control area that did not own oxen were only able to cultivate up to a hectare of land using either other types of animals like donkeys or their neighbour's animals. Even the efficiency of the oxen was found to vary according to thearea, with those in high-risk tsetse areas being found to be 38% less efficient than oxen in low-risk areas.

The conclusion from all these studies is that trypanosomiasis, in the context of limited mechanization, constrains crop production. And because of this, some societal ills such as child labour, human slavery, polygamy and child marriage have become common as households try to maximise yields from farming. In the Zambezi Valley, for example, Reynolds (1991) documents how children in the Nyaminyami District were forced to work in plots, especially during peak farming periods, not only because of some forms of socialization that still prevail in the area but also because draught power is almost non – existent in the area. During these periods, children could contribute up to 81% of their labour to farm activities. Ford (1979) also shows that the decimation of livestock by tsetse resulted in precolonial states taking forced labour to clear land for farming.

Furthermore, it is not only dry land farming that has been affected by the tsetse fly. Scholars have also shown that loss of livestock also affects small-scale gardening as farmers use cattle manure in place of fertilizer for the health of their crops. The gardens are essential in supplementing the diet of rural populations in times when

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field crops would have run out. In parts of the Midlands Province, for instance, Drinkwater (1991) found that communal farmers depended heavily on cattle manure for the health of their crops. Elite farmers with cattle could manure up to 0.4 hectares of their land annually while those without had to resort to using fertilizers, and only if they could afford them. Generally, farmers preferred manure to fertilizers which they believed lasted more than one season in the soil compared to fertilizer that could be easily washed away (*ibid*). Manure was also believed to improve the soil nutrition and retain moisture, thus producing healthier vegetables than fertilizers.

Lastly, authors have shown that tsetse infestations can cause people to abandon their homes and farming activities. Cases of forced relocation abound. In Ethiopia, Rickwood (2001) shows how some districts such as Cheha that once flourished with agriculture in the late 1980s were deserted by the turn of the century due to tsetse. He further notes that only 10% of rural districts that used to produce different fruits, coffee and cereal crops were still active with the rest having fallen to tsetse.

From the foregoing, it is clear that crop production, mediated by cattle, is threatened by tsetse through loss of draught power. This is made worse by the fact that small-scale farming is often precarious as it faces numerous risks arising from pests and disease outbreaks, changing weather patterns and unstable markets among others (Harvey *et al.*, 2014). The next section considers the effects of tsetse and its diseases on household labour.

Household Labour

Sleeping sickness compromises household labour (Lutumba *et al.*, 2005; Fevre *et al.*, 2008a; 2008b). Authors have been seized with trying to understand the true burden of the disease at thehousehold level. As Lutumba *et al.* (2005) have noted, studying specific local situations is pertinent because the effects of sleeping sickness are not only confined to the person infected by the disease but also places a burden on the entire household of the sick individual.

Some authors have shown that a person infected with sleeping sickness can barely do any work (Fevre *et al.*, 2008a). They show that when infected, an individual develops a fever, severe headaches, irritability, fatigue, swollen lymph nodes, aching muscles and joints and may die if untreated (Hide, 1999; Fevre *et al.*, 2008a). With such symptoms, a human being cannot go about their daily activities and will thus require care. Furthermore, Fevre *et al.* (2008b) have noted that the disease normally affects economically active adults, between the ages of 20 and 29 years, as they are the ones that are likely to venture into tsetse areas in search of livelihoods. Their sickness, therefore, affects the wellbeing of the households that are dependent on them.

The cost of the disease to households is also demonstrated by Matemba *et al.* (2010) whose study in Tanzania revealed that sleeping sickness patients stayed an average of 25 days in hospital at a total cost of \$US 143 per patient. In addition to this, were costs for indirect expenditure on travel, meals and accommodation incurred during the 25 - day period. Additional productive time was lost by those taking care of the sick as sleeping sickness patients require assistance with almost all their daily activities. Similarly, in the Democratic Republic of Congo, it was revealed that the burden of the disease to households was equivalent to five month's salary for average cases while the more serious cases spent up to ten
month's salary on patients with HAT (Lutumba*et al.*, 2005). In the Nari Province of Congo (Brazzaville), Gouteux (1987) estimated the cost of sleeping sickness per household to be \$US 100. All these authors have also shown that although treatment of sleeping sickness is almost free in most countries, rural populations often fail to pay the minimum charge for treatment, which in some cases may be as little as US\$0, 50 (Matemba *et al.*, 2010; Lutumba *et al.*, 2005). Tong *et al.* (2011), in their study on the challenges of controlling sleeping sickness in the Democratic Republic of Congo, have also noted that people sometimes do not seek medical attention for the disease because they deem the medical personnel in health centres around them as incompetent. Still in other areas, as documented by Kaona *et al.* (1991), sleeping sickness is associated with witchcraft and as such, some people will seek traditional healers to remedy the situation.

Researchers also converge on the point that the burden of sleeping sickness is even more for households if the sick person is the breadwinner as the other members will have to work harder to make up for the lost finances. This is the case in Zimbabwe's Zambezi Valley, where, because of migration by men out of the Valley, women have become breadwinners. Furthermore, the burden of taking care of the sick falls disproportionately on women, most of whom are not only breadwinners but are also already responsible for other domestic chores (Reynolds, 1991) Children, too, who constitute critical labour in homesteads are also affected as demonstrated by the work done in the Zambezi Valley by Reynolds (*ibid*).

Studies have also shown that the burden of sleeping sickness on livelihoods is worsened by the fact that once diagnosed of the disease, patients take several months, sometimes up to six, to recover (Lutumba *et al.*, 2005; Swallow, 2000). The disease, which affects the central nervous system, often renders the sufferers weak and unproductive, leading to loss of income. In other cases, authors have shown

that patients may develop long-term or permanent complications related to treatment (Matemba *et al.*, 2010; Robays *et al.*, 2004). The authors note that this may be one of the main reasons why patients never report cases or report them late. But a delayed presentation of the sickness to a health facility also comes with serious consequences for the patients as they may fail to get completely cured or may develop complications associated with drugs (Matemba *et al.*, 2010; Lutumba *et al.*, 2005). Thus sleeping sickness not only debilitates rural households through loss of labour but also diminishes household savings.

So in essence, human trypanosomiasis has been seen as crippling to farming, which is the backbone of rural livelihoods. Without farming, most rural households cannot sustain themselves. They become poorer. In the next section, the effects of trypanosomiasis on food security are discussed.

Food Security

Scholars have also shown how livestock underpins the health of rural communities through the provision of nutritional benefits to human diet in the form of meat and milk (Shaw, 2004; Rickwood, 2001). Rural communities, like any other, require a balanced diet that includes proteins, among other nutrients. Milk is one of the main sources of protein in rural areas as it is readily available to those who own cattle. Occasionally, farmers also slaughter cattle and goats for meat to supplement their protein diets. But in tsetse-infested areas authors have demonstrated that access to this essential dietary component may be compromised.

Researchers have shown that animal diseases, such as nagana, limit the availability of protein as it reduces calving rates, meat and milk yields. According to Shaw (2004), livestock in areas affected by trypanosomiasis experience a 6 - 10 percentage point higher annual calf mortality, a 6-19 percent point lower calving

rate and a 20% decrease in milk yield. The point on the reduction of milk yields is taken further by Rickwood (2001) who has shown that mixed breeds which unfortunately cannot survive in tsetse zones can produce up to 10 litres of milk per day compared to the zebus, famed for their tsetse resistance, that can produce about 1 - 3 litres per day. Similarly, Kristjanson *et al.* (1999) studied the meat and milk off-take in tsetse-free and tsetse-infested areas. Their results showed that tsetse-free areas produced 83% more milk and 97% more meat per unit land than tsetse-infested areas.

Reduced milk yields will obviously have negative impacts on the nutrition of communities residing in the disease areas as their protein intake is greatly reduced. As far back as 1948, Tothill noted that trypanosomiasis was once so severe in Bahr el Ghazal and Equatorial Districts of Sudan to the extent that it caused serious protein deficiency in the population. Years later, Rickwood (2001) showed that the diet of the Surma in Ethiopia, a tribe that heavily depends on cattle as their diet is composed mainly of milk and blood, was greatly threatened by the presence of tsetse in the area.

Writers on the Zambezi Valley have also shown high levels of malnutrition in this area that has been home to disease and forced movements (Reynolds, 1991). Between 2012 and 2013, some districts in the Valley had the highest prevalence of acute malnutrition of 5.3%¹². For a household that is affected by malnutrition, this comes with a lot of stigma and loss of esteem. So tsetse and its diseases do not only affect food security but also the positioning of affected households on the social structure.

¹²Zimbabwe Vulnerability Assessment Committee, Report, 2013. www.fnc.org.zw/media-publications.html

Besides high levels of malnutrition, the Valley has the highest levels of infant and maternal mortality rates, making it one of the most deprived communities in Zimbabwe (Mavhura et al., 2015). This malnutrition is also worsened by the fact that people in the frontier zones where tsetse occurs are not permitted to exploit wildlife, an alternative source of protein (Gandiwa, 2011). When they do, they are deemed illegal hunters and persecuted by the state (Dzingirai, 2003; Metcalfe, 1994). To justify the positive effects that tsetse eradication has on food security, authors draw on the case of Zanzibar, a region where the war against tsetse has been successfully won. Rickwood (2001), for example, notes that farmers can now keep mixed breeds and goats instead of just the tsetse resistant zebu. He adds that with the eradication of tsetse, milk from both cows and goats became abundant as the value of livestock production almost trebled. Children, in particular, benefitted from the protein source as women started goat keeping projects, funded by non governmental organizations, a development that was not possible when tsetse proliferated. These benefits of tsetse control to food security are echoed by Kamuanga et al. (1999) who note that in the Yale Province of Burkina Faso, tsetse control operations increased milk yields from 0.2 to 2.2 litres/cow per day and herd size from 0.1 to 1.1 per household.

The effects highlighted above therefore all point to the disruptive nature of trypanosomiasis, which is why tsetse qualifies as a 'poverty fly'. Control, or better still, total eradication of the diseases is seen from this perspective as an ideal solution as this will allow rural communities to continue with their livelihoods. From this perspective, this will improve human and livestock health, allow diversified agricultural systems, increase food production and security and in the long run improve livelihoods and sustainable use of natural resources. Poverty will, thus, be a thing of the past in these communities. The next section looks at the arguments from the scholars that support the continued presence of tsetse.

Protectionist/Socio-Ecological Narrative

Despite the widespread view that tsetse and its diseases cause poverty, there are some writers who say that the tsetse fly and its related diseases can be a resource to some communities. By this, they mean that for these communities, the fly presents opportunities that relate to their livelihoods and also protects their interests. Firstly, there are writers who show the tsetse fly and its diseases as shielding communities from state machinery. These writers say that as always, the colonial and postcolonial state is eager to mobilise people for taxes, exploitation and development (Arnold, 2001). But instead, people want to remain uncaptured.

Authors have shown that the Tonga people, for instance, still reeling from their experience of being relocated to pave way for the construction of the Kariba Dam, find comfort in that they are secure from any further state intervention as long as their area is tsetse infested (Dzingirai and Madzudzo, 1999). That way, no development can take place in their area and people are left to be themselves. This argument is also advanced by Arnold (2001) in his account of Indian frontier communities, who up to the late 1940s used disease infestation, sleeping sickness and malaria, to discourage an ambitious bureaucracy from invading and settling into their landscape. In what can be considered a case of Darwin's 'survival of the fittest', the locals took advantage of their immunity to various tropical diseases, especially malaria, to keep at bay the vulnerable and susceptible colonial authorities. For the colonial state, the frontier presented an opportunity to collect taxes for forest, land and produce and also maintain law and order but the presence of diseases was a hindrance to this as their officials almost always perished from diseases. But for the locals, the presence of pests and diseases constituted a desired fortress against the colonial government to exert control over them. It became evident to the colonial authorities that the 'hill and forest

populations were protected in no small part by the terrain, vegetation, and disease (climate) of the regions they inhabited' (*ibid*: 190).

Thus, for these writers, targeted people take comfort in the fly, because it creates for them 'non – state places' (Scott, 1998: 40-41) where the resource-starved state is forced, should it dare, to make extremely difficult and expensive steps to capture and dominate the inhabitants. Thus the argument by neo-functionalists that disease guarantees autonomy and independence of those settled in such territories cannot be dismissed.

Secondly, there are other writers, fascinated with micro-politics, who see tsetse fly as ensuring that tribal communities remain in control of their resources. The pest, together with the diseases it causes, deters other ethnic groups from descending into the area. Dzingirai (1998a, 1998b), for instance, shows how the Tonga people took comfort in the fly which prevented migrants from taking their land for petty commodity production and other economic activities dominated by powerful social groups. Arnold (2001) also shows how in the plains of India, the local dark-skinned aborigines, who were immune to some tropical diseases, acted as carriers and thus infected other vulnerable groups that entered their domain. He notes that the tracts were 'particularly fatal to the fair-skinned non-aborigine and outsider' who quickly acquired the disease in its pernicious form and rapidly succumbed to it or became maimed for life (*ibid*: 194). In this way, the locals were able to keep the outsiders away from their fertile and resource-rich plains.

But it is not only Arnold (2001) supporting this functional aspect of tsetse. Murombedzi (1994) also shows how local indigenous people in Omay Communal Lands deliberately settled migrants in tsetse zones so that they could be fearfully stung and never set foot in the Zambezi Valley again. Whether these practices worked or whether the migrants were able to find ways to control the fly is another issue but the point here is that there is a strong sense in which tsetse was used as a micro-strategy in the struggle for land.

Thirdly, and perhaps more significantly, there are writers that show how some ethnic groups have used the fly and other hazards to ensure their autonomy, thereby allowing them to maintain their lifestyles even in a changing world. For, as Dzingirai and Bourdillon (1997) document, it is the fly that has stalled development in the Zambezi Valley, allowing the Korekore and Tonga to continue their traditional lives, with their distinct patterns of authority and administration that are based on ritual. Although it was a policy of the Rhodesian government to suppress development in the Zambezi Valley in order to preserve the populations in their 'pristine' state as a tourist attraction (Rutherford, 1997), the post-colonial state has tried to modernise the community but with much resistance from the locals (Murombedzi, 1994). And they have used the presence of the fly to deter any form of modern infiltration into their traditional systems.

Finally, there are some writers who see the tsetse fly as a resource that creates and protects livelihoods. For these writers, under the influence of socio-ecological thinking, the presence of tsetse promotes conservation of flora and fauna and through this, the livelihoods of those communities that survive on forest resources are protected. For these authors, areas that are inhabited by tsetse are not suitable for any productive farming. Encroachment into tsetse zones, therefore, is seen as presenting nothing but a threat to environmental conservation (Jordan, 2012; Douthwaite, 1992). The tsetse fly, from this perspective, is seen as a preserver of the natural environment. This argument is not new and can be traced as far as the 1930s when Swynnerton (1936, quoted in Jordan, 2012:1) declared that 'tsetses are the most potent preservers of the natural flora and fauna. Drive out tsetse and the whole landscape changes.'

For these authors, it is these pristine landscapes that make livelihood activities possible. Hunting, for example, is one such activity and it is no wonder that hunters are among those advancing this perspective. The activity forms an essential part of rural livelihoods. Meat is not readily available in most rural areas and bushmeat is most often used to supplement diets. Forests, thus, become an essential requirement for this activity to take place. But as more and more land is cleared, the targeted animals move further and further away from settlements in search of denser habitat. Consequently, hunting also becomes more sophisticated and time-consuming as hunters have to go further in search of their prey (Mphande, 2016). Authors have also shown that tsetse clearance programmes tend to destroy fauna and flora, through the use of chemicals. In several reviews of pesticides used to control tsetse in Africa (Graham, 1964, Wilson, 1972), it was found that most applications of pesticides could kill non - target organisms, such as birds, monkeys, squirrels and other small organisms. In Botswana, for instance, riverine forests were sprayed using dieldrin and after a period of ten days, birds, reptiles and fish were found dead (Graham, 1964). Some of the small animals, like birds, fish, squirrels and herbs are targets for hunters, fishers and foragers.

From the foregoing, all writers are in agreement that tsetse is a resource and is perceived as such by some local people. They show that this functional role of the fly is the reason why some communities oppose eradication of tsetse. For these locals, the fly together with the surrounding forests provides an ecological package that protects them and their interests. For the writers, the destruction of fly traps and control equipment is an attempt by the local people to ensure that the disease and the pest continue. Their reference to control operations as being an affront to the spirit of the land is an ideological attempt to ensure that practically, the fly remains in place, protecting them from the state and other dominant groups that eye their territory. This section has presented two narratives that have emerged regarding the effects of the fly and its diseases. Obviously, each will have its own strengths and limitations. One strength of the poverty narrative is that it places emphasis on ecological causes to poverty, wherein most causes are related to socio-economic factors. But on the flipside, it can also be argued that the perspective places too much emphasis on tsetse as a cause of poverty and yet there are many rural areas that have no tsetse but are extremely poor, suggesting that poverty is a product of multiple factors.

For the protectionist/socio-ecological perspective, the study observed that while its obvious advantage is that it promotes the preservation of the environment, this also presents a disadvantage in that it preserves the environment at the expense of human livelihoods. For the creation of pristine environments always limits access to forest resources by those living within the vicinity of these areas. From the two perspectives, the study leans more on the poverty than the sociolo-ecological perspective, simply because it is seized with documenting the various ways that tsetse has compromised livelihoods.

Clearly, there is some fervent debate on what tsetse does at various scales. Although there is no consensus about what it really does, the main argument is that the fly is a serious hazard. In the next section, the chapter narrows the focus and reviews how the hazards from the fly come about. It asks fine-grained questions of how the exposure is possible and who exactly gets exposed?

Livelihoods and Exposure to Tsetse Fly and its Diseases

The matter of how livelihoods expose people and their livestock to disease and tsetse has also received some attention from researchers. This attention has been directed at how people get exposed to the fly and its diseases as they go about their daily activities. This section reviews theliterature on livelihoods and exposure to tsetse and its diseases, starting with livestock production.

Livestock Production and Exposure to Tsetse and Disease

One of the livelihood activities that has been found by various writers to expose rural communities to zoonotic diseases is livestock production (Welburn and Coleman, 2015; Tschopp, 2015; Rutto*et al.*, 2013). Tschopp (2015), for instance, has shown that herding patterns drive disease exposure. For him, livestock gets exposed to the disease at water and grazing points as these are some of the areas that provide a favourable environment for the transfer of trypanosomiasis between wildlife and domestic animals. These herding patterns are seasonal as has been demonstrated by Rutto *et al.* (2013) in their study in Uganda and Kenya. They found that during dry seasons, the usual grazing areas became un-nutritious and scarce and water supplies also became scarce or even disappeared altogether. Under such conditions, cattle were taken to swampy areas to graze thereby increasing the likelihood of contracting the tsetse disease. At the same time, the herders were also exposed to the disease. From their samples, a total of 51.8% and 31.1% herders in Kenya and Uganda, respectively, were found to be exposed to slepping sickness as a result of herding cattle in areas that were tsetse infested.

Still on herding, Torr *et al.* (2007) found out that herd size and heterogeneity can influence bites by tsetse flies. In their study carried out around Mana Pools National Park, Zimbabwe, they concluded that the higher the number of cattle the

more the number of tsetse attracted to the herd. However, the composition of the herd was also found to be a factor as the study showed that tsetse favoured older cattle than younger ones. Their conclusion was that herding presented a higher risk of bites for some cattle than others.

In Uganda, Welburn and Coleman (2015) have also demonstrated how cattle trading as a livelihood can expose people to sleeping sickness. They show that movement of cattle from tsetse infested regions to markets for trading led to an upsurge of sleeping sickness as cases rose from 119 to 400 between 2000 and 2005. Similarly, Fevre *et al.* (2008b) have shown that, in the same country, cattle movements between 1998 and 2006 also led to the introduction of sleeping sickness into eight new districts. In Uganda and Kenya, Rutto *et al.* (2013) have also shown that trade of livestock can escalate transmission of trypanosomiasis. For these authors, long-distance trading of cattle, arising from lack of ready markets in some areas such as Busia and Tororo in Uganda, facilitated transmission of disease across a wider area, extending across borders.

But who exactly gets exposed? Scholars are rather fuzzy on this. It is not clear if exposure is uniform across all areas and social groups living in tsetse zones. Preliminary work by Scoones *et al.* (2017) shows that tsetse and disease may be concentrated in certain patches where important resources for human and animal survivalsuch as water, are always found. In another preliminary study by Dzingirai *et al.* (2016), it emerged that exposure is not uniform across seasons, social group and area but certain social groups such as women, children, herders, hunters and migrants will be affected differentially and at specific times of the year. Still, some are exposed because of economic political forces that have forced them into disease zones.

So we see people being exposed to tsetse and its diseases while carrying out their daily livelihood activities such as herding and trading of livestock. The next section discusses exposure related to farming activities.

Farming and Exposure to Tsetse and Disease

Some authors have also shown that farming exposes people to tsetse diseases. As noted by Swallow (2000), sleeping sickness is associated with agrarian communities or those who work/ live close to rivers and thus have close contact with tsetse. These communities work along the tsetse-infested riverine areas daily in their gardens and fields, thereby exposing themselves to tsetse diseases. And yet for these communities, farming or gardening in these areas is unavoidable because this is where perennial water supplies, which they so badly need for their crops, can be found.

Migrants who take up farming in virgin lands have also been shown to be victims of trypanosomiasis. Grady *et al.* (2011), for instance, studied the vulnerability and disability of migrants and residents in Kenya's seven tsetse belts. Their results showed that migrants enter tsetse zones out of economic necessity and the land they occupy is often tsetse infested making them more vulnerable to disease than the residents.

Authors have also shown that sleeping sickness can affect urban areas. Evidence for this comes from the extensive mango plantations near Bamako, Mali where Jolly and Cadbois (1996) have shown that tsetse found suitable habitat in riverine areas close to the city. The authors also note that cocoa and coffee plantations in the urban areas of Ivory Coast and Cameroon experienced outbreaks of sleeping sickness due to their moist sub-humid conditions that have provided suitable habitat for tsetse. This means that on a daily basis, workers in all the plantations as well as the communities close to these plantations face the risk of being bitten and contracting sleeping sickness. The next section looks at how another livelihood activity, hunting, is deemed to expose people to sleeping sickness.

Hunting and Exposure to Tsetse and Disease

Various authors have shown that in many parts of Africa, game meat forms an essential part of the diet and is also an important economic and cultural component of rural livelihoods (de Merode *et al.*, 2004; Friant *et al.*, 2015). In some rural areas, it has been shown to be the main type of meat available. In the Congo Basin, for instance, de Merode *et al.* (2004:576) have noted that bushmeat contributed 3.1% of food consumed in a household per day, making it the third most consumed wildfood after fish (6.2%) and wild plants (9.6%). Similarly, in Cameroon, Kalish *et al.* (2005) have demonstrated that bushmeat plays an important dietary role for both poor and rich households. The poorest two percentiles spent 16 - 17% of their meat budgets on bush meat while for the rich it was 7% of the same. In Nigeria, Friant *et al.* (2015) note that approximately 900 000kgs of bushmeat are sold annually at local and international markets, creating large profit margins for communities involved in the activity.

Hunting, therefore, is a livelihood activity that sustains many rural households. In some rural areas, authors have shown that it is part of a tradition that is passed from one generation to another (Friant *et al.*, 2015). Nevertheless, it has been shown that besides being unsustainable, it is one of the main drivers of trypanosomiasis as it brings people into close proximity with wild animals, thereby exposing them to the diseases (Mphande, 2016). The point is further elaborated by Friant *et al.* (2015) who found out that in Nigeria specific hunting behaviours such as hunting at night and sleeping in forests involved high rates of contact between humans and wildlife and thus increased exposure to sleeping sickness. In the next section, exposure arising from foraging is discussed.

Foraging and Exposure to Tsetse and Disease

Some researchers have also shown that rural populations are exposed to trypanosomiasis as they throng forests within their proximity in search of forest products. Murombedzi (1994), for example, shows how the people of Omay Communal Lands have inevitably turned to natural resources to make up for food shortages. Because of a series of crop failures in the past, the villagers have become experts in foraging for wild foods and game. Through this practice, also known as 'poaching', simply because it takes place in national park areas where it is prohibited, men search for meat and honey while the women search for relishes.

This point is further elaborated by Hasler (1996), whose studies among the Chikunda and VaDema people in Dande have shown that foraging is one of the most important livelihood activities. Here, the the locals gather edible worms, honey, insects and edible plants in surrounding landscapes that are eyed by investors and local elites. But the forests that surround them are tsetse infested. So as they go about their daily activities in the forests, they put themselves at the risk of being bitten by flies and hence contracting sleeping sickness. This has been demonstrated through the preliminary work of Dzingirai *et al.* (2016) in the Zambezi Valley.

Exposure to Tsetse and Disease through Profession and Leisure

Authors have also shown that zoonotic diseases do not only affect the poor rural communities as some professionals have also been exposed to trypanosomiasis. The professions exposed are those who voluntarily engage in risky activities and, thus, see no problem in being close to dangerous animals in remote places. But also at risk are those who find leisure in these dangerous and risky areas. Thus tourists, game rangers and safari operators become exposed while doing these riskbased jobs and hobbies. In Zimbabwe, game rangers, tourists and safari operators have been identified as some of the most vulnerable to sleeping sickness (Berger, 2017). Katsidzira and Fana (2010) have also documented an incident where a game ranger succumbed to the disease in 2010 after a series of misdiagnoses. Similarly, Mushava¹³ has also reported that of the eleven cases of sleeping sickness that were identified in 2011, two were tourists while one was a professional hunter. Another author, Berger (2017) has also documented that between 2005 and 2012, six tourists from South Africa, Brazil and America acquired sleeping sickness in Zimbabwe. However, the advantage with professional people and tourists over rural communities is that they are elites with money and insurance which can save them if infected while they are abroad. With the American case, for instance, the victim from Minneapolis reported the case within a week of returning from Zimbabwe and sleeping sickness was diagnosed. Presently, the situation of those contracting the disease could be worse if it were not for the preparedness of the WHO to deal with the disease, although in some areas, details of this facility are not known.

Other Exposing Activities

Authors have also shown many other activities that expose communities to the tsetse fly and its diseases. For instance, Rutto *et al.* (2013) have demonstrated some socio-cultural aspects of exposure. In their studies carried out in Kenya and Uganda, they found that cleansing rituals and circumcision were often cited as drivers of sleeping sickness in both countries. Other activities that exposed the communities they studied included exhumation of the dead, rainmaking and

¹³See article by Mushava, E. "Sleeping Sickness Claims Lives Newsday Zimbabwe". November 15, 2012 https;//www.newsday.co.zw/2012/11/15/sleeping-sickness-clai mslives

marriage rituals. With the latter for instance, brides with their maids would wait in the bushes for gifts prior to being officially presented to their in-laws, making them susceptible to tsetse bites. The same authors have also shown how other daily activities such as fetching water and firewood take people into tsetse infested zones, thereby exposing them to sleeping sickness.

