LINKING NATURAL RESOURCE GOVERNANCE TO RURAL LIVELIHOODS AND WILDLIFE CONSERVATION: A CASE STUDY OF MUFUNTA GAME MANAGEMENT AREA, ZAMBIA

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Dissertation presented for the degree of Doctor of Philosophy in the Faculty of Economic Management Sciences at Stellenbosch University

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April 2022

Declaration

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Emelda Miyanda Hachoofwe

April 2022

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Nature of contribution
- Organised and searched for literature - Conceptualised and wrote paper

The following co-authors have contributed to [chapter three, pages 40-61 in the dissertation]:

Name	**e-mail address**	**Nature of contribution**
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With regard to [chapter five - An assessment of the existing governance structures in the Mufunta Game Management Area: The role of co-ordination in improving community-based natural resources management implementation pp 80-117 of the dissertation], the nature and scope of my contribution were as follows:

Nature of contribution
- Organised and searched for literature - Collected and analysed data - Conceptualised and wrote paper

The following co-authors have contributed to [chapter five, pages 80-117 in the dissertation]:

Name	**e-mail address**	**Nature of contribution**
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With regard to [chapter six - Linking natural resource governance to rural livelihoods: The gatekeeper role pp 118-153 of the dissertation], the nature and scope of my contribution were as follows:

Nature of contribution
- Organised and searched for literature - Collected and analysed data - Conceptualised and wrote paper

The following co-authors have contributed to [chapter six, pages 118-153 in the dissertation]:

Name	**e-mail address**	**Nature of contribution**
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Date:

With regard to [chapter seven - The impact of livelihood strategies and protected area governance on wildlife habitat conservation pp 154-178 of the dissertation], the nature and scope of my contribution were as follows:

Nature of contribution
- Organised and searched for literature - Collected and analysed data - Conceptualised and wrote paper

The following co-authors have contributed to [chapter seven, pages 154-178 in the dissertation]:

Name	**e-mail address**	**Nature of contribution**
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Espen Sjaastad	_____	Provided advice as co-supervisor - Editing of the paper
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Abstract

Governance is as much about steering actors and institutions as it is about their coordination. By focusing on Protected Area (PA) governance structures in Mufunta Game Management Area (GMA) the study explores the coordination of institutions and actors in Community-Based Natural Resource Management (CBNRM). Institutions represent the 'rules of the game', while actors are the various stakeholders in CBNRM. Institutions and actors can influence constraints and opportunities for sustainable outcomes of livelihoods and PA conservation. Therefore, the study aims to establish the link between Natural Resources Governance (NRG), livelihoods and PA conservation for sustainable outcomes. CBNRM is a collaborative governance approach which requires high levels of coordination among stakeholders to harmonise divergent interests. The study uses a pragmatic approach to research, applying both qualitative and quantitative methods. The first objective is the assessment of governance structures. The study uses a three-step method for the assessment of the governance structure using a transdisciplinary approach. The results demonstrate the critical role of the local community in the conceptualisation of a governance approach through knowledge co-production, poor conceptualization of CBNRM among stakeholders, low levels of awareness about CBNRM, missing links in the governance structure, lack of coordination among stakeholders and institutional fragmentation. Therefore, the role of bridging institutions, such as Community Resource Boards (CRBs) for improved coordination is emphasised. The study developed an equilibrium model combining a "Bottom-Up" and a "Top-Down" approach to provide the missing links, address the fragmentation and improve CBNRM implementation. The second objective evaluates the link between NRG and livelihoods. Governance structures determine the opportunities and constraints available for livelihood sustainability. The key results indicate that participation in CBNRM activities is very low, rules such as the need for licences create a barrier for income generation, rights over resources are weak and that costs outweigh benefits for households living in the PA. Furthermore, there is a high dependency by the local communities on natural resources, which increases pressure on wild resources, while rules and regulations regarding access to natural resources make households more vulnerable and act as a disincentive for conservation. The application of good governance principles such as legitimacy, accountability and fairness are key to removing such barriers and improve governance. The third objective evaluates the impact of NRG and livelihoods on PA conservation. The outcomes of PA conservation are measured by monitoring the status of the

habitat from the time the GMA was created in 2006 until 2018 using remote sensing. Results indicate there is an increase in vegetation cover attributed to the creation of the PA, which serves as a deterrent to unsustainable harvesting. However, household perceptions indicate that there is a decrease in vegetation cover as a result of land clearing. Furthermore, projections from the household survey data indicate that if all other factors are held constant 4.5% of the habitat will be lost over the next 10 years, if measures to reduce forest loss are not put in place. The study concludes that understanding the nature of governance structures in place through knowledge co-production is critical for ensuring sustainable outcomes for livelihoods as well as PA conservation. Co-ordination among stakeholders is necessary for the successful implementation of CBNRM. Finally, knowledge about how governance, livelihoods and conservation interact and influence each other is necessary for crafting a sound governance approach. Shifting attention from discrete components to the relationships between components has the potential to create a better understanding of the socio-ecological system.

Keywords: Governance, livelihood, conservation, community based natural resource management, protected area conservation, coordination

Opsomming

Bestuur handel ewe soveel oor navigasie as oor koördinasie. Deur te fokus op die bestuurstrukture van die Beskermde Gebied (PA) in die Mufunta-wildbestuursarea (GMA), ondersoek dié studie die koördinering van instansies en rolspelers in gemeenskapsgebaseerde natuurlike hulpbronbestuur (CBNRM). Instellings is die reëls van die 'spel' en rolspelers is die verskillende belanghebbendes in CBNRM. Instellings en rolspelers kan beperkings en geleenthede vir volhoubare uitkomste vir lewensonderhoud en PA-bewaring beïnvloed. Derhalwe is die studie daarop gemik om die band tussen Natuurlike Hulpbronbestuur (NRG), lewensbestaan en PA-bewaring vir volhoubare uitkomste te vestig. CBNRM is 'n samewerkingsbenadering wat hoë vlakke van koördinasie vereis om uiteenlopende belange in ooreenstemming te bring. Die studie maak gebruik van 'n pragmatiese benadering tot navorsing en pas kwalitatiewe en kwantitatiewe metodes toe. Deur gebruikmaking van ’n transdissiplinêre benadering pas die studie – vir doelwit een – 'n metode toe wat bestaan uit drie stappe vir die beoordeling van die bestuurstruktuur.

Die resultate beoordeel die kritieke rol van die plaaslike gemeenskap in die konseptualisering van 'n bestuursbenadering deur mede-produksie van kennis, swak konseptualisering van CBNRM onder belanghebbendes, lae vlakke van bewustheid oor CBNRM, ontbrekende skakels in die bestuurstruktuur, gebrek aan koördinasie tussen belanghebbendes en institusionele versplintering. Om dié rede word die rol om instellings soos Gemeenskapshulpbronrade (CRB) met die oog op die verbetering van koördinasie te betrek, benadruk. Die studie het 'n ewewigsmodel ontwikkel wat 'n benadering van “onder na bo en bo na onder” kombineer om die ontbrekende skakels te oorkom, asook fragmentering en die implementering van CBNRM, te verbeter. Tweedens evalueer doelwit twee die band tussen NRG en lewensbestaan. Bestuurstrukture bepaal geleenthede en beperkings wat vir volhoubaarheid van lewensonderhoud beskikbaar is.

Die sleutelresultate dui daarop dat deelname aan CBNRM-bedrywighede erg laag is, reëls soos lisensies skep 'n hindernis vir die skep van inkomste, regte oor hulpbronne is laag en kostes weeg swaarder as die voordele vir huishoudings wat in die PA woon.

Voorts is die plaaslike gemeenskappe grootliks afhanklik van natuurlike hulpbronne, wat die druk op wild-hulpbronne laat toeneem, wyl reëls en regulasies rakende toegang tot natuurlike hulpbronne huishoudings meer kwesbaar laat en as afskrikmiddel vir bewaring dien. Die toepassing van beginsels vir goeie bestuur is die sleutel tot sukses om sulke hindernisse uit die weg te ruim en bestuur te verbeter. Derdens evalueer doelwit drie die impak van NRG en lewensbestaan op PA-bewaring. Die uitkomste van PA-bewaring word gemeet deur die status van die habitat sedert die stigting van die GMA in 2006 to 2018 met behulp van afstandwaarneming te monitor. Die resultate dui op 'n toename in plantegroei wat moontlik toegeskryf kan word aan die skepping van die PA, wat as afskrikmiddel vir onvolhoubare oeste dien. Huishoudelike persepsies dui egter op 'n afname in plantegroei weens die opruiming/skoonmaak van grond. Voorts toon projeksies uit die data van huishoudelike opnames daarop dat alle faktore konstant daarop dui dat 4.5% van die habitat in die volgende tien jaar verlore sal gaan indien maatreëls om bosverlies te verminder, nie ingestel word nie.

Die studie se gevolgtrekking is dat begrip van die aard van bestuurstrukture, wat weens die mede-produksie van kennis ingestel is, van kardinale belang is om volhoubare uitkomste vir lewensonderhoud en PA-bewaring te verseker. Koördinering tussen belanghebbendes is nodig vir die suksesvolle implementering van CBNRM. Ten slotte is kennis oor wisselwerking tussen bestuur, lewensonderhoud en bewaring, asook gepaardgaande beïnvloeding, nodig om 'n gesonde bestuursbenadering te bewerkstellig. Die verskuiwing van die aandag van komponente na hulle onderlinge verwantskap, is vir 'n sosio-ekologiese stelsel nodig.

Dedication

I dedicate this piece of work to my son, Dalitso Chazangwe Augustine Banda for the times he had to endure the absence of a mother due to the demands of this research. I salute you my son for being strong for mummy you were the motivation to get this done. You are indeed mummy's superhero; May God bless you.

Special dedication to Mum and Dad for taking care of the little man for me; words can never be enough to thank you. May the good Lord bless you and keep you.

Acknowledgements

First and foremost, I would like to thank my God, the Alpha and Omega, for being by my side as I walked this journey. Surely, you are an awesome God, and you will never cease to amaze me. May your name be exalted.

I would like to thank my supervisor, Prof. Kobus Muller, for his invaluable support and guidance during this whole process and for believing in me. I couldn't have done it without you. To my co-supervisors, Prof. Espen Sjaastad and Dr Vincent R. Nyirenda, your guidance made the process easier. I am indebted to you for your input.

I sincerely acknowledge the NORHED project for funding my research and for giving me an opportunity to be part of the research team for advancing knowledge about the Kafue Ecosystem. I also take this opportunity to extend my sincere gratitude to The Copperbelt University, my employers, for their logistical and financial support during my research and most importantly for granting the study leave so that I could take time to concentrate on my studies.

I thank my colleagues at The Copperbelt University who rendered their support during my studies, with special thanks to Dina Mambwe, Geophat Mpatwa, Moffat Chawala, Kourouma Jean Moussa, Michael Sinkolongo and Patricia Malunga I am grateful.

Collaborators and stakeholders were an important part of the process, especially during data collection. Firstly, the Department of National Parks and Wildlife granted the permit to conduct the research in a PA. The patron of the CRB Sub-Chief Mweene Kahare is thanked for allowing the team to conduct the research in his chiefdom. Finally, my sincere gratitude goes to all local stakeholders who took time to participate in the study. These include government departments, NGOs, interest groups and the private sector.

I would like to acknowledge my able research team who were very efficient during data collection: My enumerators: Kabandami Alfred Mpundu, Kalenga Ernest, Makuni Jimmy and Sakala Job; My translators: Chimbali Musole, Kawanga. P. Namangolwa, Kasweka Ngebe,

Kwibisa.L. Ruth, Mukumbwa Elina, Nalubutu Mervelous, Siabenzu Nyambe and Walubita Lungowe; My main contact person: Peter Sinyungu. Working with all of you was an amazing experience.

I am grateful to my friends and family especially my brothers (Ernest, Edgar and Eric), my sisters (Exilda, Eunice, Edith and Emma) and my cousin Maybine for always being supportive during my studies; my nieces Mwanamono, Chimwemwe, Margret, Chilinezi, Mwachiyaba, Alice and Kayoba and my nephews Ernest Jr., Emmanuel, Obet, Mwila and Francise. Finally, I thank my lovely son Dalitso; thinking of you gave me the inspiration I needed.

Special thanks go to Mr O. O Hachoofwe and Mrs M.M Hachoofwe. Dad and Mum, you laid a strong foundation for my education and I am grateful to God for having such wonderful parents. You are the genesis of my story, without you there is no me. Thank you for being such supportive parents; you never got tired of my crying on your shoulders. God bless you.

Last but not least, I thank the local community in Mufunta GMA for their co-operation during the research and for sparing the time to respond to my household questionnaires which took them away from their daily chores.