From the foregoing, it is clear that communities living in tsetse fly zones are exposed to trypanosomiasis as they pursue their livelihood and ritual activities. On a daily basis, the communities venture into disease infested zones, putting their lives and those of their livestock at the risk of contracting diseases. But the communities are not passive participants in these zones. In some disease-prone areas, communities have developed their own perceptions of the fly and its diseases that affect them on a daily basis. The next section reviews theliterature on perceptions of communities living in the vicinity of tsetse disease areas.

Perceptions of Causes, Prevalence and Distribution of Trypanosomiasis

The question of whether the communities living within the fly zones are aware of the existence of the fly and its diseases as well the causes of trypanosomiasis has been among the burning issues investigated by researchers. Coupled with this, authors have also shown an interest in other pertinent issues such as communities' perceptions of the distribution and severity/prevalence of the fly and its diseases. One such group of researchers, Rutto et al. (2013), investigated communities in Uganda and Kenya to establish their awareness of the existence, causes and effects of trypanosomiasis. Their findings showed that the communities in both countries were aware of the existence of animal trypanosomiasis which they attributed to the presence of tsetse. Similarly, Grace et al. (2009) who carried out a knowledge, practice and attitudes survey in the West African countries of Burkina Faso, Mali and Guinea, found that while 96% of the respondents were aware of the signs and symptoms of trypanosome iasis, only 76% were aware that it was transmitted by the tsetse fly. Also in some Ethiopian districts, Seyoum et al. (2013) found that 94.1% of their respondents considered bovine trypanosomiasis as an important disease, accounting for at least 64.6% of the total cattle deaths in 2011 -2012. The disease, which they associated with the bites from the tsetse fly, was said to be seasonal, peaking during the dry months of May to June. The mean annual financial loss arising from mortality due to trypanosomiasis was estimated to be 3501 Ethiopian Birr (US\$200)/household. The farmers strongly associated the incidence of the disease with tsetse fly and were aware that it was seasonal, peaking around May and June. The farmers also viewed the disease as an economic burden that required state intervention.

A similar observation was made by Tesfaye *et al.* (2013) after they assessed public perceptions of common zoonotic diseases in South Western Ethiopia, including trypanosomiasis. They found that their respondents, comprising farmers, butchers and residents were aware of the transmission modes of zoonotic diseases, although such awareness was higher in some diseases (e.g. rabies) than others (e.g. bovine trypanosomiasis). In Nigeria, Friant *et al.* (2015) found that 55% of their respondents were aware of zoonotic diseases as well as the animals responsible for the spread of these diseases.

But in some studies, communities have been found to have patchy knowledge of the zoonoses that surround them. For instance, Swai *et al.* (2010) in their study carried out in Tanga and Arusha regions of Northern Tanzania found that livestock keepers had patchy awareness and poor knowledge of zoonotic diseases around them, including trypanosomiasis. Their conclusion was that this lack of awareness caused the farmers not to take precautionary measures thereby exposing themselves to diseases. A more recent study by Mwaseba and Kigoda (2017), which assessed the practice and attitude towards control practices against tsetse as well as actual control practices used by local people in the Serengeti District, found that cattle owners had scant knowledge of the fly such that some even confused it with other insects. However, they were very conversant with control measures although they avoided some of them such as regular dipping, arguing that the service offered was of poor quality.

In Zimbabwe, Dzingirai and Bourdillon (1997) have shown how the Korekore people originally regarded sleeping sickness as caused by ancestors. They viewed the disease as a form of punishment by ancestors for community's errant behaviour. Other authors have shown that some indigenous communities regard disease as a product of in migration, as in the case of Gokwe where migrants in search of land

were thought to be promoting the spread of tsetse by settling in zones infested by the fly (Nyambara, 1999; Dzingirai, 1998a). In such instances, Dzingirai and Bourdillon (1997) have also shown that when migrants settle in these tsetse zones, they do not perceive the prevalence of the fly and its diseases as serious as the indigenous inhabitants do. This attitude often leads to conflict between the groups as the indigenous groups view the migrants' perceptions as stalling tsetse control operations by the state.

The fact that perceptions are essential in determining responses to trypanosomiasis is demonstrated by Gargallo (2009). In his narration of the tsetse situation in Southern Rhodesia between 1898 and 1914, he documents how the perception by the state and livestock farmers that wildlife was responsible for the spread of trypanosomiasis led to the massive elimination of game in the country. Because of this perception, a total of about 750 000 wild animals believed to be tsetse hosts were eliminated between 1919 and 1961 (Ford, 1979:322). But other authors, such as Bevan¹⁴ who were totally against the policy, argued that the method had instead increased the incidence of tsetse and even spread it to areas where it had not existed before. When looking deeper into these perceptions, Gargallo (2009) concluded that there were underlying interests behind them. He noted that the farmers exaggerated the incidence of the fly in order to continue with the game eliminations, the ultimate goal being to protect their livestock and crop production interests. For the state, farming was viewed as a major revenue generating activity and therefore needed to be protected. On the other hand, Gargallo (*ibid*) shows that the environmentalists rubbished the causal relationship between game and tsetse incidence and instead defended the conservation of wild animals because they had commercial interests. For, these environmentalists had expensive and restrictive hunting licenses from which they earned their income. In the end, there was

¹⁴See paper by Bevan, L. E. W. (1965) Zimbabwe National Archives (ZNA), BE 11/9/6

mistrust among the groups and any policies proffered by the state proved ineffective. Under these circumstances, the war against the fly was lost and the communities continued to suffer.

Understanding the knowledge and perceptions of communities on the causes, prevalence and distribution of the tsetse fly and its diseases is therefore important as it may reveal some underlying factors that may hinder or facilitate progress in coming up with lasting solutions. The next section looks at perceptions of control measures by affected communities.

Perceptionsof Trypanosomiasis Control

Authors have also written about the awareness that affected communities have on measures of preventing and controlling tsetse diseases. Grace *et al.* (2009), for instance, noted in their study that 96% of the respondents were aware of the drugs for the treatment of trypanosomiasis. The respondents were also aware of preventive methods such as avoiding high-risk areas and rearing only trypanotolerant cattle. Similarly, in their study of the same in Kenya and Uganda, Rutto *et al.* (2013) found that the majority of respondents in Kenya knew of control methods such as bush clearance, traps and ground spraying and that one way of avoiding sleeping sickness was not to bath in rivers. But in Uganda, only 39.2 % knew at least one control method, mostly traps. In their conclusion, they noted that as a result of the differences in perceptions, there were more control efforts in Kenya than in Uganda. These authors also show that most communities that are aware of control activities also welcome them in a bid to control the fly and diseases.

Other methods of tsetse control which have tended to be unpopular with indigenous populations include veld fires, villagisation and diptanks. Mavhunga

and Spierenburg (2007), for instance, noted that in Zimbabwe's colonial past, the settler government at times used the bush clearance strategy as a tsetse control measure. Instead of directly employing indigenous labour, the state organized the indigenous populations into villages, located in infected landscapes and then insisted that they clear it for settlement. This method of control was obviously detested by the locals, not only because of the relocation but also because they had to bear the brunt of the fly and its diseases in the new villages. The issue of local perceptions is also advanced by White (2009) who, writing about tsetse control in Northern Rhodesia in the 1930s, argues that local narratives and colonial science can be used to reformulate the history of colonial policies and how local communities respond to these in order to control tsetse and game. He further argues that notwithstanding the ideas of colonial masters, the narratives reflect the relationship between the local farmer, agriculture and game and how the farmer interacts and copes with the fly and its dreaded diseases.

Clearly, the review seems to suggest that people have peculiar perceptions of the fly and its diseases. These perceptions relate not just to the reality of the fly and its diseases but also to what might be their prior cause. Going into the field, this is what this study was anxious to locate.

Chapter Summary

In this chapter, the thesis reviewed theliterature on three related issues. First, it looked at the fly and its diseases, their reality and effects at various scales. The suggestion is that tsetse is a reality in Africa and that it is eroding assets of all sorts. Secondly, it reviewed literature's treatment of exposure and who gets exposed. The suggestion is that particular people get exposed when they go about their livelihoods in dangerous zones. Thirdly, the chapter reviewed the literature on perceptions, finding out that various communities have definite and peculiar perceptions of tsetse, including how these are framed. The review provided the study with some guidance on fieldwork, preparing the researcher for a situated understanding of the fly and its effects, the mechanism of exposure and how locals perceived the fly. The next chapter discusses the methodology of the thesis.

CHAPTER FOUR

GENERAL METHODOLOGY OF THE STUDY

Introduction

In the last chapter, a review of literature relevant to the study was made, giving a background to the research questions that need to be answered in this thesis. This chapter concentrates on the methodology and methods used in the study. The chapter presents the methods in general terms. The specific methods for each chapter will be given in each of the three chapters on results.

The chapter starts by giving the philosophical positioning of the study. Since the study explores people's livelihood activities and perceptions, a methodological perspective that clearly unravels the social processes continuing to expose people to the fly and its diseases is chosen. At the same time, any effective study of the social processes of a community will be enhanced by their involvement, thus the need for their active participation in the research.

After placing the study within its philosophical realm, the chapter then outlines the participatory research design that is used. This is followed by a presentation of the study area and the laboured process encountered in accessing it. The various methods used in the study are then discussed in detail. The chapter ends by highlighting some ethical issues and how these were taken care of.

Philosophical Positioning of the Study

Social science research is traditionally guided by two perspectives or paradigms, positivism and interpretivism. These two paradigms offer different assumptions in terms of ontology, the nature of reality and also in terms of epistemology, the method of acquiring knowledge. The choice of a paradigm leads a researcher in a certain direction and illuminates certain issues in the process. On one hand, ispositivism, an approach with its roots in the works of Comte (2003), a French philosopher who posited in his various worksthat the real truth can only be found in science. The approach, also advanced by Popper (1959), assumes that the world can be measured and therefore takes data as being real, factual, objective and an index of what actually exists (Alexander *et al.*, 2008). It offers theories that can be confirmed or rejected through hypothesis testing (Popper, 1959). This paradigm forms the basis of quantitative methods which emphasize the use of statistics for planning research designs and producing results with high validity.

On the other hand, interpretivism does not ascribe to objective data but takes a constructivist approach towards data. Inspired by some writers like Kuhn (1962), Weber (1949), Simmel (1950) and Boas (1974), interpretivism challenges the pure scientific method propounded by Popper (1959). For these authors, any comprehension of science must take into account both subjective and objective phenomena. Interpretivists argue that social research can never measure a single reality but can only produce an interpretation of what researchers see (Alexander *et al.*, 2008). For this perspective, there is no objective reality but rather reality is constructed by the actor.

This is also in line with actor-oriented approaches, popularized by Long (2001, 1992), which place emphasis on the essential nature and importance of human agency - a notion that attributes to the individual actor, the capacity to process social experience and devise ways of coping with life, even under the most extreme forms of coercion (Long, 2001). Social actors are thus perceived to be knowledgeable and capable, making them active instead of passive participants, entrepreneurs or social innovators who can process information and strategize in their dealings interactions with various and internal and external

actors/institutions. As such, it is not necessary to impose external theory on the subjective views of actors but researchers should, instead, search for the meaning of things and events of their subjects. This perspective dismisses the use of preconceived hypotheses and measures because they hinder the researcher from understanding the subject from the subject's point of view.

These two paradigms have been contending for several decades and students have typically been guided by one or the other. In recent years a third paradigm, 'mixed methods,' that draws from both the positivist and interpretive realm has increasingly been adopted by researchers. The use of mixed methods, also commonly known as triangulation, has become common in social sciences and has several complexities and variations (Greene and Caracelli, 1997; Bryman, 2004, 2006). Triangulation involves studying phenomena in more than two different ways so as to generate the most accurate measure of it (Alexander *et al.*, 2008). The principle has several variations. For instance, it can take a form where both qualitative and quantitative methods are used, or one where more than one qualitative method is used or even where qualitative data is quantified. It also has its complexities, mainly associated with cost, the long time required to do the various methods and possible subjectivity by researchers (Greene and Caracelli, 1997). Concerns have also been raised on how conflicting results can be interpreted (Bryman, 2004).

Despite these complexities, the use of mixed methods remains essential to research in social sciences. This is simply because the different methods complement each other thereby increasing the balance and accuracy of research findings as well as confidence in the knowledge generated from studies using these methods (Kelle, 2001; Greene *et al.*, 2001). They are also believed to answer a wider range of research questions and provide adequate knowledge necessary to inform theory

and practice. Mixed methods have been seen not only as a way of pacifying 'paradigm wars' but also as an effective way of understanding the complexity of social behaviour (Greene and Caracelli, 1997).

Because of the obvious benefits of the 'mixed methods' paradigm, this thesis did not align itself solely with positivism or interpretivism but used methods from both paradigms. However, the nature of the research questions, coupled with the theoretical framework guiding the study, called for an approach that is more to interpretivism than positivism. To enhance the quality of the results, all the methods, including the survey, were carried out with some form of participation by the villagers in the study area. The rationale for the use of participatory research is discussed below.

Participatory Research Design

The study adopted a research design that is participatory. Participatory research can be considered as a methodology but in this case, it is used as a design, through which the community being studied works with the researchers as partners in the research process. Participatory research has its roots in Rapid Rural Appraisal (RRA), an approach aimed at finding better ways for outsiders to learn about rural life and conditions (Mukherjee, 1993). It originated from the dissatisfaction by some researchers with the research process which involved brief rural visits and frustration with tedious questionnaire surveys whose results were sometimes ignored (Chambers, 1997). At the same time, there was a growing recognition by development professionals of the fact that rural people were knowledgeable on issues that affected their lives, thus realising the importance of indigenous technical knowledge (*ibid*). Thus from the mid – 1980s, participation became a recurrent theme in RRA discourse (e.g. Mukherjee, 1993), slowly evolving into Participatory Rural Appraisal (PRA).

PRA became more attractive to development research than RRA because it not only considered people's knowledge but their capabilities as well and it sought to empower people instead of just collecting data (Chambers, 1997). With PRA, researchers get information from their subjects in such a way that seeks to effect change for and with local people (Pain and Francis, 2003). In this way, the researched are able to 'share, enhance and analyse their knowledge of life and conditions, and to plan, act, monitor and evaluate.' (Chambers, 1994: 983). So by virtue of being 'participants', the researched are presumed to be knowledgeable and at par with the researcher, contributing valuable knowledge and not just as research subjects.

Furthermore, the researched end up viewing researchers as part of them and not as professional strangers as described by Merton (1972). More often than not, researchers move into a study area, carrying with them the professional atmosphere associated with their workstations, extract information and return to their bases. This is particularly true where problems of an epidemiological nature, such as this one, are concerned. The villagers are deemed not to have the scientific background to contribute meaningfully to the subject. And yet some of the solutions to the research problem may lie not in the laboratories and offices but within the community itself.

In this study, local community involvement was sought in all methods used. This is because, from its onset, the study realized the importance of engaging the community in understanding the sociology of the fly and its diseases. The study recognized that there are some villagers who have lived in Chundu Ward for a long time, enduring the effects of tsetse. As such these people had insights that could benefit the study. For example, they would know where tsetse still abounds. Such insights could only be mobilized through the active involvement of the community.

Besides providing an enabling research atmosphere, the use of participation in the study also tackled ethical issues. In Zimbabwe, some ethical concerns have been raised where some research has traditionally been extractive and unethical, with researchers getting into the study areas, extracting the information they need and then leaving with no feedback to their subjects (e.g Chipendo, 2014). The study's ethical considerations are further discussed later in this chapter. For now, the chapter turns to a discussion of the specific study area, Chundu Ward.

The Study Area: Chundu Ward

To tackle its objectives, the study uses a specific area in Hurungwe, Chundu Ward, a chiefdom located within Mukwichi Communal Lands, to the East of the district (Figure 4.1). It falls within the frontier region once referred to as 'Point Four', a name arising from the points marked along the fly belt during the intensive tsetse control era (Chimhowu, n.d.). The Ward is bordered by national parks and safari areas, including Chewore, Sapi and Hurungwe Safari areas (Bird & Metcalfe, 1996). Because of this, some wildlife occasionally encroaches into the Ward despite the fact that an extensive boundary was erected to ensure that wildlife remained within the protected areas, but on the fringes of human settlement. The boundary, which is also linked to CAMPFIRE, has for some time, been a source of conflict between the settlers and the local authority.

The community in the Ward has been recipient to all the effects of the development initiatives in Chapter 2, mainly because of its location. But the development that seems to have affected the Ward the most is the resettlement process, especially by spontaneous settlers. This unprecedented settlement has seen the population of Chundu Ward rise from 9 758 in 1992 to 15 388 in 2012 (ZIMSTAT, 2013), although it is also possible that the figure might be higher than stated given that it is normally difficult to keep track of population changes in frontier areas.



Figure 4.1. Chundu Ward

Looking back at the history of the Ward, authors like White (1971) have shown that it was first settled in the early 1960s by the Korekore people after being relocated from protected areas in the north and to make way for developments like Kariba Dam. It was also around this time that Chief Chundu and his followers moved from the Zambezi Valley to their present position in the Ward, then settled by the hunter and gatherer Mbaira ethnic group which supplies spirit mediums in the territory (*ibid*: 45). Under the settler regime, the Ward was governed through traditional authority by a hierarchy of leaders consisting of the chief, headman and kraal heads. The Ward is located in a rugged area, characterized by steep slopes making it susceptible to high erosion. This, together with its fairly fertile soils, rainfall below 700mm per annum and significant populations of wildlife limits meaningful agricultural production (Tawodzera, 2005).

For a long time, the dominant livelihood activity was subsistence farming, complemented by foraging. However, with the passing of time and with the influence of migrants, the villagers moved to commercial crops such cotton, tobacco, paprika and market gardening along river banks. Livestock rearing also became a major activity, although this was restricted for a long time due to tsetse infestation. But the villagers were free to keep other livestock such as goats and pigs, which also became prey to tsetse. Gold panning on the banks of the local rivers such as Chewore is also rife. Hunting and foraging for edible insects, fruits, timber and non – timber products in the nearby protected area forests are also some of the livelihood activities undertaken by the villagers.

It is also important to note that the Ward has recently been characterized by a political wrangle between the former acting chief and the current substantive one. The acting chief led the Ward after the death of his father until a substantive chief was appointed in 2014. It was during the acting chief's reign that some illegal settlements took place in the border areas, where he was settled. This led to some friction between the former chief and the HRDC, which has on several occasions taken legal action to evict the settlers. At the same time, the illegal settlers blame the new chief for their predicament, accusing him of working with the HRDC to evict them and reserve land for CAMPFIRE and the Carbon REDD project, which they do not consider beneficial to them. The villagers say the new chief, who is also the chairman of the Carbon REDD project in the area, has been harassing them and they believe it is because of the carbon project.

Population

The population in Chundu Ward is varied. Because of its location, the Ward has been the destination of migrants, as they move in to occupy the unsettled frontiers. The migrants, hailing from all corners of the country have, in the past thirty or so years, changed the landscape of the Ward through clearance of land for agriculture and settlement. The traditional leaders have continuously defied the order by the HRDC to stop new settlements and have continued to allocate land to immigrants in the prohibited frontier. This practice has also caught the eyes of the reporters as one local newspaper reported that there is 'collusion with traditional leaders in the Chundu area who are also allocating land illegally.'¹⁵

Over time, three social groups have emerged in the Ward. These are the originals, the migrants and the squatters. These are so defined by their origin, date and place of settlement in the Ward. The originals are the indigenous inhabitants of the area, mainly the Korekore settled in villages surrounding Chitindiva Business Centre. The group moved in from the borders of the Zambezi River in the 1960s, where they were subsistence farmers, fishers and small livestock keepers (Bird & Metcalfe, 1996). They are considered to be the owners of the land. The group is united under a shared mythology of Chimombe, the revered rainmaker and magician of some repute from across the Zambezi River. His legacy continues to influence beliefs and activities of the Ward through 'Mubaiwa', his spirit medium who lives within the Ward. They farm, hunt and forage for subsistence although many have also taken to the production of the lucrative cash crops such as tobacco and cotton. However, they remain generally poor.

¹⁵Quote from The Herald, 19 August, 2015. Illegal Settlers Invade Parks. pg 15

The second group, the migrants, moved in soon after independence, mainly through resettlement, both organised and spontaneous. Some also moved in after being displaced by various developments such as the Structural Adjustment Programme of the 1990s described above. Referred to by the originals as 'vauyi', (the newcomers) the migrants are mainly Karanga, originating from the southern parts of the country. Unlike the originals, they are entrepreneurs, investing in tobacco and cotton farming and accumulating land in the soil rich frontiers that they have settled in. The migrants are located at the frontier at the edges of the originals. To some extent, their allocation of land in these areas by the traditional leadership could have been a way of shielding the originals from the destructive tsetse fly.

The third group is the 'squatters', so labeled by the HRDC because they have settled in areas designated for wildlife or forest conservation. These moved in from the mid – 1990s to the 2000s, after being displaced by the accelerated land reform programme. The farm workers came mainly from the nearby Karoi Farms and settled themselves at the periphery of the Ward, where they could be concealed from any state intervention. This was, however, with the blessings of the former chief, whom they considered as their patron. Their settlement resulted in some political battles between the HRDC and the former chief, with the latter being accused of concealing the illegal settlers most of whom were also considered to be members of opposition parties. Like the migrants, the squatters are perpetual entrepreneurs but poorer. Their investments are limited by continuous threats of eviction. The three groups will be discussed in detail in Chapter Seven.

Hurungwe District and Chundu Ward were selected for the study because tsetse is still believed to be causing problems to people and their livestock. Chundu Ward was particularly chosen because of its geographical location at the frontier and the prolonged history of tsetse infestation and its proximity to wildlife areas, some of which are still believed to host the fly. Also, its settlement history, from a mere wilderness with little or no human settlement at all in the early colonial times to the hive of activity that it is today, with its large and socially differentiated population engaged in several livelihood activities, made it an interesting study area. The next section looks at the laboured processes that had to be encountered in order to get into this complex research space.

Reconnaissance

Commencement of the study was not without its share of problems. As asserted by Moore (2005), anthropology can be a discursive practice and a located laboured process. True to this assertion, the researcher had to make several expensive trips to the District Administrator's offices, the HRDC and Chief Chundu's court seeking permission to conduct the study. As with Moore, while the researcher made efforts to position herself within the study area, other people's actions also positioned her.

Firstly, during the planning stages of the study, Chundu Ward was being led by an Acting Chief Chundu, Patrick Bere.¹⁶ All the initial visits and arrangements to carry out the study were made in consultation with him. However, he was later removed by the state because it was believed that he was involved in politics, supporting the opposition Movement for Democratic Change (MDC). His removal paved way for the appointment of a substantive chief, Allan Mabara,¹⁶ whose legitimacy is also contested because it is believed that he should not be in the lineage of rulers, being a *'muzukuru.'*¹⁷ The acting chief was also removed because of micro-politics, mainly to do with parceling out land to illegal settlers in defiance of the local government decision to reserve land at the frontier for conservation projects. Locally, he was

¹⁶The names of these and all the other informants in the study have been changed to protect their identity.

 $^{^{\}rm 17}$ It was his mother, not father, who belonged to the chieftaincy, making him a 'stranger' to the clan

believed to be a member of the MDC, the major opposition party to the ruling ZANU (PF). All arrangements made with him became null when the substantive chief was appointed. Commencement was therefore delayed as permission had to be sought from the new chief. Permission was granted after extensive interrogation, at a chief's court held at Chitindiva Primary School on 9 March 2013. The meeting was also attended by village heads and the chief's advisors. The major concern was that the study was taking place at a time when political tension was high owing to the pending July 2013 general elections. A strong emphasis was therefore placed on non - involvement in politics by the researchers.

Secondly and as hinted above, the survey was carried out under difficult political conditions. It was done in May and June 2013, a period leading to the July 2013 general elections. Political tension was high during this period and outsiders were, obviously, viewed with suspicion of belonging to parties opposed to the dominant ZANU (PF) party, which has ruled the country since independence. The commercial farmers within the district, their workers and the displaced commercial farm workers resident in the communal areas were all believed to belong to the opposition MDC and hence the ruling party wanted, by all means, to regain control of the district. The suspicions were brought to the fore by one senior government official in charge of the province who adamantly refused the researchers permission to carry out the study, on the pretext that tsetse had been in the province for a long time and communities had learned to live with it. His major question was 'Why now?' querying, obviously, the timing of the study and insinuating that it had political ties.

However, the Chief gave the survey the green light despite the governor's reservations. But even then, the political tension made it difficult to get full cooperation from some respondents. This situation was further complicated by the allocation of bicycles to research assistants to ease movement through the Ward's mountainous terrain. The move was perceived by some as a vote-buying gimmick, synonymous with elections in this country.

So in the end, the survey was modified to deal with ethical and political challenges that the research faced. As such, if the tool and its implementation were partially scientific, it was because the issues of politics and ethics weighed heavily on the researcher's shoulders. In addition to this, it became clear during the study that the people in thearea had been over - studied and therefore getting them to cooperate became a huge challenge. For instance, many were very reluctant to be interviewed because they believed it was a waste of their time, after which they will gain nothing. Others deliberately gave responses which they thought the researcher would want to hear, perhaps to get over and done with the process as soon as possible.

Thirdly, as part of its participatory strategy, the survey was carried out with the help of local research assistants. The assistants were chosen by the researcher, but with political moderation by the chief, from a pool of A' level graduates in the Ward. The assistants included one female and one village head. Because the chief had identified and recommended the assistants, he took them as his employees to the point of issuing them with pay slips bearing his name/stamp for the field allowances (Figure 4.2). After the complexities of entry into the study area, the methods detailed in the next section were then used to collect data.

CHIEF CHUNDU -- 04 30 30 80 Name :.. ID No:. \square Position:. ... Date: Basic salary : vanc Deductions : Nil Housing : Transport Airtime : NET PAY : \$ A.MBASERA (CHIEF CHUNDU) Prof V. Dzingir Fo CASS, Univ Zimbabue 303080 Tel Prof. V. Dzingirai : paußis Transport : Airtime : NET PAY : Buisnor TEMOIL Rasic salary Position aidie IDN NO CASS, University of Zimbabwe D L CHIEF CHUNDU-TEL: 04303080

Figure 4.2 Payslip Issued to Research Assistants by the Chief
Methods

Guided by the desire to balance its philosophical stance, the study adopted a mixed method approach. The mixed method variety adopted in this study involved a limited survey plus several qualitative methods.¹⁸ The methods are discussed below. It is also important to note here that every method used, including the survey, involved some form of participation by the people of Chundu Ward and was aimed at getting as much information as possible for the three objectives of the study.

Survey

As pointed out earlier, the survey was carried out from May to June 2013, after several reconnaissance visits and preliminary interviews with the community leaders in the area. The survey was inevitable for the study as it would provide the necessary background information that would form the basis of subsequent methods. It covered a total of 587 households in a Ward made up of roughly 1100 households. Of the respondents, 421 were male while 166 were female. The households were randomly selected from 14 out of 56 villages (Table 4.1).