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List of Acronyms

ADMADE	Administrative Management Design of Game Management Areas
CBNRM	Community-Based Natural Resource Management
CBO	Community-Based Organisations
CHA	Controlled Hunting Area
CRB	Community Resource Board
DC	District Commissioner
DFID	Department for International Development
DNPW	Department of National Parks and Wildlife
DNPWS	Department of National Parks and Wildlife Services
DOF	Department of Fisheries
FD	Forest Department
FGD	Focus Group Discussion
GMA	Game Management Area
GMP	General Management Plan
JTI	Japanese Tobacco International
KNP	Kafue National Park
LCC	Land Cover Change
LIRDP	Luangwa Integrated Rural Development Project
LULCC	Land Use and Land Cover Change
NGO	Non-Governmental Organisations
NR	Nature Reserves
NP	National Park
NRG	Natural Resource Governance
PA	Protected Area
PAG	Protected Area Governance
SLA	Sustainable Livelihood Approach
SLF	Sustainable Livelihood Framework
SI	Statutory Instrument
TBZ	Tobacco Board of Zambia
TD	Transdisciplinary
VAG	Village Action Group
WCED	World Commission on Environment and Development
WPO	Wildlife Policy Officers
ZAWA	Zambia Wildlife Authority

CHAPTER ONE: GENERAL INTRODUCTION

1.1 Introduction

In the context of transitional social economics the importance of aligning Protected Area (PA) goals with the needs of communities that depend on them is recognised (Child, 2004). This study investigates this shift by assessing the Community-Based Natural Management (CBNRM) governance structure in Mufunta Game Management Area (GMA) and linking it to livelihoods and PA conservation outcomes. Natural Resource Governance (NRG) for PAs in Southern Africa has been implemented using the CBNRM model. Community-Based Natural Resource Management in Southern Africa generally entails the empowering of communal systems of resource management on the spectrum of community conservation (Child, 2004).

Protected area governance (PAG) operates at different levels, which interact and ultimately shape local governance. According to Borrini-Feyerabend & Hill (2015, p.175) " The national legal and policy contexts of governing PAs are embedded in international legal frameworks: conventions, plans of work, declarations, pronouncements and widely accepted best practices that link them to an evolving body of learning". The research starts by analysing the concept of PA governance from the global perspective. It then explores the legal and policy framework for NRG in Zambia. This was done to put into context the understanding of PAG and how the global, macro and meso level have shaped PA governance in the study area. Despite CBNRM in Southern Africa having a common conceptual foundation, political-economic, institutional and social context of a particular country have shaped them differently (Child, 2004).

Using a pragmatic philosophy, a mixed-method qualitative and quantitative research approach was used for data collection. A three-step transdisciplinary approach for knowledge co-production was adopted for governance structure assessment. Transdisciplinary approach is defined as "an approach that cuts across academic boundaries, actors, fields and approaches in a process of co-designing and co-producing practical knowledge that is more transformative" (Yeboah-Assiamah, Muller, & Domfeh, 2018, p.22). In a transcidisplinary approach knowledge is seen a web of interconnected relationships (Montuori, 2013). An assessment of the existing governance structure (CBNRM) was done which highlighted the constraints and opportunities of this model for livelihoods and PA conservation. Livelihoods in the study area

are highly dependent on the natural resources. Therefore, the sustainability of these livelihoods is dependent on getting right the institutions for governance of natural resources.

The Brundtland report define sustainability as meeting the needs of the present without compromising the ability of the future generation to meet their own needs (WCOED,2021). Article 2 of the Convention on biological diversity (CBD) defines sustainable use as ‘‘the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations’’ (Hutton & Leader-Williams, 2003, p.216). The interactions between governance and livelihoods result in a positive or negative outcome for PA conservation. Finding a balance between resource use and conservation is crucial for CBNRM to deliver sustainable outcomes. Sustainable use of resources in CBNRM is linked to the concept of sustainable development which is concerned with economic, social and ecological sustainability (Mbaiwa, 2004). According to the WCED,1987 sustainable development is anchored on economic efficiency, social equity and ecological sustainability (Mbaiwa, 2004). This study looks at the three aspects as equitable benefit and cost sharing, equal access to resources and natural resource conservation.

1.2 Background to the study

Governance is usually defined as an interaction among structures, processes and traditions that determine how power is exercised, how decisions are taken on issues of public concern, and how stakeholders have their say (Graham, Amos & Plumptre, 2003, ii; Lockwood, Davidson, Curtis, Stratford & Griffith, 2010, p. 987). Governance occurs at different levels and is usually context-specific. In Game Management Areas (GMAs) in Zambia, Community-Based Natural Resource Management (CBNRM) is the established and legitimate local institution of governance. Therefore, it would be relevant to investigate CBNRM as a governance structure, since CBNRM has been legally established in most GMAs buffering National Parks (NP).

The IUCN defines a PA “as a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values” (Borrini-Feyerabend & Hill, 2015, p.176). Protected areas in Zambia are comprised of core areas, buffer zones, corridors,

and sustainable use areas. Zambia's National Parks (NPs) are intended to function as core areas and their adjacent GMAs as buffer zones and sustainable resource use areas by encouraging sustainable use of wildlife such as safari hunting to generate income for local communities (Watson, Becker, Milanzi & Nyirenda, 2014; Milupi, Somers & Ferguson, 2020). A GMA which is in category VI of the IUCN categorisation, comprises mostly customary land and as such, is used for both sustainable consumptive and non-consumptive utilization of wildlife through hunting and photographic tourism. Human settlements, agriculture and mining are permitted but are regulated through a zoning scheme or Statutory Instrument (SI) specifying how such activities can be carried out without compromising the status of the resources it is meant to protect (Jones, 2008: Simasiku, Simwanza, Tembo, Bandyopadhyay & Pavy, 2008).

In the early 1980s, subsidiary legislation was introduced to partially decentralise authority over wildlife from the state to local communities in order to enhance community participation as major stakeholders (Lindsey, Nyirenda, Barnes, Becker, McRobb, Tambling, Taylor & t'Sas-Rolfes, 2014). The Administrative Management design for Game Management Areas (ADMADE) was initiated as the first step towards the active participation of local communities in the management and sharing of benefits from the direct use of wildlife resources in GMAs (Umar & Kapembwa, 2020). This was the first attempt towards a partial decentralization of authority over wildlife resources to local communities who shared their rural frontier with wildlife and suffered the cost of crop damage, loss of livestock and at times injury or loss of human life. Participation is a key feature of CBNRM as effective participation is essential for the legitimisation of the initiative by the community involved. Public participation as a principle and key characteristic for CBNRM is said to directly impact on public trust, confidence and legitimisation (Gruber, 2010, p.56). Gruber (2010, p.55) cited Arstien (1969) who describes public participation "as an eight-rung ladder of citizen participation that moves from what is referred to as manipulation up to partnerships, delegated power, and finally to citizen control". GMAs in Zambia may fall in this continuum of categories of participation along a gradient of community involvement and empowerment. The governance structure is important for participation at all levels. At macro level it relates to participatory democracy and involvement in the contest and distribution of power and influence. On the other hand, at micro level governance is about self-empowerment, rights-based development and how participation fits into local structures and institutions.

The Zambia Wildlife Act, No. 12 of 1998 was the first piece of legislation to formally recognize CBNRM and identify Community Resource Boards (CRB) as institutions for communities to co-manage and benefit from wildlife in GMAs (Lindsey *et al.*, 2014). The CBNRM is supposed to foster mutually beneficial partnerships and collective management of natural resources by the state, local communities and other stakeholders (Nyirenda & Nkhata, 2013). The term 'new governance' has emerged to describe modes of governing that are aligned to collaborative approaches among government and non-government actors from the private sector and civil society (Lockwood *et al.,* 2010, p.987). The role of coordination in the study area is assessed to determine how it can enhance collaborative governance in CBNRM. The dominant dynamic perspectives on governance in the literature describes it as a process of steering and coordination (Katsamunska, 2016, p.153).

Currently, however, it appears that PA governance through community governance structures such as CRBs is failing to achieve the purpose for which GMAs were established. Which is to act as buffer zones to PA in order to protect wild animals and their habitats, and support a viable wildlife-based tourism industry which contributes significantly to the welfare of local communities (Simasiku *et al.,* 2008). The CBNRM approach has been criticised as having failed to achieve the objectives of biodiversity conservation and livelihood sustenance (Fabricius, Koch & Turner, 2004; Zyambo, 2018). One of the key feature about CBNRM as a natural resource management approach is its focus on rural livelihoods (Fabricius, Koch & Turner, 2004).

In this research, the implementation of CBNRM governance approach in the study area is assessed against the theoretical guiding principles of CBNRM governance. Armitage (2005, p.704) summarizes the commonalities of CBNRM, firstly, as a mechanism to address the dual objectives of environmental management and rural development. The results for objectives two and three of this study, reflected in Chapters 6 and 7 respectively, present the outcomes in relation to rural development and environmental management. Secondly, CBNRM governance requires some degree of devolution of decision-making power and authority over natural resources to communities and community-based organisations. Therefore, study objective one in Chapter 5 assesses the existing governance structure by focusing on institutions and actors' roles in decision-making. This is important for highlighting the challenges that are limiting success and addressing them.

Thirdly, CBNRM regimes are expected to address critical issues related to the access and control over common resources by local and non-local actors. The second objective focuses on the link between governance structures and livelihoods, and the role of institutions in mediating access to PA natural resources. Zyambo (2018) reviewed published documents and identified four challenges that are limiting the success of community-based conservation programmes in Southern Africa as an inability to sustain livelihoods, weak land and resource tenure, weak community institutions and poor governance.

1.3 Brief theoretical underpinning to the study

Theories are critical ways of representing scientific knowledge by expressing important causal relationships among a set of related concepts (Cox, Villamayor-Tomas, Epstein, Evans, Ban, Fleischman, Nenadovic, & Garcia-Lopez, 2016). Lund (2014) states that any study objective is analysed through a set of concepts. The concepts that are critical to this study include natural resource governance, sustainable livelihoods and wildlife conservation. Wildlife means any life that is wild and not domesticated, including trees, animals, insects, amphibians, birds and fish. The concept of governance is used in many and varying contexts therefore, it is important to get the focus right (Barnes & Child, 2014).

In this study, the focus is on micro governance of PAs through CBNRM at GMA level and how this is linked to the higher layers of governance. This area of research of PAs, though very pertinent to governance, has not been given much required attention (Barnes & Child, 2014). On the other hand, the concept of "wildlife conservation" means the sustainable management and use of wildlife for its inherent value and for the benefit of human beings and other living things (Zambia Wildlife Act, No.14, 2015). Tidball (2014) defines wildlife conservation as an activity in which humans make conscious efforts to protect plants and other animal species and their habitat. This is as it is done in the purposeful creation of a PA through policy and legislation. Conservation is broadly defined as a social-economic process by which societies endeavour to manage resource scarcities and control utilisation within the biological capacity of the system to sustain production (Child, 2004). The concept of 'sustainable livelihoods' (SL) is an analytical framework that emerged from existing studies on rural livelihoods systems, agrarian change, and community development going back to the work of William Cobbett, Karl Marx, Karl Polanyi, Amartya Sen and several influential household and micro economists (Batterbury, 2016).

Using the Sustainable Livelihood Framework (SLF), the interactions between the three concepts of governance, livelihoods and wildlife conservation will be analysed. The UN Conference on Environment and Development in Agenda 21[1] noted that the sustainable livelihoods approach is a powerful integrating concept that offers a way to link socio-economic and ecological considerations in a cohesive policy-relevant structure. In this study theories are introduced using the SLF to explain the relationship between the concepts and the interactions of variables falling within the various concepts. In Chapter 5 natural resource governance structures are assessed, which refers to the institutional processes and organisational structures of the framework. In Chapter 6, the study links the governance structure to the livelihood resources and strategies. The analysis of institutional influence on access to livelihood resources is done by linking the institutional processes and organisational structure components of the framework to livelihood strategies and forms of capital such as natural, social, human, financial and physical. Finally, in Chapter 7 the study focuses on the contextual conditions and trends and how they are affecting sustainable livelihood outcomes.

The focus is on governance theories that deal primarily with rational choice models of human decision-making and the role of collective action in affecting environmental outcomes. Leach, Mearns and Scoones (1999) developed a generalised theory of access to natural resources called environmental entitlement (Fabricius *et al*., 2004). The generalised theory states that local people are constantly in search of power and control over natural resources to attain other end goals, such as livelihood sustenance. Furthermore, to evaluate the link between natural resource governance and sustainable livelihoods, the theory of access by Ribot and Peluso (2009) is applied to this study. The theory of access enhances an understanding of the ability of households to control access to resources beyond resource rights.