¹⁸The study was part of a bigger one that looked at various aspects of tsetse and disease in Hurungwe. See pages 114-115.

NO.	NAME OF VILLAGE	AREA	HOUSEHOLDS	%TOTAL
1	Mayamba	Frontier	41	7
2	Kapoko	Frontier	36	6.1
3	Kabidza	Frontier	36	6.1
4	Mahwau	Frontier	31	5.3
5	Mayamba	Frontier	38	6.5
6	Chisauka	Frontier	30	5.1
7	Katenaire	Frontier	30	5.1
8	Mocho	Central	56	9.5
9	Muringanisa	Central	31	5.3
10	Mangwaira	Central	43	7.3
11	Nyikadzino	Central	57	9.7
12	Marigachando	Central	60	10.2
13	Butau	Central	52	8.9
14	Mubairacheni	Central	46	7.8
	TOTAL		587	100

Table 4.1: List of Villages Covered in the Study

The villages were randomly selected from a transect stretching from Chitindiva Business Centre, which is the centre of the Ward to the frontier. This was deliberately done to capture data from the three main groups in the area, namely, the originals (mainly Korekore), migrants (mainly Karanga) and squatters (aliens). The settlement pattern is such that the villages around Chitindiva house mostly the original inhabitants of the Ward, while the outskirts house mostly the migrants and the 'squatters' occupy the extreme edge of the Ward. Although efforts were initially made to get equal sample sizes for each group, this proved very difficult because of the different settlement patterns. In the central villages, the village pattern is linear, making it easy to sample. On the hand, the pattern at the frontier is very haphazard, making it very difficult to come up with a sample. Furthermore, households are not ordered according to villages. Two households within close proximity may fall under two different village heads. This may be because the households fall under the village head who settled them. So for most of the households at the frontier, the ordering of villages is more administrative than spatial/geographic. This was confirmed by one of the key informants, Mavhudzi, who is also a village head in the established villages.

The settlement pattern is just random and scattered. There could be two reasons affecting the pattern of settlement here. First, it could be because it was not designed by the council but was done by the acting chief and his village heads. Secondly, it could be because of the terrain since all Chundu border areas are too mountainous for organized settlement. So there are no organized villages except in the sense that a given number of households fall under one village head appointed by the chief.¹⁹

¹⁹Interview, Chitindiva Shopping Centre, 22 March 2013

A further observation was that the villages vary in sizes but rarely exceed a hundred households per village. From the interviews, it was established that this was deliberately done for the purpose of government or donor aid. Normally, aid or government assistance is given per village and if a village is too big, not all households may benefit. At such times, households then take turns to get benefits. So if the village is too big, it may take a while before all households benefit.

The questionnaire (Appendix 1) was the first instrument used to obtain primary data for all the objectives in the study and it was thus designed to capture as much preliminary information as possible about the state of tsetse and disease in the area, livelihoods, economic activities and social structure. However, in trying to capture the wide variety of data, the instrument ended up being too long, causing fatigue among respondents, who also needed time to attend to their fields and other duties. Nevertheless, the preliminary data was pertinent since there had been no recent study in this area on the topic.

The questionnaire contained both closed and open-ended questions. The latter was meant to allow the respondents to give as much information as possible. The instrumentwas administered with the assistance of six local research assistants, all recommended by the chief. One of them was a village head. The use of local research assistants was aimed at involving the local community in the study as well as toning down tempers and suspicions of the community as this was a time of political turmoil. But the fact that the entry of the assistants into the villages was facilitated by the chief may have introduced some bias with some respondents thinking that the survey was a kind of census whose results would be used to control them. As a result, falsification of data was common during the survey. The assistants, all high school graduates, were thoroughly trained to administer the questionnaire. During the training, a standard way of interpreting the questions to the respondents was agreed on to avoid variance in the results arising from different translations.

Because of the logistical problems encountered during the reconnaissance period outlined above, the survey was modified to deal with ethical and political challenges that the research faced. If the tool and its implementation were not scientific, it was because issues of politics and ethics that weighed heavily on the researcher's shoulders. But despite the problems, the survey generated a lot primary but general data for the study. The data, which was analysed using the Statistical Package for Social Sciences (SPSS), formed the base for the qualitative methods.

Unstructured Interviews

As suggested by their name, unstructured or non – standardized interviews are when the researcher simply has an indicative set of questions or interview guide consisting of topics that they wish the interviewee to talk about but is free to change the order of the topics (Fielding and Thomas, 2008). Thus the questions are standardized but what is unstructured is the manner in which they are asked. Unstructured interviews are simple and are usually conducted in a way that corresponds to everyday social life.

Sixty-three (63) interviews were carried out with various villagers in the area between November 2013 and March 2014. Efforts were made to spread these across the three social groups such that 26 originals, 19 migrants, and 18 squatters were interviewed. The interviews were especially targeted at elderly people who have lived in the Ward for a long time. The elderly were targeted because of the experience they have gained from their long stay in the Ward, thus accumulating valuable information about the fly and its diseases. The respondents were spread across different villages to get a proper representation. To enhance the participatory goals of the study, the interviews were carried out with the assistance of a trained research assistant from the Ward. The assistant, himself a village head, facilitated and at the same time complicated the study. As a facilitator, his role in the village made it easy for him to access homesteads and cooperation of the elderly. He is also conversant with the politics and history of the area, which was an advantage for the study. But at the same time, the assistant has been caught up in local politics as he is seen as being against the current chief and in favour of the former chief. Thus in some homesteads, he was perceived to be working for the former chief and either dismissed or treated with suspicion.

All interviews were recorded, translated into English and transcribed into an MS Word document. The purpose of the interviews was to get an indepthlocalisedunderstanding of how the tsetse and disease situation had changed over time and with what effect. But more significantly, the interviews gave the study the much-needed background of the village, development as well as environmental politics. This helped understand the various social groups, their background and their interests as far as the fly is concerned. The information from the interviews also triangulated and supplemented the data collected from the survey and secondary sources.

Key Informant Interviews

Key informant interviews involve interviewing those members of a community with special knowledge on the area/research topic, have developed relationships with the locals and have access to information that may be denied to outsiders/researchers (Eng *et al.*, 2005). Key informants are normally valued for their thoughtful observations and informal history, which may not even be recorded in any published materials (McKenna and Main, 2013). Because of their long stay in an area, they know which issues are important and why.

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Key informants also normally act as gatekeepers, these being, people who control access to information in a study area (Clark, 2011). Gatekeepers are common in populations that are considered vulnerable and as such take it as their responsibility to determine if the research to be carried out constitutes a threat to those participating and to the community in general (Homan, 2001). However, gatekeepers may also be a hindrance to a study. For instance, they may have a hold over participants in a way that can complicate the research process, making it imperative for the researcher to manage the research process in a way that benefits both sides (Singhand Wassenaar, 2016).

The interviews were done with key informants in the area, these being locals who, because of their history or position in society, possess knowledge about the fly and its diseases. The interviews were done throughout the fieldwork period, right up to the writing up of the thesis, as there was always a need to fill in gaps in knowledge. During reconnaissance, the interviews guided the researcheron the research questions for the questionnaire and later gave guidance to the questions for the other methods. The informants included seven individuals/groups, namely 'madzishe,' the traditional leadership (two chiefs²⁰) and three village heads, 'masabhuku';mhondoro,the spirit medium, known locally as Mubaiwa; the local veterinary officer; a local nurse; a migrant who is believed to be the first to bring in cattle; a former tsetse - control worker and a dip tank attendant. Different and similar questions were asked to each of the informants/group of informants depending on the background of the interviewee and the objective under investigation. The chiefs and village heads were asked to give an outline of the tsetse and disease situation in the area as well as how the villagers or the state could help to resolve the problem. The interview with the spirit medium was meant to verify the history of the people in the area. It is locally believed that Chimombe

²⁰There was a change of chiefs during the study – see Reconnaisance Section above

communicates through him and that when he is possessed, it is the voice of Chimombe that will be speaking.

For the local veterinary officer, the interview sought to establish the prevalence of animal trypanosomiasis in the Ward, areas affected, the villagers' awareness of the disease and its symptoms and how to deal with it. The interview questions for the local nurse centered on sleeping sickness, whether there had been any cases identified in recent years, whether the villagers were aware of the disease and whether the clinic had the capacity to diagnose and treat cases of sleeping sickness. The migrant was to shed light on the history of livestock keeping in the area and challenges faced, given that this was at the peak of animal trypanosomiasis. The interview with the dip – tank attendant was meant to establish more information about the disease in cattle and whether there was cooperation by villagers in dipping their cattle to control diseases. The former tsetse control officer was asked about the tsetse control operations carried out in the area in the period just after independence, the benefits and whether these were still necessary.

The participation of all these informants in the study enhanced and complemented the information collected from the survey, mapping exercises and unstructured interviews. Their purpose was to further triangulate the information collected from the earlier methods relating to the effects, actors' interaction with the system and their dealings with various social groups. The interviews exposed some attitudes by the villagers towards the fly and disease that had not been revealed by other methods.

But just like any interviewees, key informants are also capable of bias or using the interview to further their interests and thus their information has to be verified and validated. For example, there are villagers that doubt claims by the spirit medium

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that he represents Chimombe and he will, therefore, use any forum to justify and legitimate his stay in the area. His account of the current whereabouts of Chimombe, that he turned into a stone and exists at a river nearby, differed from those of the other villagers and archival records that the whereabouts of Chimombe are not known. Being the only one with the knowledge of Chimombe's whereabouts, therefore, makes him indispensable.

This act of micro – politicking by the spirit medium was further exposed during the interview with the research team. Initially, he requested one black cotton material, one white cotton material, black and white beads, a cigarette lighter, a *changwe* or *mbande* (traditional type of cigarette), \$5 for summoning the ancestors (*dana midzimu*) and \$20 for *tsitso* (purpose of which was not clear) before he could be interviewed. But on the day of the interview, the spirit medium, realizing one white member accompanying the researcher, and in an obvious case of self - enrichment, changed his requirements and requested for a cow or cash equivalent before he could reveal the history.

Besides the problem of micro – politicking, there are other complications associated with interviews. As Derman (1990) notes, social scientists normally assume that their research site will be pristine, with no other researchers having treaded on it before. Yet, the community would have been subjected to multiple surveys and interviews, be it by researchers, non – governmental organizations or state agencies, all of which may impact on the research. Because of the experience from previous studies, some respondents may decide simply not to respond, give answers that will satisfy the researcher so that they go away quickly or give wrong information (*ibid*).True to Derman's observation, this researcher experienced these complications.

Under the circumstances, validation of the information gathered using this, or any other method, therefore, becomes inevitable. In this case, the different interviews served to validate each other. For example, the spirit medium's account was validated by the information from the two chiefs while the accounts by the former tsetse control worker, migrant, veterinary officer and dip tank attendant all validated each other.

Participatory Mapping

Participatory mapping, a product of PRA, is based on the understanding that local communities have expert knowledge about their environments and that this knowledge can be presented in a geographic form that can be easily understood and recognized worldwide (Chambers, 2006). During the exercise, participants use tools at their disposal to create a visual representation of their area, resources or whatever phenomena may be required (Brodie and Cowling, 2010). Maps can take different forms depending on their purpose. For instance, maps may be drawn on sand or paper/charts. In recent years, participatory mapping has been combined with modern cartography or incorporated into the complex GIS technologies to represent the spatial knowledge of communities (Chambers, 2006). Whatever their form, participatory maps represent information that is culturally distinct and may not be available in official maps.

Several participatory mapping exercises were carried out in the area, all of which were aimed at producing resource maps and animal (both wild and domestic) maps for the area. The first set of maps was drawn on 20 and 21 September 2013 at Kabidza Business Centre and Chitindiva Business Centre, respectively. Groups of villagers consisting of women, youth, traditional leadership and some local 'experts' such as dip tank attendants were asked to draw maps of the area depicting areas with resources and those that they believed to have the fly as well as regular movements of wild and domestic animal (Figure 4.3). The exercises were carried out at the frontier villages and also in central villages. The purpose of the exercise, explained thoroughly to the villagers, was to establish, using the villagers' indigenous knowledge, whether there is a convergence between resource areas and tsetse-infested areas.



Figure 4.3: Mapping exercise at Kabidza Village

The maps produced by the villagers were then combined and aligned to official maps using GIS technologies. In the end, two maps were produced, one showing resource areas and another showing animal movements.

A second mapping exercise was conducted at the end of the fieldwork, on 28 May 2015 at Makuti Tsetse offices. In this exercise, carried out with the assistance of entomologists and GIS specialists at Makuti Tsetse Control Offices, the villagers were carefully selected to represent different social groups but more importantly to also represent the originals, migrants and squatters. The participants, divided into three equal groups, were given maps of the study area, with major physical

features included, and were asked to indicate the areas that they perceived to have the tsetse fly and/or the disease as in the first exercise. But in this case, each group was asked to produce maps for three different periods, pre -1999, 2000 to date and the period post-2025. The idea behind this was to tap into the villagers' knowledge of the fly and disease situation to date and their predictions for future incidences.

The villagers' maps were then aligned to GIS produced maps showing vegetation cover for the same periods. This was meant to check if there was a relationship between vegetation cover and fly/disease incidence and distribution. This part of mapping was meant to establish if the observations of the community on the distribution of the fly and disease matched the changes in vegetation cover as reflected by GIS maps. The ultimate goal was to establish if there was a relationship between vegetation cover or land use changes and fly/disease prevalence and distribution. By asking the villagers to predict future trends for the fly and disease, the study hoped that through their knowledge and experience, they would have an idea of how the situation would unfold in future, thus giving ideas for further research and policy.

In both instances, women participated actively in the exercises, with one woman, a village head, leading one group in the second exercise. Also evident from the exercise was that there were fears that the maps will be used to evict people settled within the prohibited areas. Thus, some participants were reluctant to map settlements in areas where people were threatened with evictions, leading to arguments within group members. The exercises were obviously used by the different groups to further their interests, with the originals attempting to expose the illegally settled villagers while the squatters tried to hide the fact that they had settled in areas deemed illegal, fearing that the maps will lead to evictions. All in all

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the mapping exercises produced considerable insights for the study, especially for effects on livelihoods and how the villagers' interactions with the ecosystem expose them to the fly and its diseases. In a subtle way, the villagers also presented their perceptions or understanding of the fly through the maps and gave insights into intervention measures. The method also revealed the importance of indigenous knowledge in research as it was through this exercise that the best areas within the Ward to place tsetse traps were identified. The use of different groups to map the same phenomena and at different periods was to validate the results, with the several maps validating each other.

Focus Group Discussions

A focus group is a discussion by a small group of people, normally up to ten, who express their views about a subject specified by the researcher (Morgan, 1997). The discussion, which is normally guided by the researcher, is used to explore the views and experiences of participants on a particular subject (*ibid*). The method capitalises on interaction and communication between research participants to generate data in a quick and convenient way. Information gathered can be useful for exploring people'sknowledge and experiences, shedding light on what, how and why they think the way they do (Kitzinger, 1995).

The first focus group discussion was done in a classroom at Chitindiva Primary School on 20 April 2013 with the six young villagers, who would later become the study's research assistants. The discussions during this session focused on the problem of tsetse in the area and how it may have changed over time. The discussions, which were held before the survey, helped to finalise the instrument for the survey and directed the choice of villages to be targeted. A second focus group discussion was done with villagers at the end of the second mapping exercise carried out at Makuti Tsetse offices on 28 May 2015. After receiving a brief summary of the results obtained in the study to date, the group was asked to give opinions as to why tsetse and disease remained in some areas and not others as well as thoughts on solutions to the problem. The purpose of the exercise was to solicit as much information as possible from the villagers about the subject.

The exercises produced considerable insights, some unexpected, on the effects, views, attitudes and perceptions of the local population about tsetse and its diseases. During the second group discussion session, it became very clear that there had developed some social dimensions of the fly and its diseases, dimensions that had escaped the veterinary scientists and entomologists during their own research. The exercises also revealed the villagers' attitudes towards tsetse control operations/methods in the area and the need for scientists carrying out these operations to communicate and engage the community in their activities. Most important of all, links were forged with informants, allowing the researcher to test and in turn, be tested by the villagers.

Seasonal Calendar

A seasonal calendar is 'a diagram drawn by people with locally available materials to provide a trend in the main activities, problems and opportunities of the community throughout the annual cycle' (Narayanasamy, 2009: 171). It is a typical PRA method that provides insight on how seasonal variations may influence rural livelihoods (*ibid*). The calendar was used here to understand seasonal differences in exposure and vulnerability to tsetse and its diseases as well as identifying some cause and effect relationships. The drawing of the seasonal calendar was done at two separate points in the study area – one in villages at the border with wildlife areas, on 11 October 2013 and another within the central villages on 12 October 2013. In each area, two representative groups, one composed of men and another of women, were asked to indicate their main monthly activities for a whole year. The activities excluded some daily chores done around the house such as sweeping and cooking. The calendars for the two areas, which were similar, were later combined to produce one calendar showing activities by men and women throughout the year.

The information gained from the exercise helped the study to understand the seasonal patterns of exposure by the community to the fly and its diseases including the periods of high risk and vulnerability as well as the activities associated with this risk. The method has been used before, for example, by Catley *et al.* (2002a, 2002b) in Southern Sudan where the researchers used a seasonal calendar to understand local perceptions of seasonal variations in cattle diseases, disease vectors, intermediate hosts and rainfall. Welbourn (1992) also used the method in Sierra Leone to illustrate gender and class dynamics in access to resources.

Documentary Research

No research document would be complete without the use of secondary or documentary sources. Documentary research involves an evaluation of documented information/data, this being officially written materials on a subject (Guba and Lincoln, 1981). There are several items that can be classified as documents and these include files, records of official proceedings, statistical records and images (Silverman, 1993). Guba and Lincoln (1981) also distinguish between documents and records with the latter being defined as a written statement by an individual or agency for the purpose of accounting for an event (1981:228).

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Still, some other authors like Burgess (1992) have argued that for documentary research to be complete it must include both written and oral sources such as autobiographies and diaries since these provide first-hand involvement with a situation. Such evidence may provide a historical understanding of a group, an individual or a situation in a way that no other contemporary method can (*ibid*).But still, such documents may be found wanting in that it is only the literate who may be able to share their knowledge and experiences through such fora (Ahmed, 2010). This, therefore, calls for a critical scrutiny of all documents, where a researcher must question the structure and content of a document as well as on issues concerning the reliability and validity of data derived from the documents.

The use of documentary sources was inevitable in this study because the locals are very protective of their history and would not easily disclose it to outsiders. In addition, until the early 1990s, the remotely located Chundu Ward had a poor transport network, a situation which could have contributed to a disinterest by researchers/writers in venturing into the area for research. This was exacerbated by the prevalence of diseases especially sleeping sickness and malaria and the ravaging war of liberation, all of which restricted movement into the area, especially for research purposes. Those that were able to document anything about the area or its people were white settlers (e.g. Nicolle, 1936) who were particularly intrigued by Chimombe, as a structure of control. They would want to understand how he governed his people and exerted control over them perhaps so that they could also do the same. In their fascination with the indigenous people, these authors produced some reports that proved invaluable for this study. Three types of documents were used in this study. Firstly, documents from the National Archives of Zimbabwe were instrumental in informing the study about the people of Chundu Ward and the district in general. The information obtained gave insights into the history of the indigenous people of the Ward, their settlements, the roots of their beliefs, chieftainships as well as their economic and social way of life, especially during the pre-colonial period. From the Archives, the study retrieved papers such as NADA and District Commissioner's reports. The study acknowledged the possibility of bias in these reports and validated these by using other reports. For example, the narratives by Nicolle (1936) and White (1971) on the history of the people of Chundu Ward all served to validate each other.

Secondly, SACEMA, an online archive, provided invaluable data on the history of tsetse operations in Zimbabwe. The archive consists of articles, reports, short papers and correspondence on tsetse and trypanosomiasis in Rhodesia/Zimbabwe by tsetse and trypanosomiasis personnel, members of Trypanosomiasis Committee, members of related departments and foreign experts. The reports, dating back to 1910, were initially labeled by D. F. Lovemore, a former head of Tsetse and Trypanosomiasis Control Department in Rhodesia/Zimbabwe and former senior regional coordinator of the RTTCP. The documents gave insights on the history of tsetse and disease prevalence and control not only in Hurungwe District but also in the country as a whole. The reports, however, could have been written with a bias towards white settler interests and thus the information from the documents was validated by the numerous published articles on the history of tsetse and disease in the area (e.g. Gargallo, 2009; Ford, 1979; Scoones, 2016).

Thirdly, the study used some public records such as census reports to obtain changing population patterns in Hurungwe District and Chundu Ward. It is, however, possible that the official figure (15 388 of 2012) is less than the actual figure because it is normally difficult to keep track of population changes in frontier areas like this one. This arises from the fact that there are several people who have settled at the borders of the Ward, beyond the reach of any formal transport system purportedly to hide away from officials and may have deliberately avoided being counted to divert any possible attention from the state.

From the Ministry of Health and Child Care, the study obtained data on the incidence of human trypanosomiasis. Data were available for the years 1933 to 2012. However, there were several gaps with some years such as 1935, 1945, 1960, 1964 – 1970 and 1986 - 2008 having no record. It was, therefore, not clear whether there were no incidences during the gap years or it was merely a result of poor record keeping or non – reporting of cases. Generally, records on cases of sleeping sickness are scanty, making it very difficult to verify and validate the data from the Ministry.

Lastly, the study relied on a wide range of published literature to generate background information and place the study within its context. The next section looks at the ethical issues relating to the study.

Ethical Considerations

This study involved human subjects and as such, it had to take issues of ethics into account. Ethics in social science research are important as they ensure that the rights and welfare of communities being studied are not violated (Nachmias and Nachmias, 1985: 317). In this ethnographic study, four important aspects of research ethics were taken into account, namely, the principle of informed consent, voluntary participation, no harm to participants and anonymity/confidentiality.

The principle of informed consent requires that participants in a study be allowed to choose whether or not to participate after being informed of the facts that would be likely to influence their decision (Nachmias and Nachmias, 1985: 324). Information that should be given to the participants include the purpose of the study, the identity of the researcher, (including their organisation and sponsor), the intended use of the data collected, risks or any form of embarrassment that may arise from taking part and how they were selected (de Vaus, 2012:85). In this study, interviewees were informed that the study was purely academic and that its main objective was basically to find out the tsetse and disease situation in the area and to hear their views on this situation. After giving the background and purpose of the study and after sharing with them, in the local language, the research instruments including the survey, the interviewees were then asked if they wanted to participate.

The second aspect that the study took into account, and one closely related to informed consent, was voluntary participation. According to this principle, participants should not be led to believe that they are required or obliged to participate in a study (*ibid*: 83). Rather, they should be made aware that participation is voluntary and that they have a right to withdraw from the study or interview at any point. In this study, all participants were asked prior to any interview about their willingness to participate before being interviewed.

Adherence to this principle was very important for the study given that prior to the commencement of fieldwork, Chief Chundu and his village heads had already implored on people to cooperate with the researchers. Under the circumstances, it was therefore likely that respondents would allow themselves to be interviewed not because they wanted but because the local leadership had asked them to. Therefore asking each respondent to indicate whether or not they were willing to participate ensured that this ethical requirement was fulfilled.

Thirdly, the study took into account the principle of 'do no harm' to participants or non-maleficence (Akaranga and Makau, 2016:6). The principle, also linked to that of informed consent, requires that participants be told and be protected from the dangers/risks, be they social, psychological or even economic, of taking part in the study (*ibid*). For this study, this principle became evidently important, especially during the survey and interviews. The survey was done just before the July 2013 elections, a period that was characterized by political turmoil, especially in Hurungwe. Outsiders and anyone associated with themwere, therefore, treated with the suspicion that they belonged to opposition political parties seeking to overthrow the ruling ZANU (PF). Because of this, some villagers were reluctant to take part in the study for fear of being victimised. If there are some local research assistants who were harassed by some sectors of the society associating them with opposition politics, this was never brought to the attention of the researcher. Suffice to say that as an ethically conscious ethnographer, the researcher consistently requested the local leadership to protect the participants and research assistants from any form of political harassment. Furthermore, the study initially intended to establish the incidence of sleeping sickness through blood tests. However, at the time of the fieldwork, there were widespread rumours of satanic activities throughout the country and Hurungwe was no exception. Any talk of drawing blood from the respondents, therefore, sparked fear and alarm. As a result, these intentions were abandoned in adherence to the concept of doing no harm, even psychological harm, to participants.

The last ethical principle that the thesis took into account was that of anonymity and confidentiality. This entails ensuring that participants cannot be identified as the source of any particular information and that all data collected is confidential (Akaranga and Makau, 2016: 6). This study ensured that these two concepts were strictly adhered to. Firstly, pseudonyms, instead of the actual names of the participants, were used in the thesis. As a result, no statement in the thesis can be directly linked to a particular informant, except in the rare cases where the informant felt they needed global recognition for the points made. Secondly, all the data collected was treated with confidence. After the capturing of the data on SPSS, the questionnaires were safely stored for future reference. The written and recorded interviews were also stored safely after transcription.

These four principles were enhanced by the participatory research design that was adopted in the study. The design was adopted to deliberately co-opt the community as partners and not just subjects in the research process. In this way, virtually all the ethical principles were fulfilled. In addition, and as a further way of incorporating the community into the study, some representatives of the community were invited to two workshops at the end of the fieldwork, where the results were presented and discussed. The first was held at Makuti Tsetse Offices, close to Chundu Ward, and was attended by several people from the study area. The second was held in Harare and was attended by a representative from the community who had played a key role in data collection. This gave the community an opportunity to discuss the results of the study and indicate problem areas. The presence of the community at both result presentation workshops and their active participation was a testimony of the study's adherence to basic ethical principles.

Furthermore, the study also tried to add value to the lives of the people by selling the novel research findings to colleagues in the DTTC in government, who had also been part of the study. It is most unlikely that the findings will be put into policy immediately as policymaking is normally a protracted process, requiring a delicate balancing of priorities. However, the study at least put the data on the table and the hope remains that the relevant offices will use it to 'rescue people from the mud and thorns', as asserted by Mararike (1995: 24) in favour of research that is instrumental, transformative and non-extractive.

Clearly, this research tried, by all means, to take the part of the informants to appropriate Lipton's (1982) popularstance on pro-poor scholarship. Every facet of the research was organised to serve the people even against capricious politicians. And perhaps, it is precisely because the research did this so well that powerful actors did not always look at the research h kindly.

Multidisciplinary Nature of the Study

This study was part of a larger multidisciplinary study under the auspices of the Dynamic Drivers of Diseases in Africa Consortium (DDDAC). The DDDAC is an interdisciplinary group of researchers whose main objective is to study ways of reducing the risks of disease emergence and the negative consequences for the poor in Africa by ensuring that ecosystems are managed sustainably in ways that assure disease regulation while avoiding trade-offs for livelihoods. This objective was achieved through the use of case study research on intersections of ecosystem change, emergence and transmission of diseases, poverty and wellbeing in local settings, involving people's local knowledge systems and practices, and close interaction with local stakeholders and policy makers. The case studies were drawn from four diseases in five countries namely Lassa Fever in Sierra Leone, Henipa Virus in Ghana, Rift Valley Fever in Kenya, and trypanosomiasis in Zambia and Zimbabwe.