In the context of this study it is hypothesised that people will participate in CBNRM governance processes to be in control of their livelihood strategies and are driven to participate to gain capabilities to enhance livelihoods. The assumption is that people will make choices to maximise benefits and mininise costs. The entitlement theory states that untapped ecosystem goods and services in areas become useful through the impact of transforming structures and institutions (Fabricius *et al.,* 2004). This offers a conceptual framework that highlights the

[1] https://www.un.org/esa/dsd/agenda21/Agenda%2021.pdf

central role of institutions in mediating the relationships between the environment and society, where institutions are understood as regularised patterns of behaviour (Leach *et al*., 1999). In this case the hypothesis is that the interaction between CBNRM stakeholders influences the accessibility of natural resources by the local communities.

The analysis in Chapter 5 determines the roles and responsibilities of the different stakeholders within the structures and seeks to identify elements of greatest importance to livelihoods and PA conservation. The SLA enables the researcher in Chapters 5, 6, 7 and 8 to use theories to make connections between the main concepts in the study and, most importantly, to make the theoretical generalisation of the research findings by entering into a dialogue in which one's research findings resonates with other similar works (Lund, 2014).

1.4 Governance defined

Governance is a word that presents a challenge in its definition as attested by a number of authors (Graham *et al*., 2003; Frederickson, 2004; Asaduzzaman & Virtanen, 2016). Asaduzzaman &Virtanen (2016) discusses governance as a "model" from four perspectives; those of Stoker (1998), Mintzberg (1996), Peters (2001) and Heady (2001). For most authors governance is a "notoriously slippery" concept and it is often used by scientists and practitioners without a common definition (Katsamunska, 2016; Asaduzzaman & Virtanen 2016; Evans, 2012). Governance poses a challenge of occurring at many scales, from international to local as each level influences the other (Child & Wojcik, 2014, p.44). Therefore, the definition of governance should be explained and guided by the level and context at which governance is exercised. The level and context will determine the systems and processes by which actor's interactions are directed and controlled.

This would be governance in the global, national and organisational space. Of relevance to this research is governance in the national space; this is sometimes understood as the exclusive preserve of government, of which there are several levels: national, provincial, district or local. Governance processes reveal the interactions amongst multiple social actors, of which government is just one (Nyirenda & Nkhata, 2013). For PAs, the type of governance of concern is natural resource governance.

To bring all these aspects into perspective the definition is narrowed down to the domain of natural resource governance where PAs fall. According to Barnes & Child (2014, p.1) "the scope and definition of governance vary considerably across disciplines, but for the purpose of this dissertation it is considered as the rules and processes that create and enforce negotiated agreements related to people's access to and use of collective goods and services in a community". Natural resource governance is considered as key for successful benefit flow to local households, because it concerns rules and processes that create and enforce negotiated agreements related to people's access to and use of natural resources (Child & Barnes, 2010). Natural resource governance focuses specifically on those rules and processes that control the allocation of rights to and use of natural resources.

Furthermore, reference is made to institutions as rules of the 'game' and the organisations as actors (Vatn, 2017). Legitimacy is one of the criteria that is used in evaluating governance structures. Input legitimacy entails appropriateness and acceptability of decision making processes with regard to interests of various actors which include participation, transparency and accountability (Vatn, 2007). While output legitimacy is about the result of the process including allocation of costs and benefits and achieving set goals (Vant, 2007). Legitimacy in governance is key in order to achieve equity among actors involved. Equity involves acknowledgement and respect of actors rights and identities, inclusiveness in rules and decision making and sharing of costs and benefits (McDermott, Mahanty & Schreckenberg, 2012).

Wildlife resources are the main natural resource of concern in GMAs, as a primary land use type of the GMA should be wildlife management. Wildlife governance in the past was mainly the preserve of state institutions such as Department of National Parks and Wildlife Service (DNPWS). However, since the late 1980s the management and governance of wildlife resources in GMAs has been progressively devolved to local communities and implemented through the CBNRM programmes with CRBs being the actors (Mupeta-Muyamwa, 2012). The promulgation of the Wildlife Policy of 1993, enactment of the Zambia Wildlife Act, No. 12 of 1998, together with the recently reviewed Wildlife Policy of 2015 and the Zambia Wildlife Act, No. 14 of 2015 enhance the concept of community participation in GMAs (Simasiku *et al*., 2008; Umar & Kapembwa, 2020).

The CBNRM approach is designed to improved natural resource management with the full participation of local communities in decision-making, and the incorporation of local

institutions, customary practices and knowledge systems in management, regulatory, and enforcement processes (Armitage, 2005, p.703). The CBNRM participatory approach advocated for in most of Southern Africa is premised on a homogenous type of local community rather than egalitarian communities. Community can be defined spatially, socially, culturally or economically, depending on the purpose of the application or functionality. According to Fabricius *et al*. (2004), communities can functionally be identified through the type of organisation representing them, ethnic affiliation, geography, common interests, utilising the same resource or practising the same type of land use.

The Zambia Wildlife Act, No.14 of 2015 defines a local community as residents within a GMA or open area, other than owners of tourist and camp lodges or hunting concessions, who by virtue of their rights over land, including under customary land tenure, invest in and derive benefits from the sustainable utilisation of the wildlife resources in their area. Therefore, the definition of community may have implications for the participatory approach to governance as intended in CBNRM, as it has implications for membership.

1.5 Sustainable livelihoods in perspective

This framework was adopted mainly for the analysis in this study since the focus is mainly on governance, livelihood strategies and their outcomes in relation to wildlife conservation (Fig 1.1). The analysis and discussion of the research findings will be based on the Sustainable Livelihood Framework (SLF). Even though it cannot be used as a model of reality, the SLF provides a checklist of important aspects to consider when investigating livelihoods. The Department for International Development (DFID) stresses that it is a framework, not a theoretical model, which is designed to allow an examination of an array of factors and relationships that show how people build their lives, their quality of life, and how that life can sustainably be enhanced (Fabricius *et al*., 2004). According to Evans (2012, p.15) "A framework indicates what kinds of variables are important, while theories offer an explanation of how the world works and why things happen the way they do".

1.5.1 A Framework for rural livelihood analysis

Figure 1.1 was applied in analysing the links between the components of the framework, the livelihood platform were the assets are found is the GMA. Access to these assets is however modified by social relations, institutions and organisations in a changing context resulting in livelihood strategies with positive or negative outcomes for livelihoods and the PA.

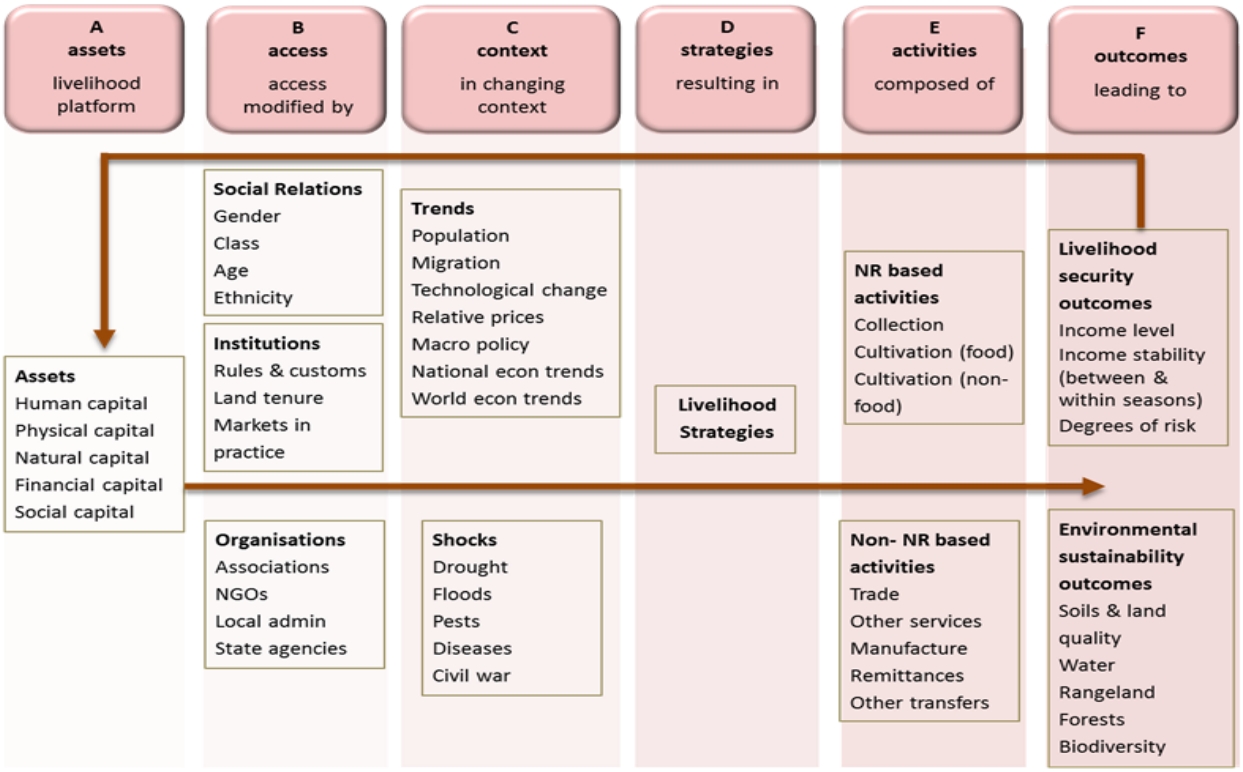


Figure 1.1: A framework for rural livelihood analysis.

Source: adopted from Ellis (2000, p.30)

1.6 Problem statement and rationale

Despite the growing importance of the concept of governance to researchers, development practitioners, policy makers and international aid agencies, the concept is still evolving and needs examining analytically and systematically (Asaduzzaman & Virtanen, 2016, p.1). Community Based Natural Resources Management (CBNRM) is the governance approach in the study area which requires robust methods of assessing its performance which are just being developed. Using a transdisciplinary approach, the study developed a community-driven model for assessing CBNRM. Governance is emerging as a critical part of the agenda for addressing development challenges such as poverty alleviation and the unsustainable management of natural resources (Barnes & Child, 2014; Child &Wojcik, 2014). The study area has high levels of poverty and vices such as charcoal burning and tobacco farming which contribute to the loss

of wildlife habitat. The threat of extinction of species due to over utilisation of resources, the inability of the state to protect its declining wildlife resources, land use conflict and the need to link conservation and development were some of the driving factors behind introduction of CBNRM in Southern Africa (Mbaiwa, 2004).

Local governance structures such as CBNRM aim at attaining the sustainable use of natural resources. In the context of CBNRM good governance has two goals, namely the reduction of multidimensional poverty and promoting sustainable use of resources upon which communities in GMAs depend (Child &Wojcik, 2014). However, due to the combined effects of various challenges in wildlife governance, such as ownership and control by various interest groups, which is typical of the CBNRM approach, it has resulted in a major reduction in wildlife densities in most PAs and the loss of habitat in GMAs (Lindsey *et al.,* 2014). The study identifies the gaps in the governance structure which has resulted in reduced access to natural resources by households creating a disincentive for PA conservation.

This could be attributed to the lack of coordination among stakeholders, since wherever there are natural resources, different stakeholders will lay claim to aspects of those resources, attaching different interests to a particular resource (Yeboah-Assiamah, Muller & Domfeh, 2018). Good performance in governance is related to the ability to aggregate and coordinate various interests for consensus building on policies (Asaduzzaman & Virtanen, 2016). When interests are not harmonised, the less powerful are ultimately disadvantaged. Therefore, lack of co-ordination in resource use increases the vulnerability of natural resource dependent-communities.

Natural resources constitute the most important base for the survival of poor people, and means of long-term livelihood security (DFID, 1999). The households in Mufunta GMA are natural resources dependent. Thus, it is important to establish how the governance structures that are in place, such as the CBNRM, are influencing livelihood strategies. The nature and structure of these governance apparatuses may be well understood, but the influence that they have on livelihoods remain unclear (DFID, 1999) even to date. Therefore, this study goes beyond the state of the structures and processes to examining the effect that CBNRM, through CRBs, have on the livelihoods of people in GMAs and on PA conservation. A synthesis of knowledge on human-environment interactions will enable policymakers to more effectively diagnose problems and develop the relevant knowledge to explore possible solutions (Cox *et al*., 2016).

1.7 Significance

The study intended to reveal gaps in the governance structure that are relevant for policy and structural adjustments. Using a transdisciplinary approach, the study developed a community-driven model for improving co-ordination in Community Based Natural Resources Management using a 4-step approach: (1) conceptualisation by the local community; (2) understanding existing local structures; (3) linking traditional and state structures; and (4) overcoming fragmentation within the CBNRM working space. The identification of a bridging actor for overcoming institutional fragmentation in CBNRM between the traditional structure and the state structure is an interesting finding for improving coordination. Furthermore, the role of the local community in developing a governance model is highlighted through knowledge co-production. The bottom-up-top-down equilibrium model for PA governance is worth exploring through policy implementation. By assessing the governance structure, institutions and actors that may serve as a constraint or opportunity for improving natural resources governance were be identified. The study will contribute to empirical data on the institutional constraints to accessing natural resources, which in turn reduces opportunities for households living in PA to improve livelihoods. The results on the vegetation cover trends to monitor habitat loss through remote sensing will be another important contribution; vegetation change detection monitored from the establishment of the GMA in 2006 to 2018, will highlight the significance of PA status and the role of PAG. Finally, the performance of the current governance structure is evaluated through livelihood and conservation outcomes, therefore pointing to the successes and gaps for the improvement of CBNRM in the study area. Some of the findings could be relevant to other GMAs in Zambia, since the governance structures and many other social economic factors maybe similar.

1.8 Aim, objectives and scope of this research

The argument underlying this dissertation builds on the assertion that understanding the link between governance structures, livelihoods and PA conservation has the potential for improving PAG for sustainable outcomes. The study's overall goal is to contribute to the knowledge, theory, evidence and tools needed to assess the existing natural resource governance structures in the greater Kafue landscape and their contribution to wildlife conservation and rural livelihoods.

This goal is achieved by focusing on the Zambia's CBNRM, which is a governance structure at local level. Governance in Zambia is exercised at different levels (i.e. national, regional and district/local levels). Pertinent to the livelihood strategies and PA conservation is local governance. Performance of CBNRM is dependent on local governance. Turner (2004, p.17) states that "if local governance is ineffective, so is CBNRM". The analysis of interactions among governance actors-both state and non-state-in CBNRM is limited to the micro level. However, the influence that meso-and macro-level governance has on micro governance is assessed by analysing the links of the CBNRM structure within the DNPW since they have established organisational structures at meso and micro level. The focus is on DNPW because it is the government department mandated to manage PAs in Zambia. Furthermore, this study's scope is limited to NRG with an emphasis that these resources are within the boundaries of a PA. Therefore, PAG is highlighted because natural resources inside and outside PAs are governed differently in the Zambian context.

1.8.1 Aim

To assess the existing natural resource governance structures in Mufunta Game Management Area and their contribution to enhance livelihoods and wildlife conservation.

1.8.2 Objectives

1. To assess the existing governance structures and the linkages between the various layers of governance;
2. To evaluate the link between governance structures and livelihood strategies of local communities living in GMAs;
3. To assess how current livelihood strategies, impact on wildlife habitat and the role of governance in PA conservation;

1.8.3 Research questions

1. How effective is the coordination of the CBNRM governance structure in enhancing input and output legitimacy?

- How do rights shape goals, roles and responsibilities of actors in CBNRM?
- Do the institutions governing stakeholder interaction facilitate equity for actors in the CBNRM?
- What governance variables are key to improving the coordination arrangement for livelihoods and PA conservation?

2. What is the link between governance structures and livelihood strategies?

- What factors determine household access to land, wildlife, fisheries and forests?
- What is the degree of household dependency on the natural resource base?
- Does decision-making at community level influence the choice of livelihood strategies for households?
- How do cost and benefit sharing through CBNRM affect available resources for the households?

3. What is the impact of livelihood strategies and PA governance on the conservation of the buffer zone?

- What drives the choice of land use by households?
- What are the drivers of forest loss in the study area?
- What is the role of CBNRM in buffer zone conservation?
- What percentage of forest cover loss can be attributed to decision-making at household level?
- What is the trend of forest cover in the buffer zone from 2006 to 2018?

1.9 Philosophical world view

Worldviews can be understood as the general philosophical orientation of the researcher. Although philosophical ideas remain largely hidden in research, they influence the practice of research and need to be identified (Creswell, 2014). Paradigms are thus social worlds where research communities exert a powerful influence over the beliefs considered to be "meaningful" and the actions accepted as "appropriate" (Morgan, 2014). This research has been partly conducted in the social and behavioural science domain, where there is no consensus on the methods to be employed on a particular phenomenon of research (Rosenberg, 2008). However, the philosophy and theories guiding the research must be clear. Therefore, in this study the philosophy underpinning this research is the pragmatic world view. Pragmatism is based on philosophy that knowledge should not be in competition but should be applied in a flexible manner to arrive at a solution. There is a concern about what works and solutions to problems (Patton, 1990).

This research was conducted in the domain of the social and natural sciences. The consensual set of beliefs and practices that guide a field of science is referred to as a "paradigm" or "worldview" and vary depending on the nature of research (Morgan, 2007, p.49-50). In order to manage ecosystems, natural resources practitioners must be both idealistic about science and pragmatic about politics in confronting the inevitable tension between the two (Daniels & Walker, 1996). Given that this research focuses on understanding the link between governance, livelihood and PA conservation, the research applies the livelihood and social ecological perspective to understand the complexity of these relationships. These approaches bring together the human and nature interface by looking at this relationship in more holistic and in a transdisciplinary manner. A community of social and natural scientists utilise a social and ecological system framework to take a more holistic and transdisciplinary approach to science (Schoon & Leeuw, 2015). Transdisciplinary research represents an approach that is targeted at integrating different paradigms (Helgenberger, 2010). A transdisciplinary research can be defined as cutting across different paradigms in a process of co-designing and co-producing practical knowledge that is more transformative, while holistic approach is derived from holism the theory that parts of a whole, are interconnected, such that they cannot exist independently of the whole, which is thus regarded as greater than the sum of its parts. The study uses the approach in understanding interactions between people and nature in the PA by emphasising the links that result in positive and negative outcomes for livelihood and PA conservation.

Pragmatism focuses on the changing universe and emphasises the practical application of ideas by acting and testing them in the light of human experience (Morgan, 2014). The practical application of ideas is the added value of Transdisciplinary (TD) research (Helgenberger, 2010). Considering that the nature of the research spans several disciplines, it requires a robust approach, which captures the real essence of the investigation. Therefore, a process-based approach to knowledge was adopted, in which the inquiry was the defining process (Morgan, 2007; Morgan, 2014). According to Morgan (2014, p. 1046) "Pragmatism rests on the argument that the meaning of an event cannot be given prior to the experience". Instead of concentrating on methods, pragmatic researchers focus on the research problem and use all available approaches to understand the problem as a philosophical underpinning for a mixed- method approach (Creswell, 2014). Instead assigning post-positivism and constructivism a priori to different ontological and epistemological camps, a pragmatist would focus on their characteristic approaches to inquiry as they are applied to research (Morgan, 2014, p. 1049).

The study found this approach resonating with the TD methodology that was applied during data collection using the pragmatic principle of flexibility and experience based research. See Figure 5.1 for the application of the TD methodology. By using a transdisciplinary procedure, the researcher goes beyond participatory methods as the stakeholders, at least in some phases of the research, actively contributed their interest and knowledge (Scholz *et al*., 2006, p. 228). In Chapter 5, research participants through knowledge co-production model the CBNRM structure for the study area from their perspective as they see it presently and propose changes. Pragmatism not only replaces arguments about the nature of reality as the essential criterion for differentiating approaches to research, it also recognises the value of those different approaches as research communities guide choices about how to conduct research.

Pragmatism is not committed to any one system of philosophy but instead it relies on a process-based approach to knowledge, in which inquiry is the defining process (Morgan, 2014). This is adopted in this study by applying a mixed-method approach which draws liberally from both qualitative and quantitative assumptions during all the stages of the research. This research affirms the assumption that research always occurs in social, historical and political contexts specific to the study area. The point here is that any attempt to produce knowledge occurs within a social context (Morgan, 2014). Therefore, the research applies an integrated and

adaptive approach using pragmatic philosophy to answer the research questions since they are transdisciplinary in nature.

1.10 Study site

1.10.1 Brief historical overview

The study was conducted in Mufunta Game Management Area (GMA), the buffer zone bordering the Kafue National Park (KNP) on its western boundary (Figure 1.2). Mufunta is one of the 9 GMAs surrounding the KNP (Namukonde & Kachali, 2015). It is situated in Kahare Chiefdom, located in Nkeyema and Luampa districts in the Western Province of Zambia. The GMA was created by the government through the Statutory Instrument (SI) No. 43 of 2007, with the technical and financial support from the World Wildlife Fund for Nature (WWF). Through the Zambia Wildlife Authority (ZAWA), now DNPW, the Zambia Wildlife Act, No. 12 of 1998, a Community Resource Board (CRB) was established as a local body for governance of the GMA (Lindsey, *et al.,* 2014; Umar & Kapembwa, 2020).

The CRB started by setting up Village Action Groups (VAGs), which are the lowest local governance structure constituting limited number of households. Initially, there were 3 VAGs, namely, Litoya, Shikela and Lalafuta, because they are the closest to the KNP. Presently, there are 10 VAGs; 5 in Nkeyema district, and 5 in Luampa district. In Nkeyema district there are Lalafuta, Litoya, Kalale, Kambwize and Shivuli VAGs, while in Luampa district there are Shipungu, Kanyenze, Luampa, Mwangalesha and Shikela VAGs.

1.10.2 Key biophysical features

The GMA lies within an elevation of approximately 1,200 m above sea level. It is divided into the Kaoma Terrace and the Luampa-Lui Watershed. The Kaoma Terrace has moderately good arable land and consists of sandy clay loam soils with sandy loam topsoil. The Luampa-Lui Watershed has higher water tables, and because of the general absence of major tributaries dissecting the landscape, scattered small circular to sub-circular watershed pans are a common feature.

Mufunta generally has three seasons: hot-wet season which begins in late October and usually ends in April, cool-dry season which runs from May to August, and hot-dry season which starts in September and ends in October. The temperatures in the GMA range in extremes from 5^0C

and 32^0C. It lies in agro-ecological region II. Rainfall in this eco-region ranges from about 800 – 1,200mm annually. The GMA generally receives more rainfall than the other parts of the district. The northern part receives higher amounts of rainfall than the southern part. The mean rainfall for the wet miombo >1000 mm (Chidumayo, 1997).

The major vegetation type in Mufunta GMA is the Miombo woodland, which is also dominant in the KNP. It covers about 4,976 km^2 or 76% of the GMA, leaving only 1,579 km^2 or 24% for other vegetation types (ZAWA, 2006). The Miombo woodland provides a habitat for elephants (*Loxodonta Africana*), sable antelopes (*Hippotragus Niger*), roan antelopes (*Hippotragus Equines*), lions (*Panthera Leo*), leopards (*Panthera Pardus*) and warthogs (*Phacochoerus Africanus*). Grasslands cover 491 km^2 or 7%. The grasslands are a habitat for reedbuck (*Redunca arundinum*), oribi (*Ourebia ourebi*) and impala (*Aepyceros melampus*).

Wildlife populations in the GMA are relatively low because of land use practices incompatible with wildlife management, such as agriculture and hunting (ZAWA, 2006). Although natural factors such as diseases and the availability of waterholes can potentially contribute to these low numbers, their effect is considered minimal in comparison with the anthropogenic activities. The anthropogenic activities include poaching, destructive farming methods, uncontrolled fires and settlement patterns (ZAWA, 2006).

Fish species include Liminga (*Clarias spp*), Lindombe (*Clarias spp*), Limbundu, Limbala (*Sardine spp*), Linchiba (*Sardine spp*), Lipapati (*Tilapia spp*), Mitome (*Eel fish*), Limbufu (*Tilapia spp*), Nembele, Mabango (*Silver Barbel*), Lituhu (*Tilapia spp*), Milumesi Pike (*Hepsetus odoe*), Kokwe (*Clarias gariepinus*), Nangalole (*Philander spp*) and Mawetete (*Clarias spp*) (ZAWA, 2006). The top three species in terms of economic importance are Limbufu (*Tilapia spp*), Lindombe (*Clarias spp*) and Lipapati (*Tilapia spp*). Lindombe (*Clarias spp*) is commonly consumed among local communities because of its meaty nature. Lipapati (*Tilapia spp*) is abundant and therefore mostly serves as relish.

1.10.3 Population demographics

Mufunta GMA has an estimated population of 25,000 people and has an annual population growth rate of 3.4%. The population density is 4-7 persons per km^2. About 50% of the total population lives within 10 km on either side of the Lusaka-Mongu road. The area has 143 villages, with 5,599 households, giving an average of 4-5 people per household.