In Zimbabwe, there were three research groups, namely social scientists; veterinarians and entomologists; and geographers. While this study concentrated on the social aspects of the fly and disease, the entomologists and veterinarians studied trypamosomisis transmission dynamics in livestock while the geographers used modern Geographic Information System (GIS) technology to identify suitable habitat for the fly. The role of the social scientists in the study was to untangle the complex casualties that link people's livelihoods, their environment and livestock - use practices with vulnerability to disease, and effects on well-being.

The multiplicity of reserachers from different areas of specialisation in the Consortium was also inspired by 'One Health', an approach that demands attention to the interconnectivities between politics, science, ecology and zoonoses. The approach realises that zoonotic diseases are complex and can only be solved through a perspective that integrates human, animal and ecosystem health (Bardosh, 2016:4).

Being part of a larger project also meant that this study had to adopt certain methodological and theoretical underpinnings. In terms of methodology, the Consortium encouraged use of innovative methodologies that would capture insights from people's own perspectives and indigenous knowledge. Hence the use of a participatory research design to capture as accurate as possible, people's perspectives on tsetse and disease. For theory, however, the study diverted a little, adopting a more anthropological stance but also incorporating some aspects of the Consortium's analytical framework that focused on the political economy of knowledge and policy, multi-scale drivers of disease, disease – ecosystem dynamics, and local system context and interactions.

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Chapter Summary

The chapter has presented the methodology and methods used in the study. It places the study under the interpretive or phenomenological perspective which looks at the subjective reality of phenomena. This is because the study is concerned with the actor, his capability to process knowledge and strategise as he strives to survive. To complement this perspective, the study adopts a design based on participation whereby all methods involved the participation of the respondents. This not only ensured the empowerment of the participants in the research process but also took care of ethical issues.

In terms of methods, the study adopted a mixed methods approach. A limited survey was employed to get baseline information on the characteristics of the community, their livelihood activities and their perceptions of various aspects of the fly and its diseases. Interviews, be they key informant or unstructured, were widely used to gather information for virtually every objective of the thesis. Besides being used to get new information, they also served as an important tool for verifying and triangulating information gathered from other methods. This was also the same with focus group discussions. Mapping and seasonal calendars were used for the first objective relating to livelihoods and exposure. They revealed information on where livelihoods were undertaken, when and whether the places and times when these were undertaken constituted any form of exposure. The mapping exercises also revealed some information relating to perceptions (Objective 3). Finally, the study made use of secondary sources to get information on the background of the study area, its people, history, customs, culture and what other researchers/authors have written about the topic under study.

The chapter also shows how ethical issues were factored into the methods. No data was forced from the people as voluntary consent was first sought. The study

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realised, from the onset, that ethical considerations could be achieved through the involvement/participation of the community under study, thus the participatory design. The design required that the research is carried out among the people and with the people under study. Thus the sources were live, requiring some innovation to make them yield data.

But at the same time, the study realized that it is in these innovations that some aspects of science are lost. This then required further innovations to balance the validity of results and ethical issues. Thus, while the participatory design took care of ethical concerns, the use of multiple methods, incorporating both qualitative and quantitative methods, enabled the study to triangulate and validate the various methods used. The participatory design was also deliberately chosen to complement the theoretical base of the study. For one of the main tenets of transactionalism is the focus on the individual and how they organise themselves as they try to survive in a constraining environment and so there was no better way than to involve the said individuals in the research process.

CHAPTER FIVE

TSETSE, LIVELIHOODS AND EXPOSURE TO DISEASE

Introduction

The previous chapter presented the overall methodology of the thesis. It emphasised the ethical and participatory dimension of the study in the study area, which is often a hunting ground for anthropologists and political ecologists. The argument was that participatory research became a necessity in order to make progress and deal with research fatigue in the area.

In this chapter, the thesis moves away from methodological concerns and attends to the first objective, that of investigating livelihoods and their links to exposure. In particular, it looks at local livelihood strategies and how these connect local people to the fly and the disease. The discussion takes place against the background of the argument presented in Chapter 2 that certain development iniatives at local and national level, stretching from the pre - to the post – colonial era, forcibly led the people of Hurungwe into tsetse infested zones where they had no choice but to venture into infested forests and valleys in order to secure livelihoods. The development initiatives referred to include the establishment of wildlife/protected areas, construction of the Kariba Dam, creation of Karoi Farms, wartime villagisation, tsetse control initiatives, land resettlement, CAMPFIRE, and the Kariba Carbon REDD project.

Rather ironically, the developments have left the area undeveloped and the residents very poor. This is evidenced by the fact that there is one clinic in the Ward and at the time of the study, there was only one secondary school for the entire ward of about 15 388 people. Although, by the end of the study, three satellite primary and secondary schools had been opened to service the community,

these were still not enough and not adequately equipped. During the study, it was observed that this poverty is more pronounced among frontier villages, mostly populated by people criminalised as squatters. These people are threatened with eviction which inevitably discourages any meaningful investment. Because of this threat, they do not construct modern, permanent living structures but temporary structures that could easily be destroyed should they have to relocate.

In its discussion, the Chapter borrows from various authors (e.g. Chambers and Cornway, 1992 & Ellis, 1998), to define livelihood strategies as the broad range of activities necessary for the reproduction of life at local scales. These not only include what people do, either individually or collectively, in order to deal with poverty that in some cases arises from long-term histories of state intervention or ecological factors (Chambers & Cornway, 1992) and not from their own making, but also include institutions and those cultural and social choices that constitute the primary occupation of a household (Ellis, 1998). In the case of ecological factors, for instance, successive droughts and general aridity can be given as examples of these objective processes or shocks as they are popularised by participatory researchers in Africa (Tittonell, 2014:12). These shocks generate poverty leading people to develop desperate strategies to deal with it. A broader conceptualisation of livelihoods in the study will be presented in the next chapter. For now, the thesis concentrates on the strategies developed by people to deal with shocks and stresses related to securing livelihoods and whether or not these produce a level of risk to tsetse flies and disease.

The findings presented in this chapter are threefold. First, and rather obviously, the study shows that local people are exposed to tsetse fly in the landscapes of their location. On daily basis, and as they exercise their human agency, people together with their livestock have chances of deadly contact with the fly and diseases it generates. Secondly, this exposure to the fly is rarely a general phenomenon, involving everybody. Nor is it a phenomenon occurring everywhere in the landscape. What is clear from the data is that exposure is limited to those people that must spend a protracted time in zones of disease, or residual tsetse patches, in pursuit of given livelihoods. The groups that are affected mostly are cattle herders because they go deeper into the wild in search of pastures; migrant farmers because they go into tsetse wilderness spaces where they establish fields for cash cropping; hunters and foragers because they look for wildlife and forest products such as edible worms, insects, thatch grass and wild fruits in tsetseinfested zones; and squatters because these are settled in the periphery where disease and tsetse fly are found. Thirdly, there is a dimension of seasonality in exposure. This means that the risks to the fly and disease occur at specific times and seasons that coincide with particular livelihoods. People in Hurungwe report increased tsetse menace during the dry season, which is the time when they throng isolated patches with water that simultaneously attract wildlife and tsetse.

From the above, it is clear that there is a complex and dynamic relationship between livelihoods and the fly. The fly comes to the people but in many ways, the people also go to it at specific times with consequences of exposure. This understanding has considerable implications for disease control, a matter that the study will take up in the last chapter. For now, the study solely underlines the complexity of the problem. As already stated in the last chapter, the data is based on fieldwork in the study area, where interviews with affected people were conducted. These include migrants, who are extending their fields in tsetse zones. They also include squatters who are strategically located in frontier zones away from state presence. The study also interviewed the indigenous people, mainly the Korekore, who have lived in the study area for generations, developing detailed knowledge of the disease. In addition, the data for the chapter also emerges from participatory mapping exercises carried out with selected members of the community at different periods and landscapes of Chundu Ward. These exercises were designed to map tsetse and trypanosomiasis with the help of local people who know the area and have lived in it for generations. Finally, a survey focussing on livelihoods also complements the data. The next section describes the livelihoods in the study area and how these structurally relate to exposure. The final section summarises the chapter.

Livelihoods and Tsetse in Chundu Ward

Faced with poverty, the people of Hurungwe are engaged in four distinct, but not exclusive, activities of equal importance. These are foraging, livestock production, hunting and crop production. These strategies and how they increasingly expose people to tsetse and trypanosomiasis are discussed in sequence.

Foraging and Exposure to Tsetse and Disease

Foraging is a livelihood strategy based on collecting or gathering resources, often wild and common. It is central to livelihoods in Hurungwe and is a complementary activity to agriculture (Dzingirai & Mangwanya, 2015: 145). During the survey, respondents were asked if they venture into the forests and how often. The results are presented in Table 5.1.

Frequency	Respondents (%)
Often	64.5
Seldom	29.0
Never	6.5
Total	100

Table 5.1 Frequency of Venturing into Forests

It is clear from the data presented here that foraging is an essential part of survival in the study area. From the respondents, a total 93.5% admitted that they go into the forests regularly, be it often or seldom. This is supported by Mr. Marizani, from Mayamba Village.

Forests are our lives here. We cannot survive without forests. They are like offices and industries to us. We wake up every morning and get into the forests to look for survival. Food, water, medicine, whatever you want is found in the forest.²¹

²¹Interview with Mr Marizani, Mayamba Village, 14 March 2014

For the 6.5% that indicated that they do not venture into forests, it was mostly the aged, who, because of their advanced age, could no longer walk to the forests which are now found in distant areas due to land clearance. The main activities that are undertaken in the forest are shown in Table 5.2

Forest Activity	Frequency	%
Herding	72	13.9
Grass	258	49.7
Water	130	13.7
Edible Roots, Fruits and Insects	44	8.5
Firewood	43.6	84
Others	8	1.6

Table 5.2 Main Forest Activities Undertaken in Chundu Ward

The activities are pursued by all social groups, men, women and children. As further noted by Mr. Marizani,also quoted above,

Everyone goes into the forest, be it children, women or men. Women will go there,mostly, to look for food like wild vegetables, edible insects and fruits. They also look for water, grass for brooms and resale. Children also assist the women. They are very useful because they can climb trees or go into those tiny spaces which the women cannot reach. They also hunt for small wildlife. We as men hunt for bigger animals and look for poles. There is so much to do in the forests.²¹

So foraging is indeed an essential activity that is undertaken by all family members in the study area. As detailed by the informant above, what is different is the resource collected and how it is collected. For instance, when children are involved in foraging, they collect resources which demand agility beyond that of other age groups. Thus, they collect edible worms, often through climbing trees and collect bird eggs in tall and thorny trees. For women, it is normally, wild fruits and grass, all of which are burdensome, while for men it is mainly risky projects such as collecting honey, even in protected areas under surveillance from the state. Thus, foraging is an important livelihood strategy, pursued by all groups of people. What is also important is that forest use is a year-long activity, as illustrated in the seasonal calendar in Table 5.3. The calendar excludes some daily non – forest activities such as cooking and house cleaning.

Table 5.3: SeasonalCalendar for Chundu Ward

MONTH	ACTIVITY		
	MALE	FEMALE	
JANUARY	Firewood for curing tobacco, cattle herding around the home	Herding around the home, Water and firewood collection	
FEBRUARY	Riverain gardening continues, Herding around the home,	Foraging of mushrooms, Herding around the home, Water and firewood collection	
MARCH	Herding around the home	Herding around the home, Fetching water and firewood	
APRIL	Collecting poles for construction, Herding around the home,	Thatching grass, Herding around the home, Water and firewood	
MAY TO JULY	Same as April	Same as April	
AUGUST	Fetching poles for repairing roofs,Herding further from home, Gardening, Hunting	Thatch grass and firewood collection, Riverain gardening, Herding further from home	
SEPTEMBER TO OCTOBER	Same as August	Same as August plus foraging, fetching water	
NOVEMBER	Hunting	Fetching water and firewood	
DECEMBER	Tobacco Planting, fishing, herding close to home	Planting, weeding, herding close to home, fetching water and firewood	

In this calendar, it emerges that foraging takes place in the dry season (September and October). This is when people throng the forests for insects and edible worms. Also during the wet season (December - February), they venture into the forests, this time in search for mushrooms and seasonal fruits. Mrs. Mataga from Kabidza Village further elaborates,

People go into the forests mostly during the dry season when field activities are less. Forests are useful this time because people get food to supplement their diets. Some families would have run out of their field produce from the previous season. The activity is less intense during the wet season because people will be concentrating on farming. But it is a year-long activity. There is always something that people want from the forests throughout the year.²²

Previously, foraging used to be around homesteads. Each homestead is allocated or personally maps out a piece of land, from which they should build their homestead, get grazing and agricultural land as well their forest-related needs. This is also the land from which children, particularly male sons, inherit. These two, pasturelands and potential homestead areas,were rich in resources, and the villagers would scurry these areas for such.

Nowadays, foraging is not confined to the homestead due to depletion of forests. Because of this, women in peripheral villages such as Mayamba and Kabidza now encroach into protected areas where there are still thick forests containing forest resources while those in central villages around Chitindiva throng the unsettled and evergreen Mushangishe Valley.Says Mr. Shamba from Kabidza Village,

There are no more forests to talk about. They have become depleted. So the only solution for us is to go beyond the (game) fence where you can still find good trees for poles and even wildlife. We know that it is not allowed but we have no choice because we need to survive.²³

²²Interview with Mrs Mataga, Kabidza Village, 21 March, 2014

²³ Interview with Mr Shamba, Kabidza Village, 22 November, 2013

In encroaching into areas of rich resources, the people of Chundu expose themselves to tsetse fly. Certainly, not every area frequented by these villagers is dangerous. While those forests in the immediate vicinity were felt to be safe, the thick forests surrounding perennial water sources are areas of risk. As testified by one Mrs. Moyo from Butau Village,

Now we have no choice but to go into valleys which have tsetse if we want to fetch thatch grass, firewood, poles, and water in deep streams or even washing and bathing.²⁴

Mr. Moyo also adds,

We get into the forest regularly for several activities. You might want to go hunting and tsetse can bite you during the process. Even if you come across it one might fail to kill it as it is a clever fly. But we still go because there is nothing else to do. Houses need to be thatched and gardens need poles and fences so that animals do not stray in there. Sometimes, it is even basic things such as water. ²⁵

This is illustrated by local mapping exercises conducted in 2013 (Figure 5.1). From the exercises, it was established that water and most forest resources are scarce between September and November when temperatures are high. As a result, the villagers have to go further into the forests in search of these. Ultimately, this takes them to the valleys, such as the Mushangishe Valley, with thick forests and perennial water sources, such as Chitake River, where they can still find water, edible fruits and other forest products for both domestic and commercial use. These are also the areas where water for cooking and laundry can be found during the hot season. In fact, water for domestic use is a challenge in the Ward as it is

²⁴Interview with Mrs Moyo, Butau Village, 7 February, 2014

²⁵Interview with Mr Moyo, Butau Village, 7 February, 2014

serviced by only two boreholes, both located within the original villages. This means that all the other villagers, especially those at the frontier have no access to clean water. Thus they rely on springs in the gardens and forests. But these normally dry out in summer and thus women have to frequent perennial water sources to get water.

Normally, women only fetch water for cooking and drinking to take back home. But activities like laundry and bathing are normally done at the source of water. This increases the risk of being bitten because women do their laundry and dry it in the forest to avoid the burden of having to carry wet clothes to dry at the homestead. Bathing by adults and children is also done at these points, normally while waiting for the clothes to dry. As documented by Mrs. Machaya,

We do our laundry in the valleys. It takes a whole day because we also wait for it to dry. And while we wait for it to dry, we take a bath and also bath our children. When we bath, we look for hidden spots in the thick forest where we cannot be seen by passers-by. But these are the spots where tsetse will also be hiding and can easily bite as we bath with no clothes on. So this activity comes with a risk. But what can we do? We have to wash clothes regularly and bath daily. ²⁶

As reported by Syed and Guerin (2004), tsetse normally lies low during this period and will only bite when disturbed. Regardless to say, the activities that take place at these points during this period are definitely bound to disturb the fly. Worse still, the women and children are highly exposed as they take off their clothing to bath in these areas. And as will be noted later, these areas are also frequented by both domestic and wild animals for watering. In the end, the human-wildlifelivestock interaction is high, thereby exposing people and cattle to tsetse. In

²⁶Interview with Mrs Machaya, Mahwau Village, 7 March 2014
short, the study concludes that foragers are affected by tsetse as they make use of resources in these patches. People actually repeatedly described these areas as *'mateneti etsetse'*, meaning tsetse maternity areas.



2014 PRODUCTION

Figure 5.1. Chundu Ward Resource Map

When asked to indicate areas perceived to have high tsetse incidence, women in villages around Chitindiva consistently pointed to the valleys while those in the peripheral villages pointed to the protected areas as the most dangerous tsetse fly zones. As admitted by Mr. Chikazaza ofMahwau Village at the frontier,

There is tsetse here, yes, but there is more of it beyond the fence as you approach Gova (Zambezi Valley)²⁷

Hunting and Exposure to Tsetse and Disease

This section looks at another livelihood strategy, hunting, and how it relates to tsetse diseases. In practice, people hunt mainly during the dry season, when done with agricultural activities. This, as indicated in the seasonal calendar in Table 5.3, is mainly from August to November, the hottest months of the year.

Hunting as an activity exposes people. This is because people do not hunt just anywhere but in those thick and forested places and these typically include frontier zones. They also increasingly hunt in protected areas which are popular because they have a wide variety of game, including buffaloes and impalas, the favourite of hunters. As expressed by Mbangira, a daring prominent hunter in Mahwau Village at the frontier,

There are no more animals here. People have driven all animals away. Animals do not like people so they ran away. Now we have to go into national parks to get animals. And we have to travel kilometres and kilometres to get to where the animals are. We are normally away for about ten days or more. Three days are for traveling to the valley, one or two days for hunting, then we have to skin and dry the meat before we head back home. All this time we will be playing hide and seek with game rangers so we usually take long

²⁷ Interview with Mr Chikazaza, Mahwau Village, 14 March 2014

routes to avoid detection. So definitely we are bitten by tsetse because we spend a lot of time in the forest. Our dogs are affected too. But we have our own ways of dealing with the problem, although not always very effective.²⁸

As is evident in this testimony, these high-value areas where wildlife is found are also infested with tsetse flies, which is a danger to both the hunters and their hunting dogs. Hunting is, therefore, one activity that carries considerable risk of disease in this area. However, because it is illegal, only a few daring people were willing to discuss it, with the rest fearing the information may end up in the wrong hands, leading to their prosecution.

Livestock Production and Exposure to Tsetse and Disease

This is an important livelihood activity in Chundu Ward and without doubt, one that has exposed many households to disease. Exposure normally arises through movement of animals, both domestic and wild as they seek water and grazing points. There are two main ways in which people and livestock are exposed to tsetse and disease. Firstly, exposure was said to be high during the off-farm season. The exposure arose from herding and grazing patterns. During this period, crops would have been harvested from the fields. Because of this, herding is not done around the home compared to the farming season where cattle are kept closer to home so that they do not destroy crops in the fields.

This is also evident in the seasonal calendar (Table 5.3) where villagers indicated the months August to November as the time that people herd their cattle away from home. But because there are no crops in the fields, some livestock keepers let their cattle wander, unaccompanied, in search of food and water. In most instances, these cattle end up in areas like the Mushangishe Valley which is rich in vegetation

²⁸Interview with Mr Mbangira, Mahwau Village, 13 December, 2013

but tsetse infested. It is common knowledge among the cattle owners that once cattle fray into this valley they succumb to the disease within a short period. As testified by Matambo, a cattle owner and former tsetse control worker from Mocho Village, bordering the valley.

Some people do not herd their cattle. They just let them wander in search of pastures. And they end up in Mushangishe where they spend a week there or even more. Yet everyone here knows that once a beast goes into that valley, it is very likely to come out sick because there is lots of tsetse in there. The worst part is that when they come back to the village they bring back the fly and disease and infect other people's animals.²⁹

Secondly, disease incidence was also reported to be high during the hot months, these being September and October. From the mapping exercises (Figure 5.2) depicting animal movements, it was shown that wild animals, some of which host the tsetse disease, move from the frontier in search of water and grazing points. During the hot months, water and grazing points are found only around perennial water sources within the settled areas of the Ward. At the same time that wild animals will be moving from the frontier into the villages, cattle will also be moving from homesteads into these perennial sources in search of the same resources. In the end, they both converge at these perennial grazing and watering points, thereby creating an environment that is conducive for disease transmission. This interaction also puts the herders at risk as they are also likely to get exposed to bites.As detailed by one herder, Manase,

²⁹Interview with Mr Matambo, Mocho Village , 8 February, 2014

Herding during the hot season is risky because we have no choice but to go to valleys where there is tsetse. These are the only places where water and green grass will be found and there will also be some wild animals like baboons, also looking for water. But we know that tsetse will be there too and that there is a risk of getting sick from tsetse bites.³⁰

Ironically, and as evident from this informant, it turns out that the areas that are abundant with resources are also the same areas that have a high risk of disease transmission through interaction amongst livestock, wildlife and humans.

³⁰Interview with herder Manase, Butau Village, 14 March, 2014



Figure 5.2 Animal Movements in Chundu Ward

Farming and Exposure to Tsetse and Disease

Farming has also exposed people to the fly and its diseases in this area. This is a major livelihood activity. For it is mainly through farming that the people get food and money to purchase non-farm products, livestock, pay school fees and make other investments.

The farmers that have been mostly exposed are the recent migrants and so-called 'squatters', who have settled themselves in areas reserved for CAMPFIRE, concession hunting and forest areas. The migrants are perpetual entrepreneurs and move into protected zones searching for the most fertile land where they can expand their tobacco fields to realize more profit and where they can access ready firewood for curing the crop. At the same time, the squatters, mostly former commercial farm workers also want places where they can hide from the state while also trying their luck in farming. As stated by one squatter, Mr. Masaya, settled at the very end of Kabidza Village,

I chose to settle here, even if there are tsetse and wild animalsbecause I feel safe. No one would want to come and remove me here because they also fear for their safety. They fear wild animals and snakes and being bitten by the fly. So because of that, I am safe. ³¹

At the same time, there are some settlers from the original villages who, for fear of losing fertile land to the newcomers, have abandoned their original homes and moved to the frontier. As Mr. Munangwa explained,

I have been here in Chundu for a very long time. I came with my father from Gova around 1965 when I was very young, about five years old. And we settled in what is now Mocho Village, near Chitindiva Business Centre.

³¹Interview with Mr Masaya, Kabidza Village, 21 March 2014

When I was growing up, my father was very happy because there was a lot of land for the family to farm and forage. There are eight of us in my family, all boys.As we became older and got married, the land that my father had cut out for us became smaller and smaller. It was no longer enough for all of us to farm and build homes. I wanted to have a large tobacco field but the land was not enough for me and my brothers. So my father realized that after some time, there will totally be no more land for his sons to build homesteads and fields. So he encouraged us to leave home and come here to look for land for our families and our future generations. So, four of us moved here. There is enough land here for me, my children and even grandchildren. The only problem is that there is a lot of tsetse, wild animals and we are constantly threatened with eviction. But besides this, we can farm as much land as we want.³²

The areas targeted by all these people for farming and settlement are still thick forested and have reasonable numbers of game roaming about. Yet these farmers have to endure clearing these thick forests in order to map out land for farming and settlement. But even after clearing the land, the flue-cured tobacco that they grow requires considerable amounts of wood for curing. The crop requires an excessive amount of firewood during the curing process that can take up to seven days.

Yet, the forests that are immediately around them would have been cleared for farming. As a result, when the time for curing comes, they go into the yet untouched forests stretching into the even more tsetse infested Zambezi Valley to get the firewood.So they are continually exposed to the fly and disease. This was clear in the interview with Mr. Nyamusoko, a recent migrant farmer, settled in Katenaire Village,

³² Interiew with Mr Munangwa, Kabidza Village, 21 March 2014

People are always clearing land here. Sometimes it is for settlement, other times for farming or just cutting trees to cure tobacco. There are many trees here. When we have exhausted those around us, we move further. So we are always clearing land for one reason or another. And yes, tsetse is there in the forests. Sometimes we get bitten, and also our cattle get sick.³³

The growth of the tobacco industry, followed by the continued demand for firewood has led to the mushrooming of even more new settlements within the protected areas where there is abundant firewood and large tracks of fertile land suitable for tobacco. The irony of this situation is that these are the areas where wildlife and tsetse are still abundant and by moving into these areas, the farmers expose the same cattle that they need for crop production to trypanosomiasis.

Another farming activity that exposes people in this area is gardening. This activity is normally done mainly around August to October when most field activities would have been finished as indicated in the seasonal calendar (Table 5.3). The activity takes part, mostly, in riverine areas where there are abundant and perennial sources of water. Crops grown are mainly leafy vegetables, tomatoes and onions that are used to supplement diet at a time when most field produce will be running out. As detailed by one Mrs. Machaya, from Katenaire Village,

Gardening is part of life. That is where we get our vegetables when there are no more vegetables from the fields like *muboora* (pumpkin leaves), which is only found during the rainy season. People grow tomatoes, onions, potatoes, okra and leafy vegetables like rape. Unfortunately, for a garden to survive throughout the year it has to be located at river banks, where there are perennial sources of water. We know that most of these areas are tsetse

³³Interview with Mr Nyamusoko, Katenaire Village, 15 February, 2014

infested but we have no choice. We just protect ourselves and continue to do our job. Otherwise, we would starve.³⁴

Any surplus produce is sold within the village or taken to the markets in Karoi Town. There are also some banana plantations around the river banks. Mrs. Dube, from Butau Village, explained,

I am a widow. I have been gardening for over ten years since my husband passed on. That is how my family survives. I have educated my children with money from my garden, at boarding schools, not local day schools. I used to grow tomatoes and rape only but now I have added potatoes and have just started a banana plantation. I take my produce to Karoi and sell it at wholesale prices at market stalls. My kids are grown up now. They are employed and they sometimes assist with inputs. ³⁵

Although a very important activity in terms of food security, gardening exposes people to tsetse. This is because the areas where this activity takes place are normally infested with tsetse. For the river banks are normally rich in natural vegetation, a condition suitable for tsetse habitation. And it is not everyone who is affected here. Normally, the activity is done by women and children and during the peak periods, they spend the whole day there. Men rarely work in the garden except when they fence the area to protect it from wild animals. So in essence, they do not spend as much time in the gardens as the women and children do. It is, therefore, women and children who become susceptible to tsetse bites in these riverine areas.

³⁴Interview with Mrs Machaya, Katenaire Village, 25 January, 2014

³⁵ Interview with Mrs Dube, Butau Village, 14 March 2014

The various methods that the women use to protect themselves are discussed in the next Chapter, but they are mostly traditional. Whether they work or not is a different issue but what is important to note here is that the activity exposes women and children to tsetse and disease. The next section discusses yet another vulnerable to disease.