1.10.4 Relevant social-ecological challenges

The livelihood of the people in the GMA is based on agriculture and extractive utilisation of the natural resources *such as* collection of honey, fruits, mushrooms, artisan fishing, carving, pottery, hunting and weaving (ZAWA, 2006). Tobacco is one of main crops grown both at commercial and subsistence level. Cultivation of tobacco in the area is destructive, because trees are used to cure the tobacco and tobacco growers constantly shift from one place to another. Consequently, in the process cutting down more trees, the tobacco growers are causing a lot of habitat destruction. Furthermore, unsustainable human activities have lowered the pH and consequently reduced the productive capacity of the soils (ZAWA, 2006). Soil erosion is evident throughout the study area, especially in slopes towards valleys.

There are several natural springs in this area which have untapped value, like the Kadzo Spring in Njonjolo (ZAWA, 2006). Its proximity to KNP makes it an attractive wildlife habitat. On the other hand, it has an economic potential for timber production. However, ecological problems can result from this land use practice as it could become unsustainable if not properly managed.

1.10.5 Rationale for focusing on Mufunta GMA

Mufunta is the newest GMA in the Greater Kafue Landscape. It shares the longest boundary with the KNP and has high stocks of valuable timber species and the most sought after and highly prized thatching grass *Loudetia simplex* ("Mwange" in Lozi). In terms of land, it covers an area of about 5,417 km^2 and is the third largest GMA in the Greater Kafue Landscape. It is an important socio-ecological system and buffer zone for the NP's conservation. Administratively, the GMA buffers the western part of the lower and upper parts of the KNP South and KNP North. The area consists of the Nkoya, Lozi, Mbunda, Luvale, Luchazi, Chokwe, Tonga, Lunda, Kaonde, Tumbuka, Bemba and Namwanga speaking people. It is the home of predominately the Nkoya-speaking people, who were historically hunters. The Nkoyas

bring in dynamics in terms of how they receive the declaration or degazetting of the area into a GMA further restricting their long-enjoyed hunting rights. The study provides empirical evidence on the role of governance in wildlife habitat conservation and rural livelihood sustainability.

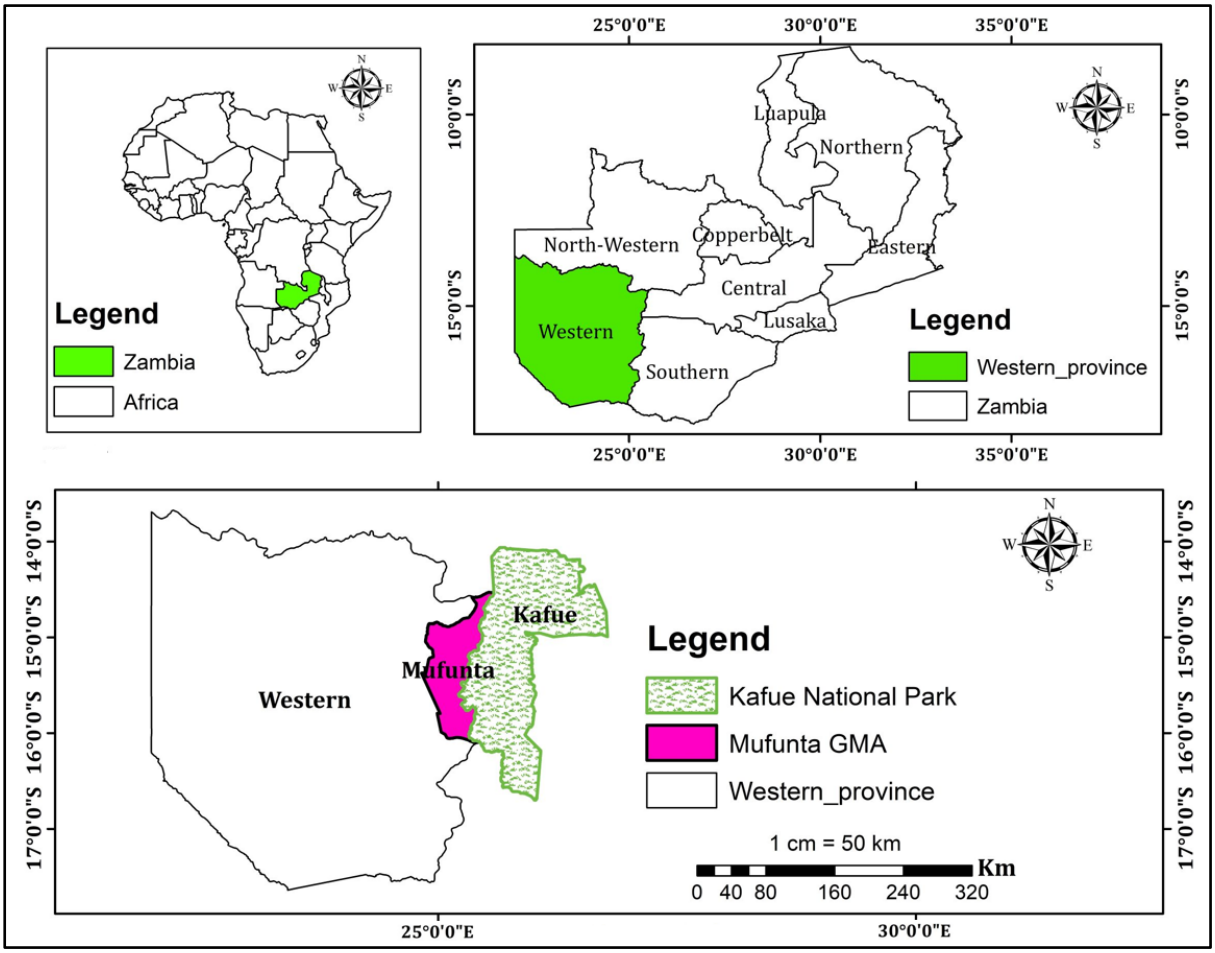


Figure 1.2: Map showing the location of the study area Mufunta GMA in relation to the Kafue National Park

1.11 Chapter outline and structure

This dissertation is comprised of 8 chapters. The first chapter provides a brief introduction to the key theoretical and practical challenges this research seeks to address, and outlines its aims, scope and objectives, influencing all subsequent chapters. The worldview is explained, the study site is introduced by giving a historical overview, a justification for the choice of study site and a description of the geographical location. As the dissertation reports on research of an exploratory nature, each chapter is linked and informs the subsequent chapter. The research outline follows a structure, which started from the broad to the narrow-to-point 'hourglass' perspectives.

Chapter 2 further develops the theory of the study and shows the link between theories of governance, livelihood and PA conservation which are used in the research. Governance theories and other theories that shape PA governance are explored in this chapter, on an international scale. The overall historical background and evolution of PA policy on the international arena sets up the scene for the subsequent chapter that focuses on the legal and policy framework of PAs in Zambia.

Chapter 3 reviews the concept and practice of PA governance, its evolution in Zambia within the domain of NRG, with a focus on policy and legal framework. A historical evolution from the establishment of KNP to the most recent policy alternative of GMA establishment is examined. This allows a narrowing of the context of governance to Zambia's local settings where the research is carried out.

Chapter 4 elaborates the methodology that was applied for data collection for the three main objectives in the study. This chapter discusses the conceptualisation of the study and design. The research design and strategy are elaborated the worldview, sampling techniques, data collection and data analysis. This chapter explains the conceptualisation of the study, which anchors the three main objectives of the study.

Chapter 5 focuses on the assessment of the governance structure in Mufunta GMA which is the case study for the research. The research evaluates the link that these structures have on livelihoods and PA conservation outcomes in Chapters 6 and 7 respectively. Finally, the research findings are synthesised and concluded in Chapter 8; recommendations for policy and future research are also presented in this chapter. Figure 1.3 below illustrates the conceptual map for the study.

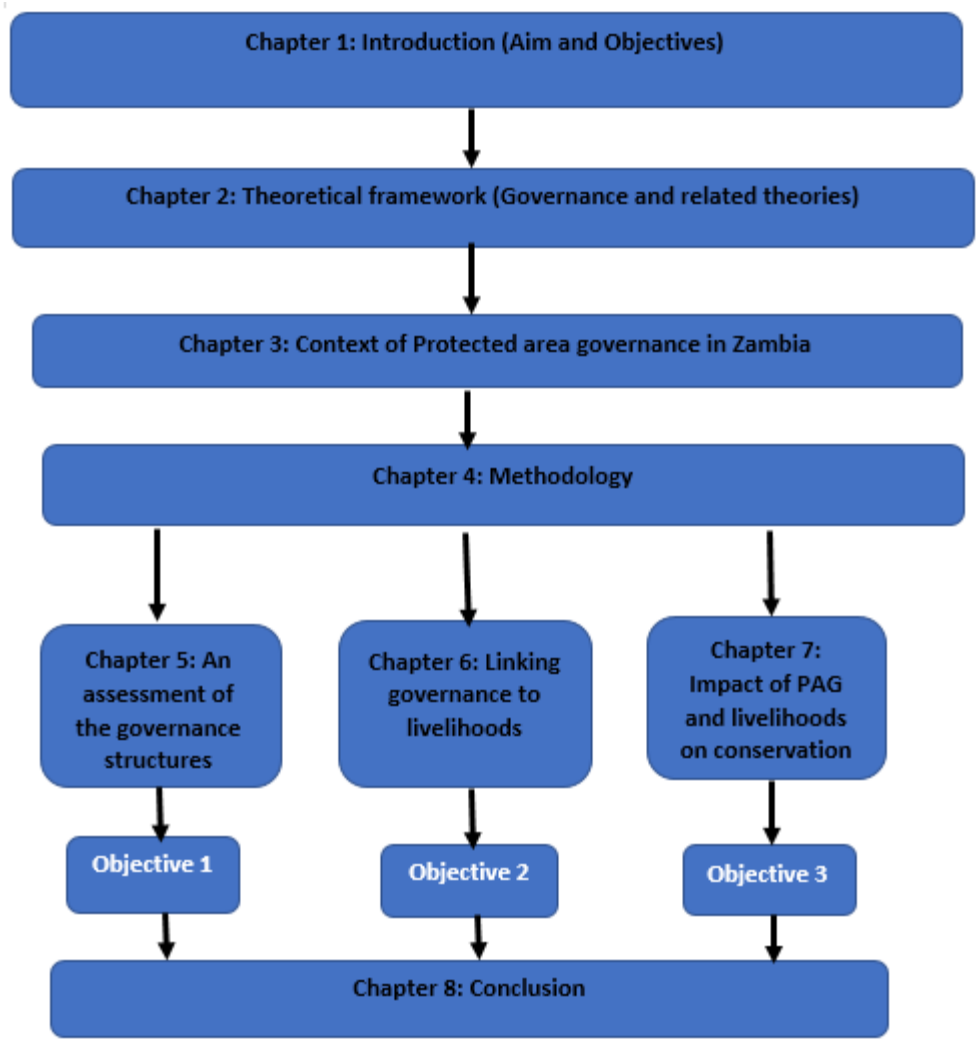


Figure 1.3 A diagrammatic presentation of the conceptual map

1.11 Chapter summary

The chapter gives the background to the study and briefly outlines the main concepts in the study. It further explains the problem and significance of the study, the aim, objectives and research questions for achieving the said objectives. It briefly introduces the philosophical worldview underpinning the methodology of the study. Finally, the dissertation structure is outlined chapter by chapter from the general introduction, setting the theoretical framework through literature review, the context of PA governance in Zambia policy and legislation, methodology, assessment of the governance structure, linking governance structure to rural livelihoods, the impact of livelihood and NRG on PA conservation outcomes, synthesis and conclusion in chapters 1 to 8. The chapter that follows sets up the theoretical framework through literature review.

CHAPTER TWO: SETTING THE THEORETICAL FRAMEWORK FOR PROTECTED AREA GOVERNANCE AND RELATED THEORIES

2.1 Introduction

Governance is a concept that is applied in different fields and at different levels because there is no single school of thought about what it entails (Evans, 2012). In this dissertation the focus is on Natural Resources Governance (NRG) for Protected Areas (PAs). This chapter reviews the literature on the theory and concept of governance. Governance can be generally referred to as the act of governing, be it in the public or private sector (Emerson, Nabatchi & Blong, 2011). The concept emerged from different historical and intellectual lineages (Evans, 2012). According to Stoker (2006) and Asaduzzaman & Virtanen (2016), literature on governance is broad and diverse with theoretical roots ranging from institutional economics, international relations, organisational studies, development studies, political science, public administration and Foucauldian-inspired theorists. Foucauldian-inspired theorists are theorists that have their work on governance inspired by Michel Foucault a French historian and philosopher. Michel Foucult social philosophy is valuable in understanding how the process of governing relates to development of the modern state and places governance within its broader historical context (Evans, 2012). In this study the governance structure is assessed in the light of its development and evolution over time and the resulting CBNRM approach currently in place

The general concept of governance is discussed and narrowed down to its evolution in the field of natural resources, with a focus on Protected Area Governance (PAG). The Canadian institute of governance defines PAG as "the interaction among structures and processes and traditions that determines how power and responsibilities are exercised, how decisions are taken and how citizens and other stakeholders have their say" (Borrini-Feyerabend & Hill, 2015, p.179). Protected area governance definition and application are explored in relation to other theories that have implications for the way PAG is applied and understood. According to Asaduzzaman & Virtanen (2016, p.1) "Governance has gained popularity in management sciences and in academic public policy discourse because of its ability to link up with many other arguments and theoretical concepts". The main objective of the chapter is to illustrate how governance and related theories influence the understanding and application of PAG. Governance as a

framework for analysis indicates what variables are important, providing an intellectual scaffolding to guide the research (Evans,2012).

Governance opens a new intellectual space as it provides a concept that allows us to discuss the role of government in coping with public issues and the contributions that other stakeholders make (Graham *et al.,* 2003). This is demonstrated throughout this dissertation as the study assesses the Community-based natural resources management (CBNRM) governance structures and the co-ordination arrangements in Chapter 5. Protected area governance was a preserve of state through fortress approach until the 1980s, when CBNRM became prevalent. However, currently "there has been a global shift in NRG, particularly with increased co-management of PAs" (Ward, Stringer & Holmes, 2018, p.137). Since, governance structures encompass institutions and actor's literature on institutional theory and participation will be reviewed to understand the implications of such theories on PAG implementation. Institutions are channels through which individual and collective actions are shaped (Cleaver, 2012). People make decisions through rational choice to ensure the greatest benefits at household and community level. The concept of governance applies to various forms of collective action such as CBNRM (Asaduzzaman & Virtanen , 2016, p.4).

Theories such as institutionalism, legitimation, democracy and fragmentation influence the understanding of PAG in this study. Chapters 6 and 7 examine the role that these theories play in shaping outcomes for livelihoods and PA conservation. The importance of formal and informal institutions in shaping the livelihood of the poor has increasingly been recognised (Sarch, 2001, p.185). Through the property rights and access theory, the influence that governance structures have on livelihoods and PA conservation is illuminated. As property rights and access are critical for regulating land rights, preventing resource degradation and depletion, managing common property and creating sustainable livelihood through well designed institutions of governance is important (Cleaver, 2012). It is evident that the wealth of a nation cannot merely be achieved by having abundant natural resources but it has to do with the state of governance (Asaduzzaman &Virtanen, 2016).

2.2 The theory and concept of governance

In his review Kooiman (1999) identifies different ten usages of the term, some of which are applied in this research: these are governance as the new public management, good governance, social cybernetic governance and governance as self-organising networks (Evans, 2012, p.5). In the 1980s the concept of governance took centre stage in the social sciences, in particular in the field of Public Administration (Katsamunska, 2016) . The concept became popular because of its flexibility (Krahmann, 2003) and capability to cover a range of institutions and relations involved in the process of governing (Katsamunska, 2016). The use of the concept of governance in describing policy-making has been increasingly used since the 1980s (Krahmann, 2003, p 323). The concept has been used frequently by scholars and practitioners, but usually with varying meanings and implications (Ruhanen, Ritchie, Tkaczynski & Scott, 2010; Borrini-Feyerabend, Dudley, Jaeger, Lassen, Broome, Phillips & Sandwith, 2013; Katsamunska, 2016).

According to Krahmann (2003, p.323), definitions and uses of governance are as varied as the issues and levels to which the concept is applied. In this study the focus is on governance in the national space, looking at the linkages between micro, meso, macro and expanding our scope to how global governance influences PAG at national scale. According to Borrini-Feyerabend & Hill (2015, p. 172-173) "ecological and economic considerations are large-scale regimes, on the other hand social typology often suggests small-scale regimes; these two can be harmonised by well-functioning nested governance regimes and by strengthening linkages and connections among actors, levels and partners". The focus of current research is restricted to detailed analyses of the specific modes of national, regional and global governance rather than the comparison of governance arrangements across scales (Krahmann, 2003, p. 323). The study, however, does not compare the levels of governance but explores the linkages across scales and how these interactions influence micro governance for PAs.

The role of government in governance is variable and not constant because they are modes of governance that are state-and society-centered (Katsamunska, 2016; Evans, 2012). The concept of governance means looking beyond the role of government towards private-public-civil society partnerships (Berkes, 2009), which is typical of CBNRM. For purpose of this study, governance can be conceptualised as steering and coordinating the society in order to attain collective goals (Graham *et al.,* 2003; Krahmann, 2003; Asaduzzaman & Virtanen 2016;

Evans, 2012). Scholars have looked at governance both from the old and the new perspective; the old governance entails steering by the state using a top-down approach, while, the new governance proposes the interactions of the state with other societal actors relying mostly on self-steering and organising (Graham *et al.,* 2003; Krahmann, 2003; Ruhanen *et al.*, 2010). According to Pierre (2002 as cited by Katsamunska, 2016, p.134) the governance concept as applied in public administration has a dual meaning: on one hand, it refers to the empirical manifestations of state adaptation to its external environment as it emerged in the late twentieth century, and on the other hand, governance denotes a conceptual or theoretical representation of coordination of social systems and, for the most part, the role of the state in that process. Frederickson, (2004) affirms that governance theories are basically scholarly responses to the transformation of the states' role. The challenge is having the role of the state transformed in a practical sense in CBNRM.

The difficulties in conceptualisation of the term have resulted in governance being an umbrella concept for a wide variety of phenomena, such as policy networks, public management, coordination of sectors of economy, public-private partnerships, corporate governance and good governance. Asaduzzaman & Virtanen (2016) argues that the lack of precision in the conceptual definition of the term governance is the secret of its success. Researchers consider governance both from the process and structure perspective. According to Frederickson (2004, p.8), structures include "organisational type, level of coordination and integration among the organisations in the governance regime, relative degree of centralised control, functional differentiation, administrative rules or incentives, budgetary allocations, contractual arrangements or relationships, and institutional culture and values". There are four common governance arrangements from the diachronic and synchronic perspective namely hierarchies, markets, networks and communities (Katsamunska, 2016, p.134). According to Evans (2012), there are three modes of governance that are generally recognised in literature, namely hierarchy, networks and markets for the coordination of collective action. Hierarchy resembles the traditional form of government structure; there is a clear pyramid of control through which decisions taken at the top are passed on to those below; network is commonly associated with the concept of governance as it emphasises connections between stakeholders as independent actors working together to achieve a common goal, and markets bind stakeholders together as suppliers and consumers of particular resources (Evans, 2012, pp. 34-36).

In the literature, governance as a mechanism of steering and coordinating dominates (Graham *et al.,* 2003; Krahmann, 2003; Asaduzzaman & Virtanen 2016; Evans, 2012). This research explores the role of CBNRM in improving coordination in GMAs through stakeholder networks. Research traditions of networks indicate that research in policy networks focus on actors that participate in decision-making and those that have power and access to decision-making arenas (Klijn & Koppenjan, 2012, p.2). Network governance involves voluntary partnerships between diverse stakeholders to build consensus on collective action (Evans, 2012). Adaptive governance is an extension of network governance and involves creating institutions that have the capacity to experiment with different solutions learn from them, adapt and transform (Evans, 2012, p.8). The concept of adaptive governance in its simplest form is 'learning by doing' (Borrini-Feyerabend & Hill, 2015). According to Borrini-Feyerabend and Hill (2015, p.195), "adaptive governance is the conscious adoption of a learning attitude in an organization". While inter-organisational service delivery and policy implementation research focuses on inter-organisational coordination, research on managing networks focuses on coordination problems in public service delivery in a fragmented setting (Klijn & Koppenjan, 2012, p.3).

Therefore, through the assessment of the governance structures, the research seeks to understand the coordination aspects of the CBNRM governance model. Muller (2007, p.48) states that networks or partnerships hold the most promising institutional prospects for integrated resource management, because no single actor, has the knowledge and information required to solve all resource problems. Therefore, adaptive co-management may be the ideal governance approach for natural resource governance. Co-management refers to PAs where power, responsibility, decision-making and enforcement are shared between the state and other actors (Holmes & Stringer, 2017).

2.3 Natural resource governance approaches

Historically, there have been two dominant approaches in natural resources governance: namely the fortress approach and the participatory approach. The fortress approach entailed different forms of exclusions, while the participatory approach is a community-centred approach aimed at bringing local people's rights to the centre of natural resources governance. Jones and Muphree (2004, p.63:4) state that "the fortress conservation is grounded

philosophically in the intrinsic value of nature and is basically biocentric, whereas community conservation is utilitarian and anthropocentric" The dominant approach to conservation in the 20th century was the establishment of PAs from which people were excluded. However, in the 1980s decentralised, community-based approaches to biodiversity conservation and natural resource management began to spread rapidly, especially in Southern Africa (Hutton, Adams & Murombedzi, 2011). Community based natural resource management in Southern Africa is a variant of what Adams and Hulme label "community conservation", which they define as those principles and practices that argue that conservation goals should be achieved by emphasising the role of local residents in decision-making about natural resources (Jones and Muphree, 2004, p.63:4). It's on record that "the poor conservation outcomes that has characterised decades of intrusive resource management strategies have forced policy makers and scholars to rethink the role of communities in resource use and conservation" (Agrawal & Gibson, 1999, p.629). The participatory approach has seen the coming of governance approaches, such as Community-Based Organizations (CBOs) and CBNRM, which are a form of co-management arrangements. Community based natural resource management is an emerging international model for natural resource management with a variety of definitions (Gruber, 2010). According to Gruber (2010, p.53) "Core to all definitions is an approach to natural resource management that seeks to support long-term sustainability through broad participation of community members and resource users in decision-making".

Natural resource governance from the fortress to the community approach is similar to the shift and changes that have occurred in public administration. This shift followed from traditional public administration where the state would solely manage PAs, to the new public administration, which assumed that the needs are satisfied by market mechanisms of market choice and currently the paradigm shift to public value (O'Flynn, 2007). Public value recognises networked community governance involves the interdependences between the state, markets and civil society (O'Flynn, 2007). This paradigm shift in governance may be necessary if CBNRM is to achieve its intended purpose. This implies moving from a state centric approach to an approach that involves other actors. Stoker (2006) agrees that network governance is suitable for co-management; however, he goes on to clarify that building a successful relationship is the key to networked governance and the core objective needed to support it. Coordination should be at the core of building relations among stakeholders for fostering networked governance (Angst, Midmer, Fisher & Ingold, 2018). CBNRM should be as much about managing stakeholder relationships as it is about managing natural resources.

Despite the shift from the fortress approach to a participatory approach through CBNRM, traits of the fortress approaches remain strong in PAG. A systematic and rigorous application of the public value principles to CBNRM management may be necessary to ensure a complete transformation. For the public value paradigm the focus is on the understanding of public interest, the nature of a public service ethos, the role of managers and the contribution of the democratic process (Stoker, 2006).

2.4 The evolution of protected area governance

A PA is a global concept playing an important role in biodiversity conservation. Protected areas are a major conservation tool and strategy for preserving biodiversity (Holmes & Stringer, 2017; Rakotonarivo, Jacobsen, Poudyal & Jockley, 2018). The first strategy towards biodiversity conservation was the establishment of National Parks (NP) and Nature Reserves (NR) dating from the 19th century (Vatn, 2017). In the 19th century, Rhodesia, the present day Zimbabwe and Zambia, were colonised by British settlers and under their rule tribal lands became buffer zones where subsistence and commercial hunting were allowed around most PAs (Shackleton & Shackleton, 2013). Unlike other global-level governance regimes concerning such matters as climate change that started at global level, biodiversity governance started from a national level and spread to the international arena. The first NP to be created was the Yellowstone national park in the USA in 1903 by an act of congress in 1872 (Child, 2004; Vtn, 2017), which was followed by an expansion of park establishments to other parts of the world. The 20th century saw the rise of government PA agencies, linked primarily to the spread of the NP concept (Graham *et al.,* 2003). The expansion process is driven by a complex set of actors and interests across the globe (Vedeld, Angelsen, Bojo, Sjaastad & Berg, 2007; Vedeld, Abdullah, Songorwa & Wapalila, 2012). A major contribution to the global policy architecture of PAs has been engineered by powerful lobbying groups such as the Nature Conservancy (NC), the World Wildlife Fund (WWF), Conservation International (CI), the World Conservation Society (WCS) and the African Wildlife Foundation (AWF) (Vedeld *et al.,* 2012, p.20). To date, these lobbying groups have influenced PAG; to illustrate this point, the study area Mufunta GMA was created with the assistance of WWF in 2006.