Professions Exposed to Tsetse and Disease

Besides exposure related to rural livelihoods, the study found another group that has greatly been affected by tsetse and its diseases. This is one group that was not initially targeted by the study but as the research progressed it became evident that these people deserved attention because they are among those affected by the fly and its diseases. However, unlike the communities in Chundu, the exposure of this group is linked to professions or activities of their choice and not because they have been forced by circumstances beyond their control. This group includes game rangers, conservation professionals, tourists and hunters who find themselves in tsetse-infested zones either because of their professions or out of leisure. According to a local nurse,

The cases of sleeping sickness that I have heard of here are from safari operators and game rangers. I think it is because they spend more time in the national park forests. But, they never come here for treatment. They go to private doctors or hospitals in Zambia where they get treated fast. ³⁶

This is corroborated by statistics, compiled from the Ministry of Health records (Table 5.4) which show a total of 20 cases of sleeping sickness between 2005 and 2014. Shereni *et al.* (2016) have documented 28 cases between 2005 and 2008. But despite the variance in the statistics, the important observation is that most of those affected were either tourists or game rangers.

³⁶Interview with local nurse, Chitindiva Clinic, 8 November 2013

Table 5.4 Incidences of Officially Reported Cases of Sleeping Sickness2005 - 2014

Year	Cases	Deaths
2005	2	0
2009	1	1
2011	2	0
2012	11	0
2013	1	1
2014	3	1

Adapted from Dzingirai et al., 2016.

The 20 cases, including three deaths, were all from Hurungwe district and surrounding areas (Dzingirai *et al.*, 2016). For instance, the death recorded in 2009 was that of a game ranger based in the Zambezi Valley. The ranger was treated for several diseases including malaria, tuberculosis and HIV/AIDS, at both provincial and national referral hospitals, before being tested and found positive with sleeping sickness (Katsidzira & Fana, 2010). However, when the correct diagnosis was finally made, the disease had spread so much that the patient succumbed to it. This case clearly shows the unpreparedness or ignorance of the country's health system in dealing with sleeping sickness. For, given the type and place of the occupation of this ranger, sleeping sickness should have been one of the first diseases to be tested for.

The plight of this group of professionals was further highlighted in a newspaper article in November, 2012 where Zimparks, a parastatal which employs game rangers and has tourism interests in the Zambezi Valley, was reported to be concerned about the increasing cases of sleeping sickness in the Valley, with tourists and professional hunters being the most affected. The newspaper also reported that due to lack of health facilities equipped to immediately attend to victims in the Zambezi Valley and surrounding areas, those who could afford to, often crossed over to Mutenderi Mission Hospital and the University Teaching Hospital in Lusaka for treatment. ³⁷

Chapter Summary

This chapter has shown that the people in the study area rely on livelihoods that are mostly forest and land-based. In fact, these are perhaps the only viable livelihood options left to households in this area affected by successive development initiatives, which, ironically, have left the area undeveloped and the residents very poor. This has made the ward attractive to wildlife and tsetse, which the study argues is central to the poverty of local people. It is because of this that they have had to continually adjust and re-adjust their lives in order to survive. The adjustment has typically taken the form of activities that expose households to tsetse and its diseases.

The chapter also shows that while exposure occurs, it is limited to specific groups of people. It is limited to herders, women, and other groups that spend protracted time in the forest in pursuit of livelihoods. And the exposure is confined to residual forests, places that people refer to as '*mateneti etsetse*' or tsetse breeding places. Finally, the chapter also shows that exposure to disease is mainly confined to the hot season and other times when considerable interaction among wildlife, tsetse and people is high.

Clearly, there is a forced convergence and competition over resources at a particular time by people, wildlife, livestock and tsetse which, in turn, creates opportunities for disease emergence and transmission. In the end, a complex interaction emerges between livelihoods and disease whereby the fly comes to the

³⁷Article by Mushava, published in Newsday, 15 November 2012.

people but in many ways, these people also go to it at specific times with consequences of exposure. The study will return to this observation and its implications for disease control in the last chapter.

CHAPTER SIX

EFFECTS OF TSETSE AND ITS DISEASES ON LIVELIHOODS

Introduction

In the last chapter, the thesis looked at how particular groups are exposed to tsetse flies as they pursue their different livelihoods. The focus was on how livelihoods exposed people to the risk, not just of the fly but also of disease. In this chapter, the thesis takes the analysis a step further. It examines the various ways in which tsetse and its diseases affect pillars of livelihoods in Hurungwe, rendering them unsustainable, when viewing them through the Rural Sustainable Livelihoods Framework. It also examines ways in which the community responds in order to cushion themselves against these effects. It must be noted that the effects discussed here do not, in any way, imply a cause and effect relationship between tsetse/disease and poverty but rather details ways in which livelihoods have been compromised by the presence of tsetse and its diseases. It must also be noted that, like in any rural setting in the country, there will be other factors causing poverty. For example, the ward has not been spared by the economic problems that have affected the country in the past two decades. In addition, the area is prone to droughts, making crop production risky, and hence, food security difficult to achieve.

The data in this chapter shows that the fly compromises the pillars of livelihoods in Hurungwe. Firstly, cattle owners are the major victims, each year losing beasts to the disease from tsetse. As a result, they are inevitably deprived of assets that boost social status within the community. For instance, they are used in the form of bridewealth to control women and their labour. Secondly, crop farmers lose as they are deprived of draught power, making it difficult for them to produce meaningful yields capable of sustaining food security. This forces them to look up to a highly unreliable state for mechanized farming, creating indebtedness to and patronage from the state. Thirdly, hunters in these tsetse infested landscapes, also lose in that they cannot continue with the practice that assures them of the much sought after game meat. Lastly, squatters are also losers because they cannot expand their compressed settlements outwards for fear of the tsetse menace in the frontier where they are located. Because of these observations, the chapter concludes that tsetse has considerably compromised the pillars of livelihoods in Hurungwe. The study returns to the implications of this finding in relation to control in the last chapter. For now, it suffices to note that there is some burden that is imposed on the people and their livelihoods by tsetse and its diseases.

Data for the chapter comes from ethnographic research in Chundu Ward. The details for the overall research methodology have already been sketched in Chapter Four. Suffice to say for this chapter, data comes from interviews with the affected people in the Ward, including some key informants. The interviews were recorded and later transcribed with the help of a local research assistant, who has lived in this tsetse-infested area and has a deep knowledge of the local situation. The key informants that were interviewed include the old chief, whose homestead is at the frontier, where there is tsetse. The new chief, who declares himself a partner in tsetse eradication, was also interviewed. A village head, local nurse, the local veterinary officer and dip tank attendant, who both keep records on tsetse incidence, were also interviewed. The chapter also draws significantly from the survey outlined in Chapter Four, which also sought to capture the tsetse problem. Finally, the chapter also draws from secondary sources such as government reports on tsetse. Of course, the latter are partisan because their nationalist authors rarely admit to the presence of any serious problem, such as tsetse, that might affect the

image of the nation. Nevertheless, these reports provide a window and useful insights into tsetse diseases and their human dynamics.

The chapter is divided into three sections. The first section discusses the Sustainable Rural Livelihoods Framework, as a lense through which the livelihoods in Hurungwe are examined. The second section details how four social groups, namely the livestock keepers, foragers, farmers and squatters have been compromised by the fly and its diseases. The section also discusses the response strategies that these social groups have adopted to deal with the fly and how these strategies have, in turn, exposed them to more dangers. The last section summarises the chapter.

Sustainability of Livelihoods in Chundu Ward

The discussion of livelihoods this chapter is done within the context of the Sustainable Rural Livelihoods Framework (Scoones, 1998). This framework brings together issues related to environmental management, rural development and poverty reduction. It addresses pertinent issues relating to the interplay between resources, institutional processes and strategies and how these can advance or constrain people, at individual, family or community level in achieving sustainable livelihoods *(ibid)*.

While a definition of a livelihood, borrowed from Cornway and Chambers (1992) and Ellis (1998), was proferred in the previous chapter, this did not delve into what a 'sustainable' livelihood is. In his framework, Scoones (1998:5) first defines a livelihood as comprising of capabilities, assets (both material and social resources) and activities required for a means of living. From this, he then goes on to define a sustainable livelihood as one that can cope with and recover from stresses and

shocks, maintain or enhance its capabilities and assets, while not undermining the natural resource base' *(ibid)*.

From this framework, sustainable livelihoods can be achieved in different settings through access to various forms of capital. These include human capital (knowledge and skills), natural capital (e.g land, soil, water), economic capital (e.g. cash, assets), social capital (social networks and affiliations) and others (*ibid*: 7-8). combined The capitals are then to pursue three major typesof livelihoods:agricultural intensification and extensification; livelihood diversification; and migration, all being influenced by formal and informal institutional and organisational factors. In order to ascertain the sustainability of a livelihood, one then has to look at the particular context and ask what combination of resources (capital, human, social, economic) are available and what combination of strategies (agriculture, diversification or migration) can be followed and with what outcomes. A livelihood will then be deemed as sustainable if it can create gainful employment, reduce poverty, promote/enhance individual well being, recover and cope with stresses and shocks and maintain the natural resource base.

This framework is, therefore, used to assess whether the livelihoods that the community in Chundu Ward has been forced into are sustainable. As will be shown in this chapter, as much as the livelihoods provide gainful employment in that they create working days with some income, monetory or otherwise, they fall short in terms of the other four measures of sustainability. Firstly, the livelihoods barely cope with stresses and shocks as they are continuously attacked by disease, economic factors and droughts, among other stresses. Secondly, in terms of poverty reduction and enhancement of individual well being, it was shown in the previous chapter that the community remains largely poor. Lastly, the livelihoods have failed to protect the natural resource base. The cutting down of trees to cure tobacco;

large scale clearance of land for agriculture and settlement; widescale hunting of wildlife and extraction of forest products to supplement diets; and gardening along river banks have all destroyed the natural resource base, which ironically for this population, is at the centre of survival.

Impacts of the Tsetse Fly and its Diseases on Livelihoods

This section discusses the various costs incurred from the tsetse fly and its diseases by different social groups as they try to secure a living. The first group discussed in the section is that of livestock keepers.

Livestock keepers

Livestock production is an important livelihood activity in any rural environment and Chundu Ward is no exception. Without a doubt, this is one activity that has been most compromised by the presence of tsetse flies in the district. The effects on livestock rearing date back to the colonial era. From the interviews with both the acting³⁸ and substantive Chief Chundu, it was established that rearing of cattle was not allowed in the area as a tsetse disease control measure up to the early 1990s. Although from the interviews with the villagers³⁹, the exact year in which they were allowed to bring in cattle was not clear, most indicated that it was around the late 1980s to early 1990s. So, this means that the community was deprived of investment in cattle for almost three decades, given that Chief Chundu and his people moved into the area in the 1960s. As testified by villager Ruswa from Butau Village, one of the oldest villages in the Ward,

³⁸Acting Chief interviewed during reconnaissance visit on January 25, 2013

³⁹ Interviews carried out within the Ward between November, 2013 and March, 2014

Chirwere change chakazara (The disease was everywhere) ...during the period 1980-1985. We were prohibited from keeping cattle in the area. They (Veterinary Department Officers) said cattle would not survive because of tsetse.⁴⁰

Even when the community was eventually allowed to keep cattle, there were still challenges according to the acting chief.³⁸At first, they were only allowed to keep cows which were believed to be less susceptible to disease. Although this was a relief to many, it was only partial because with just the cows, 'we could not breed more cattle to build herds', according to Ruswa, also quoted above. And because of this, the ban was therefore detested by locals.³⁸ Later, and after protests, households were allowed two oxen each, mainly for draught power.

Around the mid-1990s, when it was believed that the fly had been successfully controlled in the entire Mukwichi Communal Area, where Chundu Ward lies, the restrictions on the number and type of cattle were relaxed.⁴¹ However, during the first ten years of letting cattle into the area, the disease situation was very serious, to the extent that some homesteads lost their entire herds. One migrant from Gutu, who had a herd of eighteen cattle, recalled how he lost his '*danga*', (an entire herd) within two years,

I started keeping cattle around 1988, first with only cows being allowed because they were said to be resistant. Later when it was opened up, I accrued up to eighteen cattle but by 1998, I had lost '*danga rese*' (my entire herd). My cattle died between 1996 and 1998. It was because of the tsetse disease. At that time, we did not have adequate information about preventive and curative medicines like *berenil* and only used traditional methods,

⁴⁰ Interview with Ruswa, Butau Village, 21 February, 2014

⁴¹Interview with Veterinary Officer, Chitindiva Business Centre, 4 December, 2013

whose benefits were short-lived. When I came here, I thought I was going to accumulate more cattle, but instead, I lost everything that I brought here.⁴²

Another villager, Manjowe, from Mayamba village and a prominent cattle owner, added:

We started having cattle (*kuchengeta mombe*) around 1988, that's when we started keeping cattle in a serious way (*zvaionekwa*).But the cattle were being bitten (by tsetse) still, even though we were told that it was now safe.⁴³

Interviews and histories by local people all converge on the point that the period between the 1990s and early 2000s witnessed the highest number of deaths from the disease. The clearance of forests for settlement and farming by the growing population drove wildlife away further towards the Zambezi Valley. This resulted in areduction in blood meals for the tsetse fly (GoZ, 1998). With the movement of wildlife away into the Zambezi Valley (Mackie, 1993) occasioned by human activity, tsetse then turned to the newly introduced livestock for its blood meals (GoZ, 1998). This resulted in serious tsetse related deaths in Chundu Ward in the 1990s as evidenced by the following testimony from Tashaya,Mangwaira Village,

Mombe dzakafazvekuti (Cattle drastically died) in 1997 – 1998, 2000, 2002. Most kraals (*matanga*) were closed in this community. Those who were left with cattle are those who could afford to get *suramin, berenil* and other dosers.⁴⁴

⁴² Interview with Mr Charangwa, Mangwaira Village, 15 November, 2013

⁴³Interview with Mr Manjowe, Mayamba Village, 16 March, 2014

⁴⁴ Interview with Mr Tashaya, Mangwaira Village, 14 February, 2014

The death of many cattle in the 1990s due to tsetse disease also coincided with the introduction of CAMPFIRE, outlined in Chapter Two. The programme promoted the conservation of wild animals by communities. The programme, according to villagers,⁴⁵ brought wildlife within close proximity to the settled areas (*'mumisha'*). Most of the animals involved in this project, such as buffaloes and elephants, were already documented in official records, as favouritesof tsetse for blood meals.⁴⁶ Several casualties were also reported between the years 2007 and 2009 when the country was facing what locals refer to as *'nguva yakaoma'* (the worst economic crisis).⁴⁷ During this period, most cattle owners could not afford (*vaishaya mushonga*) veterinary drugs, where these were available.³⁸

The loss of cattle left households in a vulnerable state as detailed by Mr Charangwa, who is referred to above as having lost 18 cattle within two years,

Upenyu hwakandiomera (Life became very difficult) after I lost all my cattle. When I had cattle, I could get milk, either fresh or sour, to feed my family. Sometimes I would sell excess milk to raise money for school fees. When my herd was still strong, I could get even up to 10 litres (of milk) a day. This was more than enough for my family to survive. I was a *shoroma* (wealthy person) in this area but *ndakaita murombo* (I became very poor afterwards)and even more stressed because I could not feed my family. The children were always sent back from school for non - payment of fees. As you can see, I have a *barika* (two wives) and *gurusvusvu revana (*many children) here and they were looking up to my livestock wealth to feed them. Now there was nothing. At that time, I really regretted leaving Masvingo to come to this place. I have

⁴⁵ E.g Interview with Mr Zimudzi, Marigachando Village, 15 February, 2014

⁴⁶Annual Report of the Chief Entomologist. www.sacema.org/uploads/tsetse/tsetse-

project/tsetse-project-annual-report-1926.pdf

⁴⁷ Interview Chief Chundu, Tugwe Village, 20 March, 2015

since acquired four beasts but my life will never get back to where it was then.⁴³

Today, the fly is still causing sickness and even death of cattle. The effects of tsetse and its diseases and the resultant poverty it has imposed on people are clearly visible in cattle ownership in the Ward. From the survey, more than half (59%) of the respondents owned at least one beast, with only 3% having ten or more cattle. The average number of cattle for the Ward was only two per household. The findings strongly mirror those from other sources. For instance, the Rural Livelihoods Assessment⁴⁸ (RLA) (2012) reports that Mashonaland West Province, where Hurungwe is located, had the highest number of households that did not own cattle (69%) as well as the lowest proportion of households owning more than five cattle (13%). Again from the RLA, the province also had the highest percentage (73%) of households that did not own goats.

The presence of tsetse, among other factors, has affected investmentin livestock in Hurungwe.It has been a deterrent not only because there is always a chance of losing cattle through disease. But more importantly, it deterred people because there was nothing to be gained from keeping cattle. The people who had lost cattle from tsetse said they were not even allowed to touch, never mind to eat the meat from the dead beasts which were burnt as part of disease control, because as Charangwa (also quoted above) noted, *'nyama yacho yainzi yakasviba nechirwere'* (the meat was said to be contaminated with trypanosomiasis).³⁰ This includes those who had brought the cattle from their areas of origin. These practices and consequences deterred people from investing in cattle.

⁴⁸www.fnc.org.zw/media_publications.html

The tsetse menace still exists even today. But from the study, it emerged that the villages at the frontier are the ones that are still being most affected by the tsetse menace more than the other villages. This was made clear by the local veterinary officer in an interview,

Most of the reports of trypanosomiasis that I have received come from the villageslocated *kumapeto*, (at the border). So I can conclude that these are the villages with more cases than the central parts.⁴²

The observation by the veterinary officer was also corroborated by the villagers' responses in the survey when they were asked to indicate the areas they thought had the highest cases of disease (Figure 6.1).



Figure 6.1: Respondents' Perceptions of Areas with High Exposure Trypanosomiasis

As can be seen from Figure 6.1, the majority of the respondents (63,4%) pointed to the frontier villages as the ones that were most affected. A significant number (16.4%) also indicated that Mushangishe Valley, a perennial water and grazing source, and the surrounding villages also presented high disease exposure.

The veterinary officer also indicated that he recorded an average of 48 cases in the Ward every four months but also noted that the figure was lower than expected.⁴² He suspected that considerable cases, especially at the frontier villages, were not reported either because he was too far from them or the cattle owners were diagnosing and treating the cattle themselves. And both scenarios could be very true as will be discussed later in this chapter.

But despite the problems associated with the fly, people have continued to invest in cattle. They have been able to do this because of some strategies that they have devised to deal with the fly and its diseases. Some of these tactics are modern while others involve the use of traditional knowledge systems. But regardless of the method, the ultimate goal is to reverse the threat caused by tsetse and its diseases to this essential livelihood. The next sections discuss these response measures.

a) Resorting to modern medicine

There are some people, perhaps the well to do, who make use of modern medicine.One renowned cattle owner, Mr. Mashayamombe, who kept stocks of modern medicine, noted,

These days it is easy to control diseases. You just have to make sure that you have berenil or suramin at home. They cost a dollar each and you can get them from the shops here in the Ward. And whenever you suspect anything, you just dose the animal yourself. No need to wait for the veterinary officer.⁴⁹

He added that many livestock farmers in this area have learned to use modern medicines to either protect their livestock from trypanosomiasis or treat infected animals. Previously, this protection function was done by the state through its various departments but with the laxity in funding, the management of the disease has become co-shared and now includes livestock owners or *'veruzhinji*, as put by Mr Mashayamombe above.⁵⁰

Thus, cattle owners have taken it upon themselves to access the medicines and also learn how to administer them. Farmers are relieved and report that "*mishonga yacho yakutengeka*" (modern medicines have become affordable).⁵⁰ With most of the basic medicines, such as *berenil and suramin*, going for as little as US\$ 1 per dose, livestock owners find it easier and more effective to buy and treat their animals, than wait for the local veterinary officer who may take time to reach them.

Thus, cattle owners have learned to diagnose the diseases themselves without the assistance of a specialist. However, sometimes misdiagnosis resulting in wrong treatment or dosage occurs. Still, self - diagnosis of livestock diseases is common and is perhaps one of the reasons why there is low reportage of trypanosomiasis cases referred to by the veterinary officer earlier. This was, of course, a cause concern to the veterinary officer who noted that,

The cattle owners do not wait for assistance. They just inject their animals the minute they suspect that it has trypanosomiasis or even if they suspect that it might catch the disease. Sometimes it is not even trypanosomiasis,

⁴⁹Interview with Mashayamombe, Chisauka Village, 15 November, 2013

but they will just treat for this disease. This makes it difficult to give an official report on the state of disease in the Ward.⁴²

b) Using traditional medicine

Other cattle owners have also adopted traditional remedies to either prevent or cure animal trypanosomiasis. The study came across and interviewed several livestock owners who had, at some point, resorted to traditional medicine in times of disease outbreaks. Some of them gave the following testimonies:

You take the tree barks and pound them to make a powder. The powder is then mixed with water overnight. Then you measure 750ml of the medicine and give it to the beast.⁵⁰

Some (people) advised me to use aloe vera, but I used a certain herb, whose name I do not know. I was advised to dig the roots, grind and mix with water and then give the cattle to drink.⁵¹

We use trees like *mushumha*,⁵²*muremberembe*⁵³ and *bambamupani*.⁵⁴ You take the tree barks, they are pounded and the powder is mixed with water over night. Then you measure 750ml of the medicine and give the sick animal.⁵⁵

⁵⁰Interview, Mr Mashamba, Kabidza Village, 12 March, 2014

⁵¹Interview, Mr Zizhou, Katenaire Village, 16 March, 2014

⁵²Diospyros mespiliformis

⁵³cassia abbreviata

⁵⁴scientific name not established

⁵⁵Interview with Mr Duve, Mangwaira Village, 15 February, 2014

Those who used these medicines were mainly poor livestock owners, although a few well to do ones could also be found using the method. There were several other indigenous trees and herbs that were mentioned. These include *murunganyama* (*Bascia powellii*) and *chifumuro* (*Kalanchoe glandulosa* Hochst.). It must also be noted that the preparation of these medicines is done along scientific lines as it involves measurements and doses just as the modern medicines do. Whether these are useful or not is obviously a debatable issue, with specialists in the area dismissing them as 'useless works of darkness.'⁴²

While traditional medicine remains popular with local people, they nevertheless are aware that it is not wholly effective as detailed by one villager, Kamoto, from Mahwau village,

A cow can be treated and recover but it may be found dead in the kraal later. This is how these traditional medicines workyou can never be sure if it will work. ⁵⁶

Thus those livestock farmers adopting the practice do so with a degree of risk as they stand to lose their livestock even after 'treating' them.

c) Adopting a hybrid approach

There are also some other livestock keepers who have, in an act of desperation, adopted both traditional and modern medicines. Normally, this is done by the entrepreneurial migrants who are anxious to safeguard their investments. As elaborated by Mr. Mahachi, a migrant from Masvingo, who has a comfortable herd of 15 cattle,

⁵⁶Interview with Mr Kamoto, Mahwau Village, 14 November, 2013

You can never rely on one method. You have to use both medicines to treat your cattle to keep them healthy. The good thing about traditional medicines is that they are preventive. If you treat your cattle with *murunganyama* (*Bascia powellii*), you know that they will be resistant to disease, but once they catch the disease, you need modern medicine. You cannot take risks there. ⁵⁷

d) Dipping

Regular dipping is also another way that has been adopted by cattle owners to protect their cattle from disease. Particularly in the villages around Chitindiva, livestock owners regularly dipped their cattle.⁵⁸ This method is encouraged by both the local and district veterinary personnel, according to the Chief.³⁹ However, in this Ward, there is still some lingering doubt about dipping as a method of controlling the disease. Some cattle owners believe that the chemicals in the dip tank are not concentrated enough to protect their livestock from trypanosomiasis. As noted by Mr. Vutoyi,

It is better (to spray cattle at home) because one will be very sure of the mixture and make effective spraying of cattle. At the dip tank, some workers are not trustworthy because they steal chemicals and then put very little in the dip tank. So the mixture is not effective, *mheswe* (local name for tsetse fly) and ticks will not die.⁵⁹

⁵⁷ Interview with Mr Mahachi, Mayamba Village, 14 February, 2014

⁵⁸Interview with dip attendant, Chitindiva Business Centre, 8 Febru ary, 2014

As a result, these skepticallivestockownersshun the dip tank and prefer to treat the animals at home. They treat the disease using their own prepared formulas, referring to this as the 'diptank they trust.'⁵⁰ Dip tank attendants were aware of this practice and were keen to fault the cattle owners whom they accused of promoting the spread of disease in the area through false claims. One of the attendants was at pains to explain, in an interview, that their chemicals were never tampered with,

We are aware that some people say we steal some of the chemicals and end up with less concentrated water in the dip tank. That is not true. We are given enough chemical, deltamethrin,by the district office and we use it as directed. The problem is just that people do not want to cooperate, sometimes because they say the dip tanks are too far.⁵⁹

e.) Avoiding risky areas

In addition to veterinary-based responses, livestock owners have also adopted some managerial practices that reduce exposure to tsetse and its diseases. For instance, they avoid grazing cattle in areas known to be infested with the fly. These include the Mushangishe Valley, Chitake and Chewore Rivers. Mr. Mahachi supported this, adding that,

You just have to make sure that the boys don't graze cattle in Mushangishe, or around Chitake and Chevore Rivers. Otherwise, you lose your cattle fast.⁵⁸

The challenge, however, comes during the hot period when these areas are the only ones with water and pasture. Under these circumstances, the livestock farmers have no choice but to take their cattle to these perennial sources of water, even though they are likely to get bitten and infected. Where they do this, they use their indigenous knowledge to reduce chances of infection. For example, they pre-treat them with traditional or modern medicines to protect them either from bites or from contracting the disease even if bitten. This was clear in the interview with Matyaira, from Mangwaira village,

> During the hot season, we have no choice but to take cattle and goats into Mushangishe because that is the only place you can find water. We know that they will come out sick but we really have no choice. We just dose with traditional and modern preventive medicines and leave the rest to God. ⁶⁰

The herders have also learnt to move the cattle in large groups because it is widely believed here that tsetse does not attack cattle moving in large herds.⁶¹ To further reduce chances of being bitten, they do not keep them for too long in these valleys, according to one herder.⁶² In addition, herders rarely let the cattle stray for days without someone in attendance. This is all done to minimise risk to their cattle.

Livestock production has therefore been severely affected by the presence of tsetse in the area. So serious are the threats to livestock that people end up adopting desperate measures which they believe are capable of protecting their investments.

⁶⁰Interview with Mr Matyaira, Mangwaira Village, 22 March, 2014

 $^{^{61}}$ Interview with herd boys in Butau Village, bordering Mushangishe Valley, 14 February, 2014

Crop Farmers

These are mainly crop entrepreneurs who grow cotton and tobacco. The crops have a high value and are regarded by the government as key income earners for the country.⁶² Migrant crop growers have been affected in two main ways.