The IUCN first choose to make sense of the governance concept as related to PA by focusing on governance diversity, quality and vitality (Borrini-Feyerabend & Hill, 2015). Diversity

refers to the key actors holding authority and responsibility for the main decisions; quality has to do with the application of good governance principles and vitality is the integrative adaptability for innovation (Borrini-Feyerabend & Hill, 2015). As a concept PAG only gained recognition a decade or so ago, albeit the concept is not new as ever since PAs have been in existence, someone has made decisions about them, but more attention is now being given to the understanding of the practice and the concept (Borrini-Feyerabend *et al.,* 2013). It is on record that "traditional governance systems of local and indigenous people were often swept away with the establishment of PAs" (Graham *et al.,* 2003, p.11). In recent years, however, new forms of governance models for PAs have come up, such as collaborative management, management by local communities or indigenous people and delegated management by third parties such as NGOs and the private sector (Graham *et al.,* 2003). Borrini-Feyerabend and Hill (2015) name four types of governance for PAs: governance by government, shared governance, governance by private individuals and organisations, and governance by local communities or indigenous people. Evans (2012) also recognises transitional management and adaptive governance as emerging modes of environmental governance. Adaptive governance brings actors together with a stake in a social-ecological system, as an extension of network governance to include ecological systems with stakeholders bound together with a belief that resources will be managed effectively through co-management (Evans, 2012; Carlsson & Berkes, 2005)

In Africa the earliest wildlife co-management initiatives started in the 1980s, for revenue sharing from safari hunting, becoming wide spread only in the 1990s (Berkes, 2009). Since the 1980s the popular idea was that PAs had a high chance of survival by winning the support of the locals (Tumusiime & Sjaastad, 2013). In Zambia GMAs are using the collaborative governance approach through the CBNRM model which emerged in the 1980s. Collaborative governance is known for bringing together public and private stakeholders in collective forums with public agencies to engage in consensus-oriented decision-making (Ansell & Gash, 2008). It is evident from this history that the local communities are rarely the originators of the PAG approaches initiatives. According to Musavengane & Simatele (2016, p. 807) "the CBNRM has been criticised as a programme that is largely driven by initiatives that are exogenous to local communities and often promotes the agenda of external actors". Research agrees that in Africa external interventions have had an important impact on institutions which govern access to natural resources (Sarch, 2001; Vedeld *et al.,* 2012). This study uses a trans-disciplinary

approach by engaging local stakeholders in knowledge co-production for the evaluation of the governance structure and subsequent development of a sustainable adaptive governance approach. Adaptive governance is an extension of network governance which emphasises community knowledge and learning (Evans, 2012). It is important to acknowledge the importance of community participation without losing focus of the role of delocalisation on communities in NRG (Ojha, Ford, Keenan, Vega, Baral & Soptkota, 2016).

2.5 Governance-related theories

2.5.1 Governance and participation theory

At the governance level, participation relates to power, its control, distribution and to issues of classical democracy in society concerning who decides what, when, where, how and why (Vedeld *et al.*, 2007). Community based natural resource management is a participatory governance approach by design. The understanding of the participation concept is crucial to CBNRM. Participation of local communities in the decision-making process is central to co-management of PAs (Holmes & Stringer, 2017, p.438). The theorising of participatory approaches is often dichotomised into means or ends, which distinguish between efficiency arguments and equity and empowerment arguments (Cleaver, 1999). For CBNRM in Zambia, participation is used as a tool for achieving better project outcomes, especially during the initial stages of establishing GMAs rather than a process which enhances the capacity of individuals to improve their own lives and facilitates social change. A clear understanding of the application of participation in governance has implications for the efficiency of PAG for sustainable outcomes. Literatures emphasizes that "protected areas with meaningful participation are more likely to deliver positive outcomes for livelihoods and biodiversity conservation" (Holmes & Stringer, 2017, p.439).

Participation refers to sharing power through the governance of activities within a group of people, a family, kinship, local community, NGOs, CBOs, private sector, civil society and the state (Vedeld, 2017). Most of governance discourse is directed towards partnerships between various stakeholders and towards public participation in decision-making (Graham *et al.,* 2003). Practical, involvement in decision-making is the most effective way of ensuring legitimacy for decisions taken (Evans, 2012). Participation has an influence on the nature and role of institutions and models of individual action, as it contributes to the process of

democratisation and empowerment (Cleaver, 1999, 2012). Institutions such as rules, symbols and practices do influence rational choice decision making. According to Holmes and Stringer, (2017) and Musavengane and Simatele (2017), participation is one of the key factors in successful collaborative environmental management. However, participation is not always effective as it depends on how it is defined and applied (Cleaver, 1999).

Fabricius *et al*. (2004) highlight seven categories of participation along a gradient of community involvement and empowerment on a continuum. Based on Pretty (1995), classification of participation ranges from passive participation to self-mobilisation.

> "Functional participation in this classification involves people participating by forming groups to meet predetermined objectives relative to the project, which can involve the development or promotion of externally initiated social organisation. Involvement does not tend to occur at the early stages, but after major decisions have been made. These institutions tend to be dependent on external initiators and facilitators, but may become independent" (Vedeld, 2017, p.32).

This is where CBNRM organisations such as CRBs in the study area fall and to a greater extent most GMAs in Zambia.

Participation in governance can occur through political, cultural, social, economic and even administrative involvement (Vedeld, 2017). The interaction of members in the political arena could be through voting and membership. For CBNRM in the study area, community members participate through attending meetings and voting CRB members into office and to a lesser extent in decision-making. To ensure efficacy of collaborative governance, citizens should not merely be seen as voters, but capable of shared authority (Denhardt & Denhardt, 2016). Membership in this case is based on residence within the boundaries of Mufunta GMA. However, socio-cultural lines of ethnicity or social grouping based on kinship or clan increase the divide on who participates (Cleaver, 2001). Consequently, political, cultural, economic and social interactions affect the effectiveness of NRG. There is a need to conceptually differentiate, but also see links, between participation, empowerment, involvement and the evolution of citizenship in this broader sense. People can participate or be involved but may not be empowered. Empowerment issues revolve around power, rights and resource access and distribution, roles and status of the actors involved (Vatn, 2017).

Participation in polycentric governance, as it occurs in co-management, involves power sharing among various stakeholders (Evans, 2012). As long as actors do interact sufficiently, governance outcomes are affected positively in polycentric arrangements (Angst *et al.*, 2018). This encompasses to what extent and contexts the participatory formulation of goals and implementation of policy are or should involve the state, including the bureaucracy and politicians, and to what extent the wider public including civil society, the private sector, ethnic and religious groups should be involved (Vedeld, 2017). The objectives of such a governance approach can be achieved through decentralisation by raising public participation as voters, political actors but also clients, customers and consumers constituting the broader role of being a citizen (Agrawal, 2005; Vedeld, 2017).

The governance architecture reflects the participation ambitions of NRG and by interpreting such structures and processes, we may infer much about power relations, interests and the existing participatory approaches and ambitions (Vedeld, 2017). Assessing the governance structure of the DNPW will reflect the organisation's interests and priorities in the way they allocate resources for CBNRM, as this determines the type of participation in governance and has implications for implementation. Participation is a requirement to set the agenda for change as it gives direction to governance goals (Evans, 2012).

2.5.2 Institutional theory and human action

Governance as a framework for collective action in its strictest sense concerns the studying of institutions as arenas that bring different actors together, and rules which set the parameters within which they interact and act (Evans, 2012, p.15). Institutions can be understood as a social construct which guide human relations and structure human interactions. They create a certain level of stability and are specific to communities and cultures (Vatn, 2017). Institutions may be constructed to support one interest against another. Institutions must be interpreted properly to avoid misunderstandings. Scholars define institutions differently depending on the purpose and applications. Ostrom (2005) defines institutions as prescriptions that humans use to organise all forms of repetitive and structured interactions including those within families, neighbourhoods, markets, firms, sports leagues, churches, private associations, and governments at all levels. According to Mwitwa, Mwila & Mweemba (2018), institutions are formal rules (laws or constitutions) or informal norms of behaviour that shape political, social and economic incentives in human exchanges. Institutions could be organisations or rules in use,

which could be formal or informal. Laws are formal and conformity is obligatory, while informal conventions only expect conformity (Sarch, 2001). These are also known as hard and soft rules. For the purpose of this research "institutions are conventions, norms and formally sanctioned rules of society that set up expectations, stability and meaning, which are essential to human existence and coordination" (Vatn, 2017, p.78) .

The rules determine the interactions between actors who have power and access to decision-making, which affects access to resources. Participatory approaches such as CBNRM should be examined from the aspects that motivate actors to participate. According to Cleaver (1999), the nature and role of institutions and the models of individual action should be examined to understand the efficiency of a participatory approach. Institutions such as rules, norms, laws and sanctions can serve as incentives or disincentives for people to participate in PAG. Rational choice theory is based on the assumption that individuals choose actions based on self-interest. Elinor Ostrom's work and that of other economists recognises the importance of institutions and the role they play in shaping incentives (Ostrom, Chang, Pennington & Tarko, 2012). Models of individual action range from economic motivations, responsible citizens behaviour, lack of participation due to norms or acceptance of *status quo*. Thus, the institutions in place can influence collective and individual action. Institutions shape the incentives that people are presented with and affect the likelihood of whether they will coordinate their actions successfully or whether they will engage in negative-sum games (Ostrom *et al*., 2012). Institutions influence action not only through acting as constraints, but more importantly by influencing people's perceptions, interests and types of motivations (Vatn, 2017).

2.5.3 Institutionalism and legitimisation

Institutionalism places emphasise on the role of institutions in framing and guiding possible action in governing. Asaduzzaman & Virtanen (2016) highlights governance as a system of government concentrating on effective and accountable institutions, democratic principles and electoral process, representation and responsible structures of government in order to ensure an open and legitimate relationship between civil society and the state. The literature agrees on the core principles of governance as a commitment to collective action to enhance legitimacy and effectiveness, the importance of rules to guide interactions, and acknowledges that new ways of doing things are required beyond the state (Evans, 2012). The community conservation narrative emerged at a time of significant shifts in the dominant discourses of development

from the top-down, technocratic models of the 1970s to bottom-up, decentralised, and participatory planning (Hutton *et al.*, 2011). Legitimisation can be achieved through decentralisation, sharing, participation, accountability, transparency and responsiveness. Community Based Natural Resource Management was introduced in order to decentralise the governance of GMAs to the local communities and to legitimise PAG through a participatory approach. To overcome the limitations of effective participation, stakeholder participation must be institutionalised (Reed, 2008). Legitimisation is mainly about justified and accepted authority. According to Vatn (2017), many value issues and conflicts are fought out in the political arena, while the legitimacy of a political process comes from its acceptance by civil society. Civil society is the foundation of institutionalisation (Vatn, 2017). In the case of CBNRM, the role of civil society to ensure legitimacy should not be underestimated.

2.5.4 Theories of democracy

Concerns about citizenship and democracy are particularly important and evident in recent political and social theory (Denhardt & Denhardt, 2016) cited (Barber 1984; Mansbridge 1990; Mansbridge1992; Pateman, 1970; Sandels 1996). Democracy is critical to the CBNRM movement to ensure devolution, which has mostly proved unsuceessful (Child, 2004). Administrators should see citizens as partners not as mere clients or voters in order to share authority and reduce control and trust in efficacy of collaboration (Denhardt & Denhardt, 2016). Democracy is one way of improving governance efficiency through delivery of justice. Input legitimacy through procedural justice is linked to institutions of democracy. People should have an equal right to participate in the process of formulating goals and defining the governance structure. Participating in decision-making extends the logic of democracy, which is predicated upon involving people choosing their own government (Evans, 2012). In a democratic society a concern for democratic values should be paramount and reflect in the systems of governance (Denhardt & Denhardt, 2016). According to Gruber (2010, p.52) "emerging CBNRM initiatives are said to support the principles of participatory democracy, building networks and linkages among different constituency groups, interdisciplinary groups, levels of governments, and economic sectors".

There are two dominant discourses on democracy in the literature, namely elitist and egalitarian. According Vatn (2017), the elitist view claims that the populace has the right to determine which of the competing elites can govern, but the substance of the political decisions

is made within the elite circles. On the other hand, the egalitarian view of democracy is inspired by the normative claim that citizens are able to co-determine political decisions that affect their livelihoods (Vatn, 2017). They are both legitimate as both views involve equal opportunities through participation. However, the difference is in delegation of power to decide or direct involvement in concrete decision-making. An alternative view of democratic citizenship is one where individuals are actively engaged in governance by putting public interest before self-interest (Sandel, 1996).