Firstly, tsetse limits the land under which these cash crops can be farmed. Farmers avoid arable and fertile places which are located in wooded areas, fearing to get into trouble with tsetse. This is a common theme that emerged from the interviews from the time the research started. People's testimonies included this one,

Everyone wants the most fertile soils for tobacco so that they get a good crop. The only areas that still have very fertile soils are in the thick forests where tsetse lives. So we have a dilemma because if you try to extend your fields into those areas you are likely to be bitten and no one wants to get sick. I have never seen the fly but I am scared still.⁶³

The second way people were affected was through livestock.Each time there was a disease outbreak, their cattle, a source of draught power, were wiped out. One prominent farmer, Mr. Rabvukwa, whose farming season was ruined, recalled how he lost six cattle in 2008,

In 2008, I lost all my cattle just when I was planning for the farming season. I lost the first two in March, one after another and the veterinary officer suspected trypanosomiasis but was not very sure because by the time he came I had already burnt the carcasses. The third one disappeared or was stolen in August when it had wandered in search of pastures. Then unexpectedly in September, the disease struck in my neighbourhood. There was a serious disease outbreak. We did not have medicines to treat our

 $^{^{62}}$ Quarterly Economic Review, September 2017 www.rbz.co.zw/assets/quarterly-economic-review-september-2017.pdf pg 12

⁶³Interview with Mr Runganga, Mocho Village, 22 November, 2013

cattle. Remember, 2008 was a difficult year. Even the government had no resources. Even if you called the veterinary officer, he was not able to assist. All he could do was confirm that it was tsetse disease but still he would do this by just looking at it, without conducting any tests. I tried traditional medicines but between 15 September and 21 October, all three cattle had died from tsetse diseases. I knew then that my farming season for that year was ruined the minute the cattle started getting sick. How was I going to prepare land for planting? And I needed to farm for my family because it was the only way to survive that year. Remember, that was the year when shops were empty and there was no food in the country. ⁶⁴

The disease scourge lasted for a while. At the beginning of the following year, his neighbour, Mr. Chabata recalled how he also lost four strong bulls which were central to his tobacco farming project,

From 2009, everyone was excited about growing tobacco because we knew we would earn some foreign currency. But then somehow, around July, all my cattle got sick. The four of them all died within a period of about three months, one in July, two in August and the last one in September. I tried to save them but the tsetse disease beat me to it. 'Chirwere chakandiwisira pasi ichi' (This disease destroyed me). I had hoped to use them to plough a large tobacco field for myself and also hire them out to other people's fields. As a result, I got nothing at all.⁶⁵

⁶⁴Interview with Mr Rabvukwa, Butau Village, 22 November, 2013 ⁶⁵Interview with Mr Chabata, Mangwaira Village, 20 March, 2014

From the above, it is clear that tsetse had dramatic effects on crop cultivation. The metaphor used '*chakandiwisira pasi*' denotes a severe impact capable of leaving the victim without hope.

As discussed in the previous Chapter, the disease situation is often critical between September and early November when temperatures are high. But this is also the critical period as it falls just before the commencement of the rainy season when farmers will be preparing their fields, including preliminary ploughing. Farmers, thus, get affected when their cattle get sick. For when they get infected, *'dzinowondoroka'* (they become weak), as Mr Masara⁶⁶ put it and can hardly pull a plough or harrow. When their draught power is wiped away, the farmers are left to do their agriculture the hard way. Firstly, they may have to do it by hand as testified by this villager from Mayamba Village at the frontier,

It becomes very difficult for us when our cattle die from tsetse (disease). It means that we have to use '*chibhakera*' (our hands) to plough our fields because we have to eat no matter what. You cannot survive here without farming. So you have to plant something, '*even pakandima*' (on a little piece of land).⁶⁷

Secondly, they may have to hire tractors from the established farmers or, '*shoroma*' as one villager described them, who have invested in these and other equipment,

⁶⁶ Interview with Mr Masara, Mahwau Village, 7 December, 2013

⁶⁷Interview with Mr Shumba, Mayamba Village, 22 November, 2013

There are few people here, very few, 'shoroma chaidzo', (rich people) who have tractors. So because of that, it is very expensive to hire their tractors. It costs about \$US 120 to farm one hectare by a tractor. So you can imagine. Who has that kind of money? Even if you hire, you can only till a small piece of land because of the expense. So the only way really is to use cattle. That is the only affordable way here.⁶⁸

The complication for the farmers is that whether they have to do the agriculture by hand or tractor, the land covered is usually very small compared to when they have access to draught power. This is because of two reasons. Firstly, at \$US 120/hectare, tractors are expensive to hire and therefore households can only plough a tiny fraction of what they ordinarily do. Secondly, and as disclosed by Chief Chundu⁴⁸and another villager, they are encouraged by AGRITEX officers to do zero tillage,

The officers from AGRITEX say we must practice zero tillage. It works but it is too manual. So it requires too much time and effort, only to plant a small piece of land.⁶⁹

The limits imposed by tsetse flies are a matter that migrant farmers discuss daily among themselves and wherever occasion permits. But they do not just talk about it, they take practical steps. The first of these key practical steps is reducing the vegetation around them and on a very wide scale because this is where tsetse normally rests. And there are several ways of doing this. One way, as indicated by Mr. Faranisi, is to hire people to cut down indigenous trees or stump them as done by farmers in Kabidza and Mayamba,

⁶⁸Interview with Mr Badza, Mahwau Village, 15 February, 2014 ⁶⁹Interview with Mr Chinhengo, Butau Village, 7 December, 2013
We are at the frontier and vegetation is still thick compared to other areas. So the best solution is to clear the area around our homes and farms of trees and grass because tsetse hides there. So we just cut the trees and grass to clear the way. At least that way we clear the place of tsetse and also get firewood. ⁷⁰

Another way is to burn the trees and grass, again on a wide scale as testified by Mazango, also from Mayamba Village,

We start wildfires so that they destroy large trees and tall grasses. These fires would go for days until the land is clear and the tsetse has nowhere to hide.⁷¹

The second key step that they take to encourage settlement. Thus, each concerned farmer invites or facilitates new migrants to acquire land. This was particularly common in the villages situated at the frontier, such as Kabidza and Mahwau. Where migrants invited settlers, they inevitably settled them further on the periphery of their holdings. It is partly because of this that most new migrants are settled in peripheral areas.

In settling them beyond their property, the key intention was to help clean the area of tsetse, because it reduced the trees and landscapes which provide habitat for tsetse.At the very least it was to provide, as observed by Murombedzi (1992), a tsetse repellent or buffer for the established groups. And it was clearly known by the newcomers,like Mr. Dzamba, that they were being used for this purpose,

We know that we have been settled here, not out of goodwill but because we are protecting these people and their livestock from disease. ⁷²

⁷⁰Interview with Mr Faranisi, Mayamba Village, 7 February, 2014

⁷¹Interview with Mr Mazango, Mayamba Village, 7 February, 2014

⁷²Interview with Mr Dzamba, Mayamba Village, 21 February, 2014

Curiously, the migrant farmers provided an ideology to justify this settlement of newcomers. They argued that it was to prevent future disputes over land. At least this was one of the reasons suggested by Mrs. Chamboko, a frontier migrant, who had referred and unilaterally settled new migrants,

People keep fighting over land here. So once it is all settled, there will be no more fights, no more taking each other to the chief's court.⁷³

Some also argued that referring and settling migrants further ensured that the referee retained land for expansion within his vicinity.⁷⁴

Thus, as can be seen here, migration and settlement were justified in peculiar terms. Most likely, it is because it sounded anti-social to use people as a fence or barrier against tsetse. In a way, it set them against an ideology of kinship and humanism.

But then, it is important to ask whether this was a good and clever move on the part of the migrants. Surely, it gave them an immediate ecological relief, a relief from a bothersome insect. But beyond this, the move seemed to produce unintended results. For the encouragement and subsequent settlement of new migrants drew the anger of the local authority.For the HRDC, the settlement threatened prospects for income generation through CAMPFIRE and Kariba REDD. This is because such settlement in addition to being unauthorised, was often on land that the local authority had plans for safari hunting and conservation projects. This is clear from this media statement, summarising the sentiments by the HRDC Chief Executive Officer,

⁷³Interview with Mrs Chamboko, Katenaire Village, 20 March, 2014

⁷⁴ Interview with Mr Manjengwa, Katenaire Village, 20 March, 2014

Revenue from Campfire zones in Hurungwe district has dipped in recent years owing to poaching and illegal settlements which have forced animals deeper into the wildlife area affecting hunting, which has been the mainstay for the rural community for years.⁷⁵

And because the HRDC saw further immigration as a problem, it took immediate and concrete steps. The first was vilifying migrants in the press, like the one above. Thus the HRDC ran stories in the daily newspapers, and also on radio, spreading propaganda against migrants and also depicting, to the nation that this settlement was dangerous and a threat to the means of survival of the settlers, perhaps just to portray a human face. One of the statements in a local paper read as follows,

We have illegal settlements in the wildlife buffer zone which have affected animals and are putting at risk the lives of people who are now getting closer to them.⁷⁶

The second was to initiate attempts to round up and expel migrants from the area.Indeed at the time of research, the HRDC was involved in a long drawn out legal process to get migrants expelled so as to save the CAMPFIRE and Kariba REDD programmes.⁷⁶Whether the HRDC will succeed or not is hard to say, although electoral politics might provide a cause to be hopeful. In most cases, the state has often stepped in to support the squatters against the local authority. This is clearly elaborated in the following statements by the local Member of Parliament, at a rally held in the district,

The issue of Chundu villagers is my prime concern. If the council have (sic) other plans that are against the right of citizens, then I am with you so that

⁷⁵The Herald 19 August 2015 pp. 15

⁷⁶ Zimbabwe Situation, October 14, 2015,

 $https://www.zimbabwesituation.com/news/zimsit_w_zlhr-hurungwe-council-on-warpath-over-evictions-the-zimbabwean/$

you remain here. We must be transparent on developmental projects that benefit the communities.⁷⁷

But what can be said with certainty, and what is central to this chapter, is that it is the quest by migrants to make the area habitable from tsetse fly that has brought them into a direct conflict with the state and environmental authorities. The next section looks at effects of tsetse on yet another local social group, the foragers.

Foragers

Foragers are among the groups that have been most affected by tsetse and its diseases. As noted in the previous chapter, the months of November and December, are very dry and people in this area become susceptible to hunger. During this period when there is pressing hunger, gatherers must collect valuable products from the forests. As pointed out in the last chapter, they must collect edible worms, insects, honey, birds, so that their households can become food secure and therefore be spared the embarrassment that comes with begging. The tsetse fly exerts an effect on these households, and it does so in one major way.

The fly makes certain landscapes no-go areas for the gatherers. As documented by the WHO,⁷⁸tsetse landscapes include forests, hills, river banks, valleys and cracks on tree trunks and between roots. Gatherers, also aware of the risks associated with such areas, fear contracting trypanosomiasis and generally avoid straying into them. Unfortunately, feared and avoided landscapes are the ones that are often endowed with all sorts of forest products that a household needs to supplement its diet. These are places where mushroom is plenty, where small wildlife roams, and where edible insects and bush vegetables abound. Mrs. Mukundi noted,

⁷⁷The Weekly Mirror <u>https://theweeklymirror.wordpress.com/2015/03</u>March 31, 2015 ⁷⁸ www.who.int/water_sanitation_health\resources\vector178-192.pdf

It (foraging) is now risky. We used to get all our forest products within surrounding forests. But now these have been destroyed. So now if you want to get anything from the forests, you have to go into the ones that are further away but these are the ones with tsetse. So you either take the risk or you starve. Even collecting water to drink during the dry season is very risky because it will only be found in forests with tsetse. ⁷⁹

Her neighbour, Mrs. Paradzai, agreed with the observation, adding that,

Tsetse has indeed affected our activity. They hide in places where we want to get food. Now it is risky to get honey from trees. You fear the bees and tsetse as well. And when you get beaten, it is difficult sometimes to know what has bitten you. So either you risk your life or you totally avoid areas that are said to have tsetse and starve. ⁸⁰

The response of this group has been two-fold. Firstly, foragers intensify gathering in areas that they consider to be transformed and safe. Mrs. Moyo and her neighbour chose the small hills and wooded forests around gardens, although these now have limited products.

For fear of being bitten, we use only the forests around us, but these are now depleted. So it is a serious problem for $us.^{81}$

But even in these landscapes, the women and children do not take any risks. They make sure that they are protected one way or the other. One way is to wear clothes that cover the whole body to avoid being bitten. Another common way is to use of traditional medicine to prevent bites or contracting the disease. But besides aloe vera, the respondents were hesitant to reveal the names of the trees or herbs they

⁷⁹Interview with Mrs Mukundi, Mahwau Village, 14 February, 2014

⁸⁰ Interview with Mrs Paradzai, Mahwau Village, 14 February, 2014

⁸¹Interview, Mrs Moyo, Mocho Village, 14 February, 2014

used, perhaps, as a way of protecting their indigenous knowledge. On a rather extreme end, some villagers believe that eating very salty food before venturing into these forests would guarantee them some reprieve from the bites,

As testified by Mr. Sadza:

They (tsetse) bite people but most people eat a lot of salt to weaken the poison.⁸²

The second response and one that is gaining ground in Hurungwe is to privatise foraging so that no other individual or group is allowed to gather the remaining forest resources. One farmer around Chitindiva fenced off his field, putting a steel wire around the landholding. Another farmer did not fence the land, but marked trees which enclosed the enlarged homestead.But the most interesting case is that of a villager from Kabidza, who during the foraging season, constantly patrolled the land, chasing away little boys or women who strayed into his holding.

Privatisation was carefully rationalised and always presented in ideal terms. Some villagers adopted a supposedly protectionist narrative of tsetse and argued that privatisation of their forests was only to protect the environment, nothing more. This was the excuse used by villager Chivasa, for instance,

I fenced my forest to protect it. If it is like this, it will not be invaded because people can see that it is private property. People are just cutting trees in forests willy-nilly. So we have to protect our forests by fencing them. ⁸³

⁸² Interview, Mrs Sadza, Mangwaira Village, 24 January, 2014

⁸³Interview, Mr Chivasa, Mangwaira Village, 17 January, 2014

Some said that it really was the only a way of marking boundaries, and therefore prevent disputes of land,

Once you mark your forest, you have to put a clear boundary like a fence so that other people do not mistake part of your land for free land.⁸⁴

And there were other people who presented privatisation as a way of preventing risks to the homestead. A villager located close to the wildlife boundaries said he fenced the land to prevent wildlife from raiding his homestead,

My homestead is close to the wildlife areas. So if I don't put a fence, I can lose everything.⁸⁵

Whatever the reason proffered, it is perhaps the fear of being labeled as antisocial that is behind these elaborate justifications for the privatisation.

The privatisation of forests may work for some individuals, especially in the short term. This strategy also makes things worse for those gatherers who lack endowed landholdings. This is especially true for the recent migrants who moved in when there was no longer enough land to carve out personal forests in well - endowed areas, but with fewer tsetse infestations. Beyond the privileged owners, only those households that were able to forge deals with endowed landowners were the ones that survived.These are households, like Mr. Dzomba's,that reduced themselves to being clients of the privileged groups,

We had no choice but to get into some *chibvumirano* (agreement) with our neighbour. He came here first and managed to get a big piece of land, full of all trees and all resources that people here need to survive. So he is some kind of a landlord to us. My wife and children get products from his forest

⁸⁴Interview with Mr Fushayi, Mahwau Village, 7 February, 2014 ⁸⁵Interview, Mr Mawodza, Kabidza Village, 21 February, 2014

and they give part to him. If he wants thatch grass, for example, my wife gets it for him while she is foraging in his forest for other products for us. That way we get food and he gets what he wants, *tese tinobva tararama* (both families survive)⁸⁶

Those unable to work out deals remain disadvantaged, impoverished and bitter against their endowed neighbours during the hunger period. Mr. Kanyau accused big landowners of witchcraft because he lacked access to these privileged people's private forests,

People here can be cruel. You would think that during the periods of hunger they would share their forests. But they don't. They get resources from their forests while we starve. I think *pane zvikwambo* (there are goblins in those forests) that get food for them. Why can't they share? What are they afraid of?⁸⁷

Thus we see that impoverishment in Hurungwe and the resultant bitterness, particularly, that which is off-season, is not a matter of land shortage, because there is no one without land and land is still in abundance. Rather the impoverishment and bitterness are arising because modes of gathering have shifted, and only those with the endowed land, rather than land alone, are able to get some relief. The rest remain excluded and bitter. Although the observation is preliminary, it can be argued that the response to risks from tsetse seems to create stratification and social conflict in Hurungwe.

⁸⁶Interview with Mr Dzomba, Mayamba Village, 7 December, 2013

Squatters

Squatters represent another group whose livelihoods have been compromised by tsetse and its diseases. As will be noted in the next chapter, squatters are shielded by the fly from the state. The fly makes the area a non - state place as authorities fear to venture into this landscape.⁴²In this way, the fly becomes a resource, that which protects squatters from eviction by the HRDC. But being a resource as it may be, it has also proven to be a menace to this group. For it has brought with it some costs related to their livelihoods.

To the squatters, the fly makes life unbearable. This is because they are nearer than any other group to protected areas, where the fly is abundant. The situation was reported to be worse during the dry season which is also the peak period for tsetse diseases. As indicated by Mr. Shumba,

We live here at the mercy of the fly. The frontier is the home of the fly, what with all these thick trees and animals next to us.⁸⁸

But as will be seen in the next chapter, this group does not easily acknowledge the presence of the fly, simply because of a perception that if they do, they may be relocated. But when probed further, they will admit that the fly is a problem in the area. They admit that their dogs and goats, the few possessions they have, are constantly attacked by the fly, leaving them even poorer,

Dogs are of importance here as they protect and guard homesteads, especially at night. For a homestead without a dog is an easy target for animals.⁸⁹

⁸⁸Interview with Mr Shumba, Kapoko Village, 21 February, 2014

⁸⁹Interview with Mr Munjanja, Kapoko Village, 21 February, 2014

But how has this group been able to deal with the tsetse menace? As part of protecting themselves, squatters do two things. Firstly, and like the rest of the groups already discussed here, they burn the immediate environment to destroy forests that might harbour the fly.One villager, Mr. Masairevhu, noted,

Just like everyone in this Ward, the first thing we do to protect ourselves and livestock from tsetse is to burn the grass and forests around us. This way, we drive tsetse away.⁹⁰

Secondly, some retreat into those areas that are less infested. The targeted places are the intermediary zones of Kabidza and Mahwau villages. This was the response adopted by villager Mabuza,

I realised that my family would not be able to survive for long in this area. So I talked to one of the village heads in Kabidza and he agreed to give me land to settle. I moved to the area on a Sunday morning when most people were at church. This is because I knew that people here do not like us. They accuse us of taking their land, disrespecting their ancestors and spreading tsetse. So I asked for a neighbour's scotch cart and moved in quietly with my family and belongings. The village head had already shown me my place and I was praying that I will not clash with anyone there over the piece of land.⁹¹

This strategy seems to have paid off for this respondent as he went on to say that the tsetse problem was better in his new village, although still present because the new village is also close to the frontier.

 $^{^{90}}$ Interview with Mr Masairevhu, Kapoko Village, 21 February, 2014

⁹¹Interview, Mr Mabuza, Chisauka Village, 21 February 2014

Since I moved here, the tsetse problem is better. It is there but it is better than at my previous place. I have not lost anything. I have not seen any signs tsetse of tsetse sickness on my goats and my dogs are also healthy.⁹³

But as useful as the strategy may have been in providing relief from tsetse, it also brought him problems. This is because his retreat to the settled villages brought him into closer contact with those social groups that persecute and despise this group.The squatter, in such a case, becomes a victim of ridicule. In these villages, they are made fun of and labeled, often being called 'totem-less' people.

This treatment was also extended to their children as detailed by one of Mabuza's children.

The other children tease us at school. They say they have heard from their parents that we are totem-less people. They say their parents told them that we are to blame for the drought and suffering in this area because we do not respect the cultures of this place. They also say our parents are responsible for diseases and destroying forests. It is really not easy being here.⁹²

But this response was just another way used by the long-standing villagers to express their fears of losing land to the newcomers. This is because these people settle in some tsetse-free zones that the long-settled people will be targeting for the extension of their fields or their children's inheritance.

What about the burning of forests? This was one of the responses that made the situation of the squatters even worse.For the owners of the land, the rising smoke in the morning was proof that the squatters were bent on destroying Hurungwe so that it would resemble those districts and countries from which they came. One long-standing resident, Manyuchi, from Nyikadzino Village seemed very incensed,

⁹²Interview with Tapiwa Mabuza, Chisauka Village, 21 February, 2014

These people just want to destroy our forests. When they came here, the forests were virgin but now they have destroyed it all. They destroyed their forests back in their homes in Masvingonow they want to do the same here.⁹³

Furthermore, the original villagers and early migrants in the established villages believed that this burning of forests at the frontier was responsible for spreading disease in their villages. According to them, when the forests were burnt the fly was disturbed and had to find new habitat. In the end, it looked for refuge in the valleys and private forests within the settled villages. Whether the assumption is right or wrong, it is difficult to say, but there is no doubt that squatters suffer the consequences of that assumption.

But it is not only the original settlers who were incensed by the burning of forests. Even investors who had put their money in the Kariba REDD carbon project were. For this project thrives on the preservation of forests. Without forests, there will be no revenue for them. So for them, the fires were undermining the project, destroying the very forests which the project sought to protect. As the officer remarked,

The burning releases carbon dioxide into the atmosphere. Hurungwe is hot and droughts are common. This is bad for the environment. All this is because of squatters. ⁹⁴

⁹³Interview with Manyuchi, Nyikadzino Village, 22February, 2014

⁹⁴Interview with Kariba REDD officer, Chitindiva Shopping Centre, 7 March, 2014

Whether they were owners of land or investors, both converged on one point – that the squatters must be moved from the area. The investors saw the fires and smoke not as an ordinary matter to be handled through a business as usual approach but as one warranting urgent action, this being the removal of squatters.⁹⁶

Similarly, the originals were adamant that the squatters should be removed from the area, with some even calling for them to be jailed. Mr. Samaita, from Butau, one of the old villages, was not happy with the new settlers,

Is it not against the law to destroy forests like this? Where is EMA (Environmental Management Agency)? These people should be jailed until they learn their lesson. We don't want nonsense. How can they destroy our land like this?⁹⁵

For squatters, this insistence that they should be evicted is evil and is designed to further the interests of investors in Hurungwe.They refused to accept environmental arguments, saying these were a cover-up for land grab,

We know that it is these rich people who want us removed because they want our animals and our trees. And they are working with the Council to have us removed from our land. Where do they want us to go?⁹⁶

Clearly, there is alarm among squatters. But what is worth noting is that the accusations and discontent were triggered by the squatters' desires to protect themselves from the fly.

⁹⁵Interview with Mr Samaita, Butau Village, 14 February, 2014

⁹⁶Interview with Mr Mutiro, Chisauka Village, 7 March, 2014

Chapter Summary

In this chapter, which builds on the previous one, the study has shown that tsetse fly and trypanosomiasis compromise pillars of livelihoods, contributing to their unsustainability. Cattle owners lose herds in dramatic ways as happened in the 1990s. Crop farmers are restrained from growing crops in certain places which are tsetse infested. Further, their normal farming schedules are suspended, as farmers seek to protect their health and that of their livestock. For their part, foragers are deprived of food, because they cannot advance into the well - endowed areas which have food resources.

But these social groups are not quietly taking things as they come. Rather, they adopt various strategies to cope with the situation and ensure thecontinuance of livelihoods. The strategies, which are mostly based on the villagers' indigenous knowledge, include the use of various herbs and trees for protection from both the fly and its diseases. In some cases, villagers burn vegetation from landscapes.And when traditional measures fail, villagers turn to modern drugs to deal with the disease affecting cattle production.

On one hand, these measures help villagers advance their threatened livelihoods. But on the other hand, they open up new challenges for those adopting them. For example, squatters retreat to settled and safe areas, but this brings them into further surveillance and gaze of the state. From this, it can be said that tsetse has persistently compromised livelihoods in the study area. In the next chapter, the thesis discusses the perceptions of various social groups about tsetse and its diseases.

CHAPTER SEVEN

PERCEPTIONS AND FRAMINGS OF THE TSETSE FLY AND ITS DISEASES BY SOCIAL GROUPS

Introduction

The previous chapters dealt with the observed impacts of the fly. The argument there was that tsetse compromises livelihoods. In this chapter, the thesis moves away from impacts to an examination of perceptions, this being the third objective. Here the thesis seeks to understand how different groups – migrants, originals and squatters – perceive the fly and the problems that come from it. In addition, the thesis also seeks to understand how these perceptions give rise to specific forms of tsetse control and whether these are effective and sustainable.

Data from the chapter shows that various groups, namely the originals, migrants and squatters, hold different perceptions of tsetse and its diseases. Further, each perception is linked to the concerned social group's primary interests that are usually centred around land tenure. For example, squatters deny tsetse presence as a means of keeping the state, which wants to see them evicted to create land for conservation and hunting, away from the area. Similarly originals, in a bid to retain land for themselves, exaggerate the presence of the fly at the frontier as a strategy to get migrants and squatters evicted in the name of tsetse control. The observation is that while important in some instances, local perceptions do not always point to the existence of tsetse and its distribution. Rather, they may be used to exert control over the environment and over other actors in a bid to protect underlying interests. These insights are important in understanding the political ecology of tsetse in the study area.

Data for this chapter comes from ethnography in Chundu Ward, where detailed interviews with indigenous people who are mostly located in partially infested tsetse zones were conducted. In addition, interviews were also conducted with migrants and squatters who are in areas that have a greater tsetse menace. But the study also observed social groups and how they organized themselves to deal with tsetse. For the detailed histories of social groups, especially that of the Korekore, the study also used secondary sources. Additional information was also gleaned from the household survey described in Chapter Four.

The chapter is divided as follows. In order to foreground the discussion, the chapter begins by briefly presenting the objective reality of the situation on the incidence and distribution of the fly and disease, which in a way, also represents the perceptions of the scientists who produced the data and the state, given the involvement of the government department that deals with tsetse control. Here the chapter looks at what recent studies, especially those based on scientific surveys in the area, have revealed about the incidence and distribution of tsetse in the study area. The chapter then presents the three main social groups in the area, namely, the originals, migrants and squatters, how they came to be in the study area and their perceptions of the incidence and distribution of tsetse. The last section summarises the chapter.

The Tsetse and Disease Situation in Chundu Ward.

Officially, tsetse is a problem in the area. The DDDAC, a consortium made up oflocal and international sociologists, entomologists and geographers conducted experimental work designed to establish the extent to which the fly existed and the problems caused in the area of Hurungwe. It also tried to establish the distribution pattern of tsetse in the area, also investigating the variation in relation to various landscapes. The experiments and observations, through geographical information systems, were extensive, spanning over a year. Data analysis for the scientific experiments was carried out in Edinburg. Local experts validated the data using their own laboratory in Harare.From the study's many fly traps, the teams established the areas where tsetse was present and the hot - spots were then georeferenced. As was initially suspected, tsetse was present mostly at the frontier (e.g. Mayamba Village) and in areas around Mushangishe Valley, where about 7.5% (N=40) of cattle were found infected with the disease(Scoones et al., 2017:10). There were no cases of trypanosomiasis in central villages where vegetation had been cleared. However, no areacould really be considered to be completely safe because of animal movements. It was also established that tsetse was affecting other livestock such as goats in the georeferenced areas. In a way, these scientific results also present the perceptions around tsetse and disease held by scientists (geographers, entomologists and veterinary specialists), as well as the state, which was represented in the research group through the Tsetse and Trypanosomiasis Control Department.

From these studies and experiments, it became clear that there are certain areas in Chundu Ward that are infested with tsetse and disease. It is against this background of existing and formal knowledge that the thesis now looks at the various social groups, how they frame the problem of tsetse and its diseases, their thoughts on possible solutions as well as reasons behind their framings. In the next section, the thesis describes the main social groups found in the area.

The Social Groups in Chundu Ward

As discussed in Chapter One, there has been a series of development initiatives, dating back to the pre-independence era that have led to movements of people into Hurungwe and Chundu Ward, in particular. Over time, some social differentiation has become evident due to the different backgrounds of the population in the Ward. Because of this differentiation, three social groups, which certainly overlap have emerged in Chundu Ward over time. The groups are not distinct in social characteristics as their classification is simply based on their period of settlement in the area. Thus, the main social characteristics do no vary across groups. The people in the study area share common meeting places in the Ward for religious and other social gatherings and even intermarry. Thus they interact and complement each other like in any normal society. The major differences and from which the group labels arise are derived from the period and area of settlement when they moved into Chundu Ward. Their backgrounds also carry some implications on their economic status, although such status will obviously vary across individuals within each group. The next section looks at these social groups and how they have emerged over time. For it is this background that has given rise to some of the perceptions.

The Original/ Indigenous People

This group is made up of, mainly,the Korekore, who moved in with Chief Chundu when he settled in Hurungwe from the Zambezi Valley in about 1959 – 1963.⁹⁷ Secondly, it consists of those people who moved into the area from other parts of the country up to the early 1980s. Moreover, it consists of autochthons, the 'Va – Mbara', or 'Va – Sori' who traditionally hold the chieftaincy of the area and from which spirit mediums are drawn.⁹⁹ Finally, it also includes a handful of Tonga groupings relocated to the area from the Zambezi Valley or 'Gova',^{99,100} as the locals commonly refer to it. As the Chief further notes, the relocation was to make way for the construction of the Kariba Dam which started in 1956.

But despite their different backgrounds, this group is united today under a shared mythology of Chimombe, the revered rainmaker and magician of some repute from across the Zambezi River.⁹⁸ His legacy continues to influence beliefs and activities of the Ward through 'Mubaiwa', his spirit medium who lives in one of the remaining patches in the valley and surrounded by all sorts of emblems of powers including tusks and muzzle-loaders.⁹⁹

Today, the originals exist in a lineage of villages that are mainly concentrated around a sprouting business centre, Chitindiva. But they are deeply religious, believing in the sanctity of several rivers (e.g. Chewore River), mountains, such as the Kashumba Mountain and forest patches that exist in the area.⁹⁹For a long time,

⁹⁷Interview with Chief Chundu, Tugwe Village, 20 March, 2015

⁹⁸ Interview with village head A, Chitindiva Business Centre, 13 March, 2013

⁹⁹ See Campbell, A. C. (1957) ZNA, NADA 34: 31-37

the group led a 'relatively primitive life' (White, 1971:45) with little benefits from civilization. Now, they have slowly moved out of the traditional lifestyle into a modern market economy. They grow cash crops and work on neighbouring farms.⁹⁸Even then, their time is frequently divided between the village and areas that informants referred to as 'sacred.'⁹⁹

The Migrants

This group is made up of villagers who, according to informants, moved into the Ward from around the mid-1980s.¹⁰⁰The newcomers originate mostly from Masvingo, a Karanga territory.⁹⁹ They are known, locally, as '*vauyi*' (those who don't belong').¹⁰¹ The label is probably designed to emphasize the fact that they are foreigners and have limited rights and entitlement to resources such as land when compared with the locals.

This group consists, but not entirely,of two main subgroups. The first consists of villagers who moved into the area from different parts of the country at the height of the land resettlement programme that was carried out just after independence.⁹⁹During this period, Hurungwe became a suitable destination for this programme, especially since the postcolonial state had successfully undertaken a tsetse clearance programme in the district (GoZ, 1988). About 91,000 families around the country were resettled by the state in those districts that were considered to be underpopulated including Hurungwe (Chimhowu and Hulme, 2006).This resulted in a convergence of populations from different social, economic, ethnic and religious backgrounds.

¹⁰⁰Interview with village head B, Kabidza Business Centre, 21 February, 2014

The second subgroup, the retrenchees, is made up of the victims of the Economic Structural Adjustment Programme (ESAP).¹⁰²The programme, which was implemented between 1991 and 1995, was aimed at revamping and re-directing the economy so as to spur economic growth and development by reducing government expenditure and attracting foreign investments (Kadenge, 1992). However, like all SAPs, the programme resulted in mass retrenchment, unemployment and high poverty levels (*ibid*). According to the acting chief, the people who ended up in the Ward came from nearby mines such as Alaska, Mhangura and Lynx, private companies and government departments although some came from far afield in search of land for settlement.¹⁰¹ The main attraction for the newcomers were the vast tracts of arable land that offered opportunities for agriculture. Thus, according to the acting chief, when they moved into Chundu Ward, the migrants targeted the rich and unsettled frontier areas bordering the middle riches of the Zambezi Valley.¹⁰²

In lifestyles, they clearly evoke jealous and tensions from originals. From observation, the newcomers, exhibit a penchant for luxurious and modern lifestyles. They roof their homes with metal sheets and asbestos, compared to the locals who use the abundant grass in the area for roofing. As also pointed out by a local village head, they also invest their proceeds from cotton and tobacco in cars, televisions, radios and satellite dishes.

As also observed by other authors elsewhere (e.g. Alexander and Ranger, 1997), immigrants are often Christians and educated. They own assets and have modern farming equipment and generally acquire good income from agriculture compared to the indigenous people.⁹⁹Studies by Govereh (1999) in the Zambezi Valley have

¹⁰¹Acting Chief interviewed during reconnaissance visit on January 25, 2013

also revealed similar results about migrants. His observation was that households that migrate into areas of tsetse can constitute a powerful force for change of agricultural production. He noted that in 1995, 61% of the migrants owned cattle while only 38% of the indigenous residents owned cattle and 47% of migrants owned ox teams compared to 27% of indigenous people. In addition, migrants had Z\$ 8467 of animal traction equipment when compared to Z\$ 5015 for the indigenous residents (Govereh, 1999).

In Chundu Ward, the impact of the migrants on the lives of the originals is best captured in this interview with one village head,

Yes, the Karangas have made us improve our farming methods and now we even get money from our produce. We now use cattle and ploughs. They have taught us to grow groundnuts and roundnuts, and that children should be sent to school. ¹⁰²

In this study, the migrants generally had more livestock compared to the originals. From the survey (N = 587), 54.9% of the migrants owned cattle and other livestock compared to 43.7 % of the originals although there were more originals (12.6%) owning cattle only compared to the migrants (7.7%). The success associated with migrants obviously provokes jealousy of the originals as elaborated by the one village head,

Some people hate these new comers because they are more successful than us who have been here for a long time. But they have money, cars and satellite dishes because they work hard. So maybe people should learn from them instead of being jealous.¹⁰²

¹⁰²Interview with village head C, Chitindiva Business Centre, 7 December 2013

The squatters

The third group is the 'squatters', a term that the HRDC uses to describe them because they are alleged to have settled in areas that have been designated for other uses such as CAMPFIRE.The settlement patterns in these areas are random and scattered. But in every case, they are concealed. The squatters deliberately choose them because they are non – state places (*nzvimbo dzekuwanda*), where they can easily hide from authorities.⁹⁹

There are two subgroups in this category. The first are villagers who were already settled in the area when the buffer zones were introduced by the local authority.⁹⁸ Thus, they were deemed squatters, and consequently criminals, by the mere fact that their homesteads fell within the newly created buffer zones.⁹⁹

The second subgroup consists of villagers who proceeded to set up their homesteads within the restricted areas after the creation of the buffer zones. According to one village head,⁹⁹these moved in from the late 1990s. The majority of them are former farm workers, from the nearby Karoi Farms, who were displaced by the accelerated land reform programme, popularly known as '*jambanja*'.⁹⁸ As noted in Chapter 2, the province had the highest number of gazetted farms (1,489) and given that only less than 5% of the former farm workers nationwide were absorbed by the resettlement programme, the majority had to seek refuge in surrounding communal areas, like Chundu Ward (Moyo, 2004). Some of the settlers were political refugees who had been chased away from their homes where they were believed to be members of the political parties campaigning to take over from the ruling ZANU – PF party in the run-up to the 2000 elections.

Today, this group occupies what is referred to as '*kumapeto*'¹⁰¹ which are areas in the extreme part of the borders, just close to the National Parks boundary and other protected areas. The sub-group merges itself with those claiming to have settled before the buffer zones were created. But, as highlighted in Chapter 2, the local authority adamantly refuses any claims of legitimacy and has always resorted to litigation, a process that has been going on for a long time. In October 2015, the Zimbabwe Lawyers for Human Rights won a court order preventing the eviction of nearly 1200 households from villages in Mayamba, Kabidza, Manyenyeni and Huyo (Mangirazi, 2015). This was a relief to the squatters who desperately needed a hiding place.

These, then, are the main groups found in the area. They constitute of the originals, who fear loss of land to newcomers; migrants, who are thirsty for more land to extend their agricultural empires; and squatters, who are desperate for security and protection in the face of eviction by the rural district council. The next section looks at the way these groups frame the fly, its prevalence and distribution.

The Social Groups and their Perceptions of Tsetse Fly and its Diseases

In this section, the thesis focuses on the perceptions of the social groups as well as the bases of these perceptions. The argument is that, in all cases, perception is shaped by underlying factors, namely protection of livelihoods and security. Indigenous Settlers' Perceptions of Tsetse: Safeguarding their Land and Customs The indigenous people testify that the fly still exists in the area, although not as widespread as it used to be before independence and the post-independence era running up to the late 1990s. As recalls one Mr. Matambo from Butau Village,

Tsetse is still here, but not as much as it used to be in the early 1980s when we werenot allowed to keep cattle. During those days, they would even get on to moving vehicles in large numbers. That is why we have a fly gate.¹⁰³

Another long-term resident in the area, 86 year old Mr. Saruchera echoes,

Sometime in the mid – 1990s, the situation was so serious that some households lost their entire herds to the tsetse disease. At that time we did not have knowledge of the fly or modern medicines to prevent or cure the disease. The situation is better now. There are fewer forests for the fly to hide and the wild animals that used to bring the fly have since moved away. But still, the fly is present ¹⁰⁴

In maps, the originals point, as they did at the workshop held at Makuti on 28 May 2015, to the valleys, especially the Mushangishe Valley, as the areas that are infested with the fly. In support of this, they cite cases of cattle getting sick when they descend into these *nzvimbo dzakaipisisa*,¹⁰⁵(places of danger of death)- areas with scarce water and grazing pastures, especially during the dry season commencing in September to December.

For this group, the continuous settlement by migrants on the borders of protected areas is responsible for the unending tsetse menace, 'vauyi ndovanokonzeresa'(It's

¹⁰³Interview with Mr Matambo, Butau Village 14 February, 2014

¹⁰⁴ Interview with Mr Saruchera, Mocho Village, 7 December, 2013

¹⁰⁵Interview with Mr Makanga, Butau Village, 14 February 2014

the migrants that are causing the tsetse problem).¹⁰³They believe that the migrants' cattle move into the game area, thereby exposing themselves to the fly. These cattle then move inland and mingle with those of the originals at water sources or dip tanks and in the process pass on the disease to their cattle.¹⁰⁴

Why is it that this group links the presence of the fly to migrants? The basis of this group's perceptions arises from the fact that they would like to see the area being rid of the migrants and squatters whom they accuse of taking land away from them. This point becomes even more tenable when one considers what originals consider to be the best measures for dealing with tsetse.

Where technocrats suggest spraying, and others suggest killing of wildlife, the migrants do not countenance. The best way, they hold is,

To get every migrant out of this place, and we will have no fly. They should be moved from the north of us, from the valleys, from the mountains and from the shrines. They defy our traditional norms and values. They have caused a lot of land disputes. They tend to overlap into the land of the Korekores.¹⁰⁶

Further, the originals believe that the constant and continuous clearance of vegetation by migrants destroys forests from which they gain livelihoods. Migrants are presented as being responsible for the destruction of the vast wild fruit plantations such as *'mazhanje'* (*Urpaca kirkiana*) that used to sustain people in times of hunger.¹⁰⁴Thus, by linking migrants to tsetse, the originals are making a clever basis for their immediate evacuation. The tsetse is, therefore, used to make a stinging point against in-migration.

¹⁰⁶Interview with Mr Chigerwe, Mangwaira Village, 14 February, 2014

Migrants' Perceptions of Tsetse: Sitting on the Fence

The position of this group with regards to the presence of tsetse and its diseases is somewhat ambivalent and shifting. Sometimes the migrants depict that flies exist and that their area is infested. At other times, they are quick to deny the fly's presence.

When they talk of the existence of the fly, they allege, as proof of the existence of the fly, that their livestock gets exposed when it moves into valleys in search of pastures. They say that valleys provide suitable habitat for the fly and also attract wild animals from protected areas because of their perennial water sources. The migrants also believe that their cattle are exposed to the fly through the movement of wild animals from protected areas into their villages. They point to baboons as some of the carriers of the disease.

Said Mr. Mushonga, a long-standing migrant and former dip attendant, settled on the banks of Manyoka River, in Kapoko Village,

I live close to the Manyoka River. Unlike other rivers, this one never runs dry. So in the hot season all the animals, even wild animals, flock to water themselves and graze here.In so doing they bring the disease, passing it on to our livestock. The river harbours the fly in its thick forests. I keep stocks of berenil close by in case I see signs of sickness on my cattle which go into these dangerous forests.¹⁰⁷

¹⁰⁷Interview with Mr Mushonga, Kapoko Village, 14 February. 2014

From the interviews, as the one with Mr. Mushonga above, the fly and the disease are a fact. Further, there are places like thick forests, where this tsetse fly is believed to dwell.

But Mr. Mushonga's neighbor,Mr. Chatewa, portrayed a totally opposite situation. He saw tsetse as a thing of the past, as he said,

The situation has now improved a lot. This place is just like Chinhoyi, clean and safe, with no fly whatsoever.¹⁰⁸

It was also common for even the same interviewees to show inconsistency as demonstrated by Mr. Manengureni of Katenaire Village,

The fly is a problem here. I think the people at the border (i.e. the squatters) are responsible for the problem. They let their cattle stray into the national park zones where there are wild animals and then bring back the fly which then extends to our livestock when they meet at common places like dip tanks. Those people must either be removed or a strong game fence must be erected so that their cattle don't stray into wildlife zones.¹⁰⁹

But later, when asked about what can be done to solve the problem, he responded, Tsetse is a fly. It cannot be confined to one place and so can move wherever it wants. So we cannot talk of the problem being here or there. '*Chirwere chiri kwese kwese*' (The disease is everywhere).¹¹⁰

Not only is there denial of the existence of the fly across individuals, there is also some spatial denial of tsetse existence as demonstrated by Mr. Gundidza, from Muchidzagora, a village close to both Katenaire and Kapoko Villages, at the frontier.

¹⁰⁸Interview with Mr Chatewa, Kapoko Village, 14 February, 2014

¹⁰⁹ Interview with Mr Manengureni, Katenaire Village, 7 December, 2013

There is no tsetse in this place, we last saw tsetse in the 1990s in this area. I personally have not seen a tsetse fly for the last 15 years. And my children have never even seen it either.¹¹⁰

And Mr. Gora, also from Muchidzagora Village, concurred,

There is no tsetse here in the settled areas but, maybe, in the forests surrounding rivers like Manyoka and Chitake. Perhaps the government should resume tsetse control in those areas.¹¹¹

But further down in Kabidza Village, Mr. Maruta remarked,

There are lots of tsetse flies in this place.Goats and cattle are always getting sick.¹¹²

The big question, then, is why this ambivalence exists. Why is it that some people claim there is tsetse while others deny its existence? And why do particular informants even reflect this inconsistence, apparently contradicting themselves as regards the reality of tsetse? The answer lies in the fact that the migrants would want to portray a situation that favors their needs at a particular time.

There were times during the study when the migrants denied the existence of the fly and it emerged that the purpose of this denial was to keep the state away from them. For the migrants have historical knowledge that tsetse control is associated with displacement. Therefore, they fear that a confession that there is a problem might invite the state to come and displace people in the name of eradicating the fly problem.Mr. Mhaka of Kabidza Village echoed this fear,

¹¹⁰Interview with Mr Gundidza, Muchidzagora Village, 7 December, 2013

¹¹¹ Interview with Mr Gora, Muchidzagora Village, 7 December, 2013

 $^{^{112}}$ Interview with Mr Maruta, Kabidza Village, 6 December, 2013

We know that government takes seriously the issue of tsetse. In the past, they came to this area and removed the 'Korekore' people so that they could deal with tsetse. We know that in every part of the country that is what happens. If you say it (that there is tsetse), you have dug yourself a deep grave, and all that remains is for them to bury you.¹¹³

Thus, concealing the evidence of tsetse is a strategy to secure a continued stay on the land. But what about confessing and even exaggerating the existence of tsetse? Perhaps this is linked to the general problem of development. Hurungwe has livestock diseases, and the problem is made worse by the absence of adequate veterinary staff and clinics. In respect of people's health, Chundu Ward only has one clinic serving a population of about 15 000. Under these circumstances, it is normal for people to walk sometimes up to 10 km to the nearest clinic, especially for those at the frontier villages like the migrants. Furthermore, the road network is very poor. By confessing and exaggerating the presence of tsetse, migrants desire to draw attention to those from whom rural development is expected such as government, non – governmental organizations and researchers.

Thus, the response that migrants make to the questions on tsetse and its distribution are instrumental. Each response is calculated to ensure a realization of certain interests. In particular, the responses are designed to protect peoples' access to resources in a territory that increasingly and painfully questions their history and presence. Depictions of tsetse are also designed to lure development in ways that make possible wealth accumulation through land and livestock.

¹¹³Interview with Mr Mhaka, Kabidza Village, March 15, 2014

Squatter's Perception of Tsetse: Advancing Livelihoods and Security

Unlike the other social groups who say the fly exists, even in small numbers, squatters depict it as non - existent. One key informant, Mr. Phiri, who is regarded as a village leader in the squatter area, and has been involved in advancing squatters rights claimed that there is no single fly that can be seen in the neighbourhood,

All we have are stories that it once existed in the area and that it caused problems to people, but not now. The problem we have here are mosquitoes, not tsetse fly.¹¹⁴

Mrs. Dzebonde, from the outskirts of Mahwau Village, said they often penetrated into the wild in search of firewood and even then did not find anything,

We go to the forests throughout the season, in search of firewood and also in search of fruits and edible insects for our families. If the flies existed we surely should have been beaten to death by now, or at least have seen one. There is no fly in this place.¹¹⁵

That squatters collectively perceive that tsetse does not exist, within or close to their settlements, also became clear during the mapping exercise held at Makuti on 28 May 2015. Whereas migrants and indigenous groups indicated tsetse fly to be widely found in frontier areas, and beyond, squatters had a different geography regarding the distribution. They located tsetse flies in protected areas, and even then, in remote places. Commenting on the map, one migrant, Mr. Banda, said,

¹¹⁴Interview with Mr Phiri, Kapoko Village, 18 January, 2014

¹¹⁵Interview with Mrs Dzebonde, Mahwau Village, 7 December, 2013

There is nothing like tsetse this side where we dwell. Only in the centre, right in the centre, of protected areas can you find tsetse fly. And even then we hear there are not that many tsetse flies left there. Now it is mostly the poachers who go into the national parks who get fearfully stung by tsetse. But that is not what is happening here.¹¹⁶

So, be it individually or collectively, people perceive tsetse not as being existent or as causing a problem to them or their livestock. Since tsetse does exist in the frontier, even in small numbers, there is a need to understand why this social group depicts it in this manner. The answer lies in the squatters' livelihood and security situation. Squatters have been hunted down from the commercial farms and other places for belonging to groups defined as hostile to the state. Mr. Dzomba, a squatter and former tobacco farm foreman from Kapoko Village remarked:

When we first came here, we were considered sell-outs, and many of us were victimised. ¹¹⁷

Mr. Madzivanyika, another squatter from Chisauka Village, was more open,

The war veterans ransacked my household. My brother was beaten and his family harassed. I only escaped because someone tipped me, otherwise, I would be somewhere dead. They said all farm workers area were sell-outs.¹¹⁸

 $^{^{\}rm 116}$ Interview with Mr Banda, Kapoko Village, 7 March 15, 2014

¹¹⁷Interview with Mr Dzomba, Kapoko Village, 7 March, 2014

¹¹⁸ Interview with Mr Madzivanyika, Kapoko Village, 21 February, 2014

Clearly, the squatters are a subject of political harassment, wherever they are visible. The only places left for them to hide are the marginal areas, which are not easily accessible to the state. The areas bordering Chundu Ward constitute such a place, as Mr. Matapure, a former commercial farm worker, now settled in ChisaukaVillage remarked:

We could not go to Karoi town because we had no houses there. We could not go to villages because youths were all over and could identify us as sell outs. So we came to the frontier where no one could see us.¹¹⁹

And Mr. Makanya, also from Chisauka Village, added in agreement,

The place is like a shield. It protects us from the noise and political harassment that is happening all around us. We can live in peace here knowing that no one can follow us.¹²⁰

It is very clear that the remote nature of the area, typical of Scott (1998: 40-41)'s 'non state place', led the squatters to regard the frontier as a place of refuge. But this character of the place as non - state was at risk from development. Perhaps the fact that the researcher was working with colleagues from the DDTC gave the impression that tsetse control operations were to be resumed, a situation that will open up the area for development thereby displacing them. Depicting the area as completely free from tsetse is an attempt to ensure it does not come under tsetse control and thus remains out of reach, hiding them from the state.

¹¹⁹ Interview with Mr Matapure, Chisauka Village, 13 December, 2013 ¹²⁰Interview with Mr Makanya, Chisauka Village, 13 December, 2013

Pressed on why they did not want to see tsetse control operations in the area, Mr. Masauso, from Kapoko Village expressed fears of eventual evacuation:

Once they come, they will start to make announcements that this area is under tsetse control. The next thing is that they will remove people from the area under the pretext of removing the fly. And they will target us because we have no permission to dwell here, and so where will we go?¹²¹

In a focused group discussion with squatters, the same fear of seeing the area being discovered by the state was raised. Many participants, including Mr. Mwanaka from Kapoko Village, shared this view,

We are called sell outs. We are called all sorts of names, some saying we are aliens and lack totems. As soon as they come to control tsetse, or to start their development projects, they will discover us, and who knows where they will bundle us to? And who knows what they will do to us? I think they should just leave this area alone, it is good as it is.¹²²

Because tsetse is considered as a super-conductor of state intervention which puts their livelihoods and security at risk, squatters downplay its existence and distribution. They divert the attention of the state to landscapes such as protected areas whose development and control do not affect them. Clearly, livelihoods and security are central to how squatters view the world around them.

¹²¹Interview with Mr Masauso, Kapoko Village, 22 November, 2013

¹²²Interview with Mr Mwanaka, Kapoko Village, 13 December, 2013

Social Groups and the State

It is clear from the discussions above that the social groups in Chundu Ward have developed perceptions of the fly that are meant to protect their interests relating to land use and tenure. In addition to narratives, the groups also use the state and its various institutions to further protect these interests. Thus, the originals are seen supporting efforts by the HRDC to evict squatters and migrants whom they accuse of being responsible for the increased tsetse menace and also destroying the environment through burning of forests. But as has been shown, their interests do not really lie in tsetse control or conservation of the environment but rather in securing land and livelihoods for themselves and their future generations.

Similarly, the newcomers, be they squatters or migrants, turn to the state, at both local and national level, to resist displacement by the HRDC. Firstly, they have engaged the local government, aligning themselves to the local big men, to fight their wars for legitimacy and access to land. For example, and as cited earlier in this Chapter⁷⁷, the local Member of Parliament was quoted in the media assuring the settlers that their tenancy was a matter that he was seized with. This was at a local gathering at Mayamba Business Centre in 2015, which was also attended by the HRDC leadership. Such statements from state officials would obviously deter the HRDC from executing the evictions, much to the advantage of the squatters.

Secondly, the squatters have often turned to the state, through the courts, to fight the HRDC's efforts to evict them. As shown earlier in this Chapter, the squatters have, on several occasions, been assisted by human rights lawyers, to take the HRDC to court to nullify the eviction orders issued by the HRDC and have, so far, been successful in all instances. Thirdly, the migrants and squatters use state machinery to alter their identity documentation in order to legitimise their claims to land in the area. Through a process locally known as '*kudhuura*', immigrants from outside Hurungwe change their national identity cards issued in their areas of origin and adopt new identity numbers that reflect Hurungwe as their place of origin in order to justify their access to land in the district. Lastly, the settlers also make use of the traditional leadership to access land in areas earmarked by the HRDC for conservation projects, where settlement is outlawed. As noted by Chimhowu (n.d), the settlers offer tokens in forms of money to traditional leaders in return for land and consequently, these local leaders have to defend them against eviction.

In a way, therefore, the state has inadvertently found itself at the centre of the conflicts among these groups. What then can be done to resolve the conflicts in order to bring sanity in the area so that tsetse can be controlled and livelihoods secured without any negative impacts on the environment?The thesis will return to this issue in the section on recommendations.

Chapter Summary

This chapter has shown two things. Firstly, it has shown the objective reality of the tsetse situation in the study area as presented by some recent scientific studies. The results of these studies have shown that tsetse and disease are still present in the valleys such as Mushangishe and its surrounding villages as well as in the settlements bordering the protected wildlife areas, south of the Zambezi Valley.

Secondly, this chapter has shown that Chundu Ward is home to different social groups, each with its own perceptions of the prevalence and distribution of tsetse and its diseases. It has also shown that the way tsetse presence and distribution are framed by each social group is influenced by different interests.
Thus, the indigenous people who are threatened by in-migration acknowledgethe presence of the fly, tracing it back to migrants and their livestock. By linking the disease to migrants, the indigenous people's primary objective would be to have in migration stopped, thus securing their ethnic heritage, land. On the other hand, migrants hide the presence of tsetse so that the area can have infrastructure and be opened up for economic activities, benefitting them. Squatters, criminalised for dissenting political views held by the state and other dominant social groups, deny the presence of the fly for fear that such admission might invite the presence of the state in a frontier constituting a hiding place. Thus social groups do not see tsetse and the problems it poses in the same way. Rather, it is their interests guiding them to say whether or not tsetse exists and the degree to which it is a problem. In addition to perceptions, the social groups have also taken advantage of various organs of the state to advance their interests. Such an observation points to the important fact which managers in tsetse control often miss, that while important in some instances, local perceptions do not always point to the existence of tsetse and its distribution. The thesis shall return to this point in the next chapter.

CHAPTER EIGHT

SUMMARY, DISCUSSION, THEORETICAL ISSUES AND POLICY IMPLICATIONS

Introduction

This Chapter is very brief and its purpose is threefold. First, it summarises the objectives of the entire study. Secondly, the chapter presents key findings against each objective. Third, it discusses the results and makes key conclusions of the study and ends with a reflection on policy and theory.

For ease of reference, the objectives of the study are reproduced below. The study set out to:

- a. find out how different actors' interaction with the ecosystem in pursuit of livelihoods has affected their exposure to the fly and its diseases
- b. establish the livelihood effects of the fly and its diseases and
- c. find out how different actors/social groups understand and represent the fly and diseases and how these different representations affect intervention

Summary and Discussion of Findings

Exposure to Disease

In relation to the first objective, namely, to find out how different actors' interactions with the ecosystem in pursuit of livelihoods has affected their exposure to the fly and its diseases, the study found that the various activities that the community adopts to survive put them at the risk of tsetse and its related diseases. The study found that exposure to tsetse emerges mainly from the pursuit of key livelihoods. Firstly, exposure emerges from situated livestock production processes.

These processes include herding and grazing. These processes occur predominantly during the hot season, running from September to December. In this period, water and grazing areas are scarce and as such wildlife migrates from protected areas into those settled areas with perennial water sources. Cattle freely roam during this period of risk and uncertainty, converging in these patches with residual water supplies. Simultaneously, locals throng these patches in search of water and forest products which are key to their food security and social organisation. Consequently, wild animals, humans and livestock converge at these few perennial water and grazing patches, normally forested but tsetse infested.

The second activity exposing the community is crop production. Locals, especially migrants, dot themselves in buffer and frontier zones, officially reserved for wildlife conservation and concession hunting. These landscapes, or *makombo* as they are locally termed, lie within thick forests, abound with wildlife attracting the fly. This simultaneously earns the landscape the label '*mateneti etsetse*' or tsetse maternity/breeding areas. As they go about their production, in these landscapes which include river banks, people and their livestock run into problems with the fly and its diseases.

The third activity exposing villagers to the disease is what anthropologists have termed foraging.Villagers target forested areas searching for food and resources, especially during the off farming season. Social groups, especially women and children collect forest products such as honey, edible worms, tubers, wild fruits, vegetables, small birds, thatch grass and traditional herbs in gorges, hills and forests. Men, on the other hand, seek poles for building and fencing homes and gardens. These activities, cutting across gender, take place in patches where tsetse flies still abound.

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Exposure also occurs through hunting, an institutionalised activity. Subsistence hunters encroach into protected areas and other thick forests, both containing the fly. Under ritualised leaders, hunting teams throng forests stretching into the Zambezi Valley in illegal hunting expeditions for game meat, some of which finds its way into urban informal markets. Other alternative legalities exposing villagers to the fly include gold panning, which takes place in tsetse-infested forests along river banks, especially along Chewore River. Thus, the forest is at once a landscape of accumulation and a place of danger.

The results also showed that exposure is not uniform but varied across space, time and social divide. Only particular social groups are affected by tsetse. Women and children, for example, get exposed because they are responsible for foraging. Further, only particular places have tsetse. For example, the fly is mostly found in patches which command convergence of people and wildlife. Finally, exposure occurs at specific times of the year, usually the dry season. Thus, exposure is a dynamic process. So in summary, exposure to disease is not a random process; rather it is a function of the pursuit of livelihoods in a specific environment.

The observations made here on exposure have also been made by other researchers elsewhere. For instance, recent studies by Mamoudou *et al.* (2016) in Cameroon and Simwango *et al.* (2017) in northern Tanzania have also shown that exposure to tsetse and disease varies according to season. For Simwango *et al.* (2017) however, exposure was higher at the end of the wet season compared to this study and that by Mamoudou *et al.* (2017) which showed high infections during the hot season. Similarly, the observationson patches in this study mirror those of Alderton *et al.* (2018) who noted that in Zambia's tsetse infested Luangwa Valley, it was particular groups like migrants who became exposed to tsetse and disease as they ventured into this zone to ease growing pressure on land for cotton and maize. Also, Lord *et*

al (2018:3), in their study in Tanzania, observed that tsetse has become confined to patches or 'pockets of vegetation', which still provide suitable conditions for them to thrive. And closer to home, recent work by Scoones et al. (2017) and Leach et al. (2017), in their studies on tsetse in the Zambezi Valley concluded that ideas of a 'tsetse belt' or 'front' as depicted in conventional maps are now a thing of the past in the area as the fly has now become confined to particular resource-rich patches where people, animals and pathogens continue to mix, creating disease transmission cycles. However, prior observations by Torr et al. (2012) and Vale et al. (2013) indicate that although there is considerable tsetse/people contact when people enter tsetse habitat as also observed in this study, there is also as much contact when tsetse moves into human habitats. Although all these studies in a way present similar results as those found in this study, this thesis differs in that it combined all the three aspects to come up with a 'Social Difference, Season and Time (DST) framework, with the hope that a framework that encompasses all three will produce a better solution to the problem compared to one that focuses on a single factor.

The observations in the Chapter also support the ideas advanced by the radical medical sociologist, Paul Farmer (2010, 2003, 2001). Farmer argues in his notion of structural violence, that in the Third World especially, people are driven by external and historical forces into those livelihoods and practices which expose them to danger and disease. The study echoes this observation, showing how poverty and neglect spur people into zones of disease which subsequently affect their welfare.

Livelihood Effects of Tsetse and its Diseases

As regards to the second objective, on the livelihood effects of tsetse and its diseases, the major result is that livelihoods have been compromised by the fly and its diseases. The fly and disease, together with other economic, social and ecological factors, have deemed the livelihoods in the area unsustainable. The activity that has been significantly compromised the most is livestock production. To begin with, cattle - rearing in the Ward was proscribed by the state as a tsetse control measure until the mid-1990s. And when the ban was eventually lifted, and people started to accumulate cattle, disease outbreak dealt a massive blow, nearly decimating whatever had been accumulated by the people in the study area. This obviously affected other livelihood activities and the well – being of the community. Firstly, and unlike their counterparts in other districts, the people in Hurungwe had no access to draught power. As a result, they ended up farming small plots manually, along riverbanks, thereby producing very little to assure food security. Secondly, food security was also compromised as most people had no access to meat and milk in this area neglected by the state. Thirdly, villagers were deprived of a vital mode of exchange for various services, such as marriage, which required cattle for bride wealth.

Effects of tsetse on livelihoods similar to those recorded in this study have been well documented, not only in Zimbabwe but also in many African countries (Welburn *et al.*, 2006; Swallow, 2000; Matemba *et al.*, 2010). As with existing literature, the evidence is more available for animal trypanosomiasis than the human one. In this way, the findings of the study are consistent with literature. What is novel in this study is the way the community has used its human agency to find ways of coping with the fly and its diseases. Faced with the risks arising from living in a tsetse – fly zone, the community has not sat back and let the fly

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destroy its livelihoods but has come up with various strategies to ensure that it continues, against all odds, engaging in those activities that ensure survival. The strategies, which are mostly based on the villagers' indigenous knowledge, include the use of various herbs and trees for protection from both the fly and its diseases. In some cases, villagers burn vegetation as means of clearing the flying from landscapes. As can be expected, when traditional measures fail, they turn to modern drugs such as berenil and suramin to either prevent or cure the disease affecting cattle production. These measures reflecting knowledgeability and capabilities, as expounded by Long (2001, 1992), help villagers cope with risk and advance their livelihoods. A related observation is that these forms of response create additional layers of problems for people. Livestock keepers, for instance, misuse drugs thereby putting their cattle at greater risk. Such misuse of drugs is also documented by Ngumbi and Silayo (2017) in Tanzania where they observed improper administration of drugs by pastoralists to achieve faster drug effect contrary to instructions given by manufacturers. However, this posed a high risk of drug resistance to the animals as well health risks to those who consumed the animal products. Similarly, migrants also invite the wrath of state agencies, such as the EMA, when they burn forests for purposes of eliminating the fly. And squatters attract the scorn and persecution of long term, settlers each time they retreat into settled areas for refuge from the fly. At the same time, their burning of forests, in part to make these habitable makes squatters more visible to the state and investors who subsequently initiate strategies to get them evicted from the area. All these examples suggest that local response strategies generate danger and risk for those propounding them.

Perceptions of Social Groups

As regards the third objective on the framings of the fly and its diseases by various social groups, the finding is sophisticated. The finding is that various groups hold different perceptions of tsetse. Further, each perception is linked to the concerned social group's primary interests which are usually around land tenure.

In the study area, there are three main social groups, the originals, migrants and squatters. The original group or long term settlers believes that the fly still exists in the area, especially in the surrounding valleys and around protected areas, although not as widespread as it used to be before independence and the immediate post-independence era. In terms of intervention, they would want to see a return of tsetse control operations especially at the frontier and in the valleys around settled areas. By making these statements, that tsetse exist, they hope that the state will step in, in the name of tsetse – control, to prevent settlement on the virgin land at the frontier by migrants.

The migrants - those who came to Hurungwe from mid-1980s - are ambivalent in their perceptions, shifting across time and space. On one hand, they claim that the fly does not exist while on the other they assert that tsetse exists. In terms of intervention, they are also ambivalent, on one hand suggesting the need for it, and on another regarding it as superfluous. When they say tsetse exists, their desire is to attract state intervention; and when they say it does not exist, the desire is to keep the state away from the area for fear of being displaced by tsetse control operations. Thus, the perceptions reflect an interest in land tenure which the group so desperately desires for settlement and petty commodity production.

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The third group is the squatters, so called because they are illegally settled in conservation areas. Their perception is that tsetse does not exist in any form or place in their area. In terms of intervention, the squatters are adamant that this is not necessary since the fly does not exist in the area. When these people without legitimate rights of residence vouch that the fly does not exist, their desire is to keep the state as far away from their area as possible. They believe that state presence makes them visible and open to possible eviction from their land of refuge but which is also eyed by the state for development and conservation.

Clearly, groups hold varied and multiple perceptions of tsetse, all designed to secure certain interests around land and livelihoods. The groups also make use of various state machinery to advance these interests. This aspect of the study and its conclusions are novel in that no known study on tsetse in Zimbabwe has, as yet, delved into these aspects of perception. The bulk of existing studies in this subject have been on tsetse biology (Lovemore, 1994), effects on ecology (Ford, 1979), diagnosis of human trypanosomiasis (Katsidzira and Fana, 2010) and more recently, the spatial distribution of tsetse flies (Shereni et al., 2016). Even in other countries where perceptions have been studied, the emphasis has been on establishing the knowledge people have on various aspects of the fly and its diseases like the causes, symptoms and treatment of trypanosomiasis (e.g. Tesfaye et al., 2013; Seyoum et al., 2013; Kigoda & Mwaseba, 2017). These have, however, stopped there and not gone further to establish if there could be any factors underlying these perceptions. So generally, there has been a lack of studies that look at communities that live within tsetse zones, what people think about the problem of tsetse and the diseases it gives rise to and whether there may be underlying factors behind their perceptions. And yet such ideas from people may be important in understanding how the disease is distributed at various scales.In the next section, the study moves away from the findings in relationship to tsetse to a

discussion of its implications on transactional theory, which was presented in the introductory chapter.

Theoretical Issues Arising from the Study

The theoretical grounding of the study was presented in Chapter One. Here, it was presented that transactionalism (Bailey, 1983, 1973, 1969; Barth1981, 1969, 1966, 1953), with its emphasis on decision making strategies adopted by individuals in order to survive under constrained environments, will be used as the overarching and guiding theory for the study. This is complemented by the political ecology approach (Peet & Watts, 1996; Bryant, 1992), which focuses on costs and benefits of environmental change on communities, to explain the complexities surrounding environment and development and the unequal relations that arise therefrom.

With regard to political ecology, its main arguments presented here are that, firstly, costs and benefits associated with environmental change are distributed unequally and will vary according to political, social, and economic differences within society, with political power playing an important role in such inequalities. Secondly, this unequal environmental distribution will inevitably reinforce or reduce the status quo in terms of existing social and economic inequalities. Lastly, the unequal distribution of costs and benefits together with the reinforcement or reduction of pre-existing inequalities come with political implications in terms of the altered power relationships that are produced.

Indeed, the study shows how various environmentally related developments differentially affected the people, with the poor indigenous communities being disenfranchised from their land - based livelihoods and being uprooted from areas where they could easily secure livelihoods to those where survival could only be achieved through venturing into tsetse - infested zones, thereby exposing themselves and their livestock to the fly. So whilethe colonialists and bureaucrats benefitted from these developments, the poor and powerless rural communities, already in a disadvantaged position, had to bear the brunt of these developments, they have had to engage in activities, like poaching, gardening along rivers, and cutting treesfor tobacco curing, all of which have negative impactson the environment.

Turning to transactionalism, five closely linked tenets derived from the theory to guide the study were presented. These related to a) the individual and his perpetual quest for survival and accumulation b) the strategies that individuals adopt to ensure survival c) competition among individuals/groups, mainly over resources d) the centrality of the state in local level processes and e) the use of narratives to make entitlements to resources. In this section, the extent to which these tenets generally hold is discussed in light of the data.

As regards the theoretical argument that man is individualistic, triumphing over structures in pursuit of personal interests, the data from Hurungwe is equivocal. The study shows that people are ambitious agents, exhibiting behaviour that is guided by individual interests rather than normative consideration.Just as noted by Bailey (1972) the study shows that people will struggle against all odds, even in disease infested terrains, in order to survive and accumulate wealth. This may even mean breaking some rules. People from Hurungwe are seen breaking all norms

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including state sanctions, hunting, foraging and herding cattle in areas that are prohibited on account of tsetse control. They are also seen breaking all rules governing agriculture and where it should be done in pursuit of wealth accumulation and survival. Women are seen making gardens in tsetse zones while men, seized with tobacco growing, are seen encroaching in pristine areas that are tsetse infested, in search of fertile soils. In both cases, the groups justify their activities in normative terms. For instance, men are at pains to link the forbidden practice to national goals such as generation of foreign currency. Clearly, the study corroborates this long term transactional perspective on man as perpetually advancing self-interests against environmental risk and justifying these in the process. It further shows that even in the wake of arguments by post structuralists that emphasise the equal importance of both individual and structural factors in social change, individual action will always take precedence over structural limitations against all odds, especially where fundamental individual interests are threatened.

The second tenet relates to strategies or as Bailey (1969) calls them 'stratagems', which people adopt to ensure survival and promote accumulation. The study is in agreement with this theoretical observation. In the study, migrants are seen forging or altering their national identity documents to reflect their birth place as Hurungwe in order to legitimate their claims to land which the Korekore claim an exclusive patrimony. Similarly, the newcomers also form alliances to further their contestations and justifications over land cleared from tsetse. For a fee and a transaction, the migrants hook themselves to local political leadership to ensure allocation of land, even in tsetse-infested landscapes. They also align themselves to big men to ensure protection from eviction in this contested territory. Thus, the study is in some agreement with the notion that transactionalists are advancing, namely that people perpetual strategists and schemers in the advancement of own interests.

The third aspect arising from transactional theory focuses on competition. As posited by transactionalists, individuals and communities are often located in landscapes of resource scarcity, thereby fuelling competition over these resources. In this study, various groups are seen competing over natural resources, mainly land. For example, this competition manifests through labeling and criminalisation. The immigrants are labeled '*vauyi*,' a term insinuating their foreign origins with limited rights to resources and even leadership positions. Similarly, the original people, mainly the Korekore, use history and tradition to make claims to and disqualify migrants from, land. Whether or not these competitive strategies work is arguable, but there is no doubt that there is competition over scarce resources which point transactionalistare always making in social anthropology.

The fourth theoretical component guiding this thesis relates to the centrality of the state. As indicated in Chapter One, this component involves encapsulation, whereby local level processes are embedded in or aligned to processes taking place at national level. It is the argument of transactionlists that people in encapsulated landscapes exploit the state to advance their interests. In the study, local communities are seen resorting to state machinery, in the form of courts and local leadership, to protect themselves from threats of eviction by yet another state institution, the local council, which simultaneously eyes this tsetse landscape for tourism. In this way, they pit one state institution against another to deal with encapsulation.

The fifth aspect of transactional theory highlighted in this study concerns the use of narratives to make entitlement to resources. According to transactionalists, individuals and groups in competition for resources will use narratives, or adopt tactical uses of passion (Bailey, 1983) to justify their claims to resources or to protect their interests. This study supports this. As seen in this study, there are three groups, namely, the originals, migrants and squatters, each framing the fly in a different way which is designed to make stakes to contested resources. Thus, the original group claims that the fly and disease exist, and blame migrants for causing the two through their economic activities. Similarly, migrants claim that tsetse does not exist, a view informed by their desire to continue with practices such as encroachment into wilderness areas central to wealth accumulation through cash cropping. Finally, squatters wishing to minimise state presence that might contribute to their repatriation, make wild and unfounded claims about the extinction of tsetse from the area they have settled. It is therefore clear, that, as posited by transacationalists, groups employ various discourses which exclude others from natural resources.

The study, therefore, fits very well within the main tenets of the transactional theory. But data from this study shows that there is an area that the transactional theorists did not problematise. While it is true that an individual will use human agency to overcome obstacles that confront them in their environment, the data from the study shows that this agency does not always generate desired outcomes. In fact, the data shows that human agency in risky environment can generate unintended and dangerous outcomes for those advancing them. For example, the decision by meat-starved hunters in Hurungwe to venture into tsetse infested areas where hunting is not permitted exposes them to ecological hazards such as disease and political risks like increased surveillance and control by the state. Similarly, the decision by cattle owners to herd their livestock deep into

tsetse - infested patches where water and grazing will still be available exposes them to disease. In a way, therefore, adoption of a coping strategy, normally done with the expectation that it will yield positive outcomes, may, in fact, be counterproductive, leading to more risks for those adopting it. This is a largely novel observation about human agency, but one that has also been intimated in van Dijk *et al.* (2007).

Policy Directions in Tsetse and Trypanosomiasis Control

It has been established in this study that as people try to satisfy their livelihoods, they run into problems with tsetse. Policies to deal with tsetse, informed by a hundred years of research have not helped and people continue to suffer (Seed, 2001). Where are researchers and policymakers getting it wrong? This final part of the thesis gives recommendations on policy measures to protect people from the tsetse fly. In essence, it recommends that the government must do three things to protect communities from tsetse (i) improve targeting (ii) involve communities and identify the role of the state, community and experts in tsetse control and (iii) adopt a multidisciplinary approach.These aspects are handled in sequence.

Targeting Tsetse Problem Areas

To protect people from tsetse, the government must continue controlling the fly whether through sprays, vaccination or any other method. But to be effective, the government will have to think who gets affected, where and why. This thesis shows that tsetse is mostly confined to patches which are visited by particular people during particular seasons. They include river banks (where villagers have gardens), buffer zones where villagers hunt and forage and valleys with perennial sources of water where people graze their livestock. All these areas share the presence of tsetse. And when people visit them, especially in the dry season, they become vulnerable. To protect people, now and in the future, the government will have totarget these problematic resource areas for control.

Community Involvement and Roles of Various Actors in Tsetse Control

The areas that have tsetse are particular and local. To map them for purposes of control is a difficult task. The government and researchers must, therefore, involve local communities in their activities. As demonstrated in this study and that by Girmay *et al.* (2016), involvement of the community in the deployment of targets will ensure that all tsetse infested areas receive attention, be it in terms of research or policy measures. In the case of Hurungwe, mapping for tsetse and disease control must include the original people – those long-term settlers of the area with a detailed understanding of where tsetse is located. Likewise, it must also engage the migrants and squatters who, although unwanted in the area, interact with tsetse more intensely than originals who are far removed from the frontier zones. The community also has local knowledge which can be used to identify and predict areas with risk. Of course, not every piece of knowledge will be useful because as we saw, some social groups will try to create knowledge that advances their micro-interests. But it is unimaginable how local areas that are considered risky can be fathomed without the use of those involved.

The community, therefore, together with the experts and the state all have a role to play in dealing with the tsetse problem. While the community should be willing to cooperate with the state and experts by embracing tsetse control operations and providing indigenous knowledge that may be useful for successful tsetse control, the experts should be willing to work with the locals as participants in tsetse control, making use of their indigenous knowledge. For its part, the state should deal with issues of poverty (e.g construct roads, schools, business centres) and land tenure so that people are food secure and, therefore, have no need of venturing into tsetse infested zones.

In engaging the community, policy makers should also look into and resolve any local level conflicts and perceptions that may derail progress in disease control. In the case of Chundu Ward, for example, the conflicts and contestations over land and resources must be resolved for tsetse control operations to proceed smoothly. The state, through local level institutions, should ensure access to land by everyone, regardless of their origin. This will do away with the various narratives around tsetse that are designed to protect personal interests but which in the processes generate trypanosomiasis.

Adoption of a Multidisciplinary Approach

Zoonotic diseases create complex problems that cut across human and animal health, conservation and food security. Each disease and the wider social and ecological context in which it occurs are all intertwined in a web that requires new perspectives to untangle it. A starting point would be to consider adopting a 'One Health', approach which encompasses an integrated solution to zoonotic diseases aimed at improving human, animal and environmental health (Cunningham *et a*l. 2017, Bardosh, 2016). The key benefit of the approach lies in the fact that it cuts across various disciplines and sectors. By bringing together veterinary scientists, entomologists, geographers and social scientists, policymakers are likely to come up with long-term strategies to deal with the tsetse problem. Admittedly, the approach may face difficulties in effectively bringing together researchers from different areas as these have a tendency of always wanting to remain within their corners of specialisation as they attempt to protect their disciplines and compete for diminishing donor funds (Galaz, Leach & Scoones, 2016).

It is also the study's recommendation that policy-makers must also go beyond the 'One Health' approach and delve into the political, ecological and economical aspects of the problem. This is because more often than not, the emergence of zoonotic diseases in particular spaces is not by chance. Rather, it is driven by key political and economic forces, varying across space and time. As in the case of trypanosomiasis in Hurungwe, years of development initiatives at local and national level have produced vulnerability to disease among communities. So instead of focusing on just bringing together professionals from various disciplines, the study calls for an approach that also takes into account the structural issues that continue to drive disease. This means that government must put in place programmes that centre on development as a way of reducing poverty in these disease prone areas. Most of these areas, like Chundu Ward in Hurungwe, are remotely situated, with little or no visible development. There is need for basic infrastructure like roads, access to clean water, communication technology, easily accessible healthcare and schools to service the community. When transport is easily accessible, people can adopt other livelihood activities that are less risky and do not entail venturing into tsetse prone areas such as trading in non - forest products or even formal employment in the nearest towns such as Karoi. With easy access to education, more can enter gainful employment and in the long run bring development to their areas of origin.

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APPENDIX 1 TSETSE PROJECT QUESTIONNAIRE

Nam	e of Interviewer	Date	•••••	•••••
Nam	e of Respondent	Age	•••••	
Villa	ge	M/F	•••••	
Educ	cation	Relig	ion	•••••
Place	e of origin	Date	settled	here
Reas	ons for settling			
here		•••••	•••••	••••••
1 1	Would you say there is the fly in the	area	Why	
1.1	would you say there is tsetse ify in the	arca:	vv 11y	
1.2	If there is how serious is it	•••••	••••	
1.2				
1 2	For how long has it been a problem	• • • • • • • • • • • •	•••••	
1.5	For now long has it been a problem			
1 /	Ownership of livesteels	••••	•	
1.4	Use a second sec			
	How many cattle			
	How many goats			
	Other livestock			
1.5	Who looks after the cattle whilst grazing			
		•••••		
1.6	Do you think the fly has affected cattle	in you	r area	
	Sickness of cattle			
		•••••		
	Death of cattle			
		•••••		
1.7	How serious is the problem in cattle			

1.8	Have your cattle or your neighbors suffered from the disease
1.9	How did you know it was a disease from tsetse(main symptoms)
1.10	How can you tell the difference between a tsetse disease and other livestock diseases.
1.11	Was the disease treated, how and by who
1.12	What other effects of tsetse do you know here
1 1 2	
1.15	Do people ever suller from sleeping sickness here
1 1 4	
1.14	Have you, any of your relatives or neighbors been sick of sleeping sickness?
1.15	Age of infected person
1.16	How did you know it was sleeping sickness
1.17	Was he/she taken to the clinic
1.18	Was the disease treated
1.19	Do you think sleeping sickness is serious compared to other diseases in the area eg malaria
1.20	Do you think the movement of cattle from one area to another is responsible for the spread of tsetse flies and diseases? Why
2.1	How often do you go to forest areas

2.2	What are the reasons for going to these areas					
2.3	For how long have you been going into these areas					
2.4	How do you protect yourself from tsetse when you go to the areas?					
2.5	For how long do you stay in these forest areas?					
2.6	Do women also go into the forest areas					
2.7	What activities do they undertake in the forest					
2.8	How are they protected from tsetse diseases					
2.9	How does the presence of tsetse affect the activities you undertake in these forest areas					
2.10	Have your activities in the forest changed since the 1980s					
2.11	What do you think has caused the change					
3.1	What kind of wildlife changes have you experienced since the 1980s					
	Population density					
	Population diversity					
3.2	Why do you think there have been changes in wildlife population and density					
3.3	Have there been changes in vegetation since the 1980s. Explain					
	Trees					
	Grass					

3.4 How can we explain changes in vegetation? 3.5 Do people cut down trees here and why 3.6 Would you say that tsetse population has changed since the 1980s and Why 3.7 Do you think changes in wildlife and vegetation have contributed to changes in tsetse populations. Why 3.7 Which villages do you think have more tsetse problems in the area? 3.8 Why do you think there is more tsetse there than other areas 3.9 Do you think the presence of wild animals increases or decreases tsetse. Why 4.1 How do you protect your household from tsetse bites? 4.2 How do people protect their cattle from tsetse fly other than spraying? 4.3 What is the best way to remove tsetse from the area? Do you think having more people from other areas will drive away tsetse? 4.4 4.5 What can the following do to reduce tsetse problem 1. Chiefs 2. RDC 3. Villagers

- 4.6 How have people previously reacted to policies on tsetse
- 4.7 How would you explain their reaction
- 5.1 In 2012, there were more people sick from sleeping sickness. Why do you think tsetse is now affecting more people

5.2 Every year cattle continue to die from tsetse. Why do you think tsetse is turning to cattle and not wildlife

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5.3 Do you think the people at the frontier areas are poorer than those in Chitindiva.Why?

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