2.5.5 Fragmentation theory

Fragmentation can be conceptualised according to the number of institutions and the level of legal coherence among them (Bollig & Schwieger, 2014). Alternatively, one may start from incorporating behavioural impacts of fragmentation or otherwise adopt a static approach of taking a snapshot of institutional fragmentation or follow a dynamic approach (Bollig & Schwieger, 2014). Protected area governance is an overarching issue for an area designated as such. Angst *et al.* (2018, p.2) define fragmentation "as a setting where actors have overlapping responsibilities for issues that span across multiple levels of a relevant scale of governance or work independently on interconnected issues". A fragmented institutional landscape complicates efforts to develop effective institutions for environmental governance (Muller, 2007; Angst *et al.*, 2018).

The effort to govern wildlife through property regimes is burdened with conflict and imprecision over the boundaries of the political system in which property rights are allocated, given the fugitive nature of the resource (Naughton-Treves & Sanderson, 1995). This adds to the complexity, because the range and distribution of wildlife species often exceed political jurisdictional boundaries (Naughton-Treves & Sanderson, 1995). Fragmentation is a matter of degree and may vary considerably across issue areas, spanning a continuum from relatively low levels to highly intricate institutional complexities (Bollig & Schwieger, 2014). These dimensions include the legal coherence among institutions, their jurisdiction and their membership, and the role of transnational institutions and non-state actors. Fragmentation across scales in natural resources governance can impede coordinated action due to lack of harmonisation in policy, competing responsibilities, legal incoherence among institutions and jurisdictional boundaries (Angst *et al.*, 2018). The fragmentation and lack of coordination

among the various executing agencies represent a significant barrier to successful implementation of NRG (Muller, 2007).

Coordination in NRG is challenging because of the involvement of governmental and non-governmental actors, operating at different spatial and jurisdictional scales (Angst *et al.*, 2018). The understanding of the concept of fragmentation could enhance the understanding and application of governance in PAs. Musavengane and Simatele (2016) identified policy fragmentation as one of the factors that limit environmental governance. Governing fragmentation requires institutions that facilitate coordination, clear roles and responsibilities, agreement on the issue and its proposed resolution, and the scope of the issue (Cook, 2014). Collaboration between individual actors in governance networks can remedy the challenges of fragmented natural resource governance (Angst *et al.*, 2018). Collaborative governance is defined broadly as the processes and structures of public policy decision-making that engage stakeholders across boundaries of public agencies, levels of government, public, private and civil society spheres in order to carry out a public purpose (Emerson, Nabatchi and Blong, 2011). Overcoming fragmentation in NRG requires collaboration among stakeholders and coordinated action.

2.6 The role of governance structures in shaping livelihoods and conservation outcomes

Livelihoods have been assessed using various methods; some of the operational approaches to livelihood approaches include the household economy approach, vulnerability assessment, poverty assessments and living standards measurements. Yet none of these approaches really takes politics and particularly political economy seriously (Scoones, 2015). In this research the livelihood approach explores how the political economy, institutional knowledge and social relations dimensions determine who owns what, and the key questions of the extended livelihood approach. A new politics of livelihoods pays attention to real change at the local level without ignoring the wider structural and institutional politics that shape conditions and possibilities (Scoones, 2015). This is complemented with an understanding of the wider structural dynamics that shape localities and livelihoods. The study endeavours to overcome the challenges of moving across scales from the micro to the macro in the analytical frameworks. Protected area governance is implemented at the micro level, but these governance structures are shaped by governance at meso, macro and global levels. Research

has shown that local community action is heavily shaped by wider social and environmental contexts (Ojha *et al.*, 2016). Through governance structures the rights and responsibilities, perceptions, preferences and motivations are formed that determine outcomes for livelihoods and PA conservation. Traditionally research used to view livelihood and conservation separately, but more recent approaches see poverty and biodiversity conservation as intrinsically connected (Kamanga, Vedeld & Sjaastad, 2009). Using a livelihood approach, this research shows the connection between the two by emphasising the role of governance.

2.6.1 Common property theory

Common Property Theory (CPT) has now become one of the foundations of CBNRM. This as reflected in the work of "Murphree's campfire principles" and "Ostrom's principles" for lasting common property institutions (Shackleton & Shackleton, 2013). Wildlife resources on communal lands are the focus of CBNRM activities in much of southern Africa (Suich, 2013). According to Araral (2013), Common Pool Resources (CPRs) are man-made or natural goods large enough in which exclusion from the resource system is costly but consumption of a resource unit is rivalry. A CPR is a natural resources system large enough to make it expensive to manage but not impossible to exclude potential users from obtaining benefits (Milupi *et al.*, 2020). Schlager and Ostrom (1992) confirm CPR is a term repeatedly used to refer to property owned by a government, by no one and for property owned by a community of resource users. They argue that such usage leads to confusion in scientific study and policy analysis (Schlager & Ostrom, 1992). The conceptualisation of common property resource has implications for how PA resources are governed. Common property regimes are a system of rules, rights and responsibilities that govern the ways in which group members relate to one another in relation to the commons (Milupi *et al.*, 2020). It is on record that many of the disputes over wildlife conservation involve property and property rights (Naughton-Treves & Sanderson, 1995).

Studies on CPRs have shown that some regimes do elude the tragedy of commons as articulated by Garrett Harding in 1968. According to Armitage (2005), some CBNRM strategies perform better than others. Commons theorists have approached the issue of CPRs by developing institutional design principles to address collective choice situations, while other analysts have critiqued the underlying assumptions of CBNRM (Armitage, 2005). The issue of how best to develop institutions for governing natural resources to ensure sustainability is a contested one. Ostrom (1991) argues for crafting institutions for CPRs by clearly designed principles in

consideration of existing local institutions, while Cleaver (2001) challenges the design principles common in resource management literature and explores the idea of institutional bricolage. According to Cleaver (2001), people draw on existing social and cultural arrangements to shape institutions in changing situations .

However, Muller (2007) argues that no one set of institutional arrangements can solve all types of collective natural resource management problems and advocates for an adaptive approach to NRG for PAs, as no one size fits all. Araral (2013) critiques the external validity of Ostrom's institutional design principles as regards its applicability. Ostrom (1990) argues that communities have relied on institutions that resemble neither the state nor private institutions for CPR, which is in line with co-management approaches. The understanding of institutional theories on the governance of CPR have implications for the evaluation and implementation of PAG. The new challenge is how to manage CPR, such as ecosystems, sustainably and, in particular, how to set up lasting institutions for management (Shackleton & Shackleton, 2013). Due to the "fugitive" character of wild fauna and the property rights that govern it are different from other property right claims (Naughton-Treves & Sanderson, 1995).

The understanding of property rights and the rules used to create and enforce property rights shape perceptions of resource degradation problems and the prescriptions recommended to solve such problems (Schlager & Ostrom, 1992). Furthermore, these determine the access to available resources subject to the property rights regime in place. Schlager and Ostrom (1992) developed a conceptual schema for arraying property rights regimes that distinguish among diverse bundles of rights that may be held by users of a resource system, which the study applies. The study distinguishes between rights at an operational – level these are the right to access and withdrawal – and rights at a collective-choice level, which are the rights to manage, exclude and alienate. Clearly, designated property rights influence the endurance of CPR. When people have clear rights to resources, they have the incentive to conserve resources (Suich, 2013; Zyambo, 2018).

2.6.2 Theory of access

Property rights influence the access to resources. However, Ribot and Peluso (2009) contend that having rights does not necessarily mean having access to resources. They define access as the ability to derive benefits from things, broadening from property's classical definition as the

right to benefit from things. This definition places the emphasis on power rather than on rights. Both North (1990) and the environmental entitlements approach point to the crucial role of power relations in shaping institutions that determine NRG (Sarch, 2001). Ward, Stringer and Holmes (2018) define access with reference to ecosystem services as the capacity to gain benefits from the environment. The definitions of Ribot and Peluso (2009) and Ward *et al.* (2018) refer more to bundles of powers rather than the bundle of rights. By focusing on ability rather than rights as in property theory, this formulation draws attention to a wider range of social relationships that can constrain or enable people to benefit from resources without focusing on property relations alone (Ribot & Peluso, 2009). The power that an individual actor has for example, a chief in a traditional setup can overturn the rights that others have. People are only able to realise benefits from natural resources if they can be able to access them (Ward *et al.*, 2018). Access to resources is evaluated using the sustainable livelihood framework by taking into consideration natural and social, macro-and micro-level factors which determine the vulnerability of rural households, and is designed to understand how sustainable livelihoods and PA conservation may be achieved (Sarch, 2001). Achieving sustainable livelihoods and PA conservation is the dual objective of CBNRM in GMAs. The role of governance in determining access for households to achieve sustainable livelihoods, while ensuring PA conservation, is at the core of this research.

2.7 Conclusion

Since governance is applied in different fields and varying contexts it is important to get the focus right. In this case it is NRG with a specific focus on PAG. Understanding the historical evolution and intellectual origins of governance helps us to unravel the way the current governance concept was shaped. Governance is a concept that is linked to other theories which enable us to understand how it is applied in relation to PAG. Governance opens an intellectual space which explains the changing role of government in NRG and the role that other actors play. The study demonstrates this by assessing CBNRM as co-management between the state and non-state actors. Governance structures involve institutions and actors; therefore, the literature on institutional and participation theory is critical to the understanding of the application or implementation of PAG. Institutions determine the quality of participation and so shape individual and collective action in NRG. Besides participation, institutionalism, democracy, legitimation and fragmentation influence the understanding and implementation of

governance. Furthermore, access and rights to natural resources are a product of institutions in place which affect livelihood and PA conservation outcomes.

2.8 Chapter summary

Governance as a concept has its origins in various intellectual sources; this chapter elaborates on the origins and historical background of governance, while focusing on the types of governance approaches that have dominated literature. Since the research is in the natural resource domain, the historical background of NRG has been reviewed starting with the fortress approach to the currently advocated community approach. Furthermore, the evolution of PAG is narrated to give a sense of the historical and contextual background that has culminated to CBNRM. Institutional and participation theory have implications for PAG implementation. Effective participation is dependent on having the right institutions in place. Literature has shown that their application and how they are understood has implications for PAG outcomes. Furthermore, governance cannot be understood in isolation from related theories such as theories of democracy, institutionalism, legitimation and fragmentation, as these have implications on the understanding and application of governance. Common property theory and access theory are critical to the understanding of the link between governance and livelihoods and PA conservation outcomes, since they demonstrate access rights and actors that have power to access and control natural resources use. By looking at the governance using this approach the theoretical framework which the research applies is put forward from an international and historical perspective. The chapter that follows gives the context of PAG in Zambia by focusing on historical narratives and policy and legal framework.

CHAPTER THREE: THE CONTEXT OF PROTECTED AREA (PA) GOVERNANCE IN ZAMBIA: HISTORY AND POLICY

3.1 Introduction

The chapter reviews the context and practice of Protected Area Governance (PAG) in Zambia, with a focus on the policy and legal framework. The historical evolution from the establishment of Kafue National Park (KNP) to the most recent policy alternatives extended to Game Management Areas (GMA) establishment is examined. The focus is on the timelines of legal and policy transformations associated with changes in governance approaches from community exclusion during the establishment of the KNP to participatory community approaches in GMAs. This is done to put into context the understanding of governance in the study area.

Governance in Protected Areas (PAs) is characterised by a shift from the fortress approach to the participatory approach. The fortress approach – also known as the "fences and fines" approach – was about people's exclusion from biodiversity hotspots set aside for conservation (Abel & Blaikie, 1986; Child, 2004; Robbins, 2012). On the other hand the participatory approach came with Community-Based Natural Resource Management (CBNRM) as a governance model especially in Southern Africa (Hutton *et al.*, 2011). The shift between the two approaches is examined and implications for CBNRM highlighted. Furthermore, the evolution of policy and legal frameworks is examined to trace the adaptability of its changes to provide for the CBNRM approach. The 2016 constitutional provisions on Natural Resources Governance (NRG) are reviewed. Constitutional rules specify the terms and conditions for governance (Carlsson & Berkes, 2005). In addition, acts and policies of all government ministries relevant to NRG are compared, focusing on how they are related and conflict in relation to PA governance to highlight areas of collaboration.

Such comparison enables analyses of how the policy and legal framework have shaped PA governance in Zambia and revealed implications for existing structures and institutions. Petursson & Vedeld (2015, p.251) contend that "understanding how governance institutions emerge and evolve has not been an analytical concern in the ongoing debate about conservation policies and practices in Africa". However, such institutions constitute historical accounts of successive policies that shape the current governance structures and inevitably influence prospects for institutional change (Petursson & Vedeld, 2015).

3.2 A framework for understanding PA governance policy space in Zambia

The analytical framework adapted from Keeley and Scoones (1999) is applied to understand the policy space for PA in Zambia (Figure 3.1).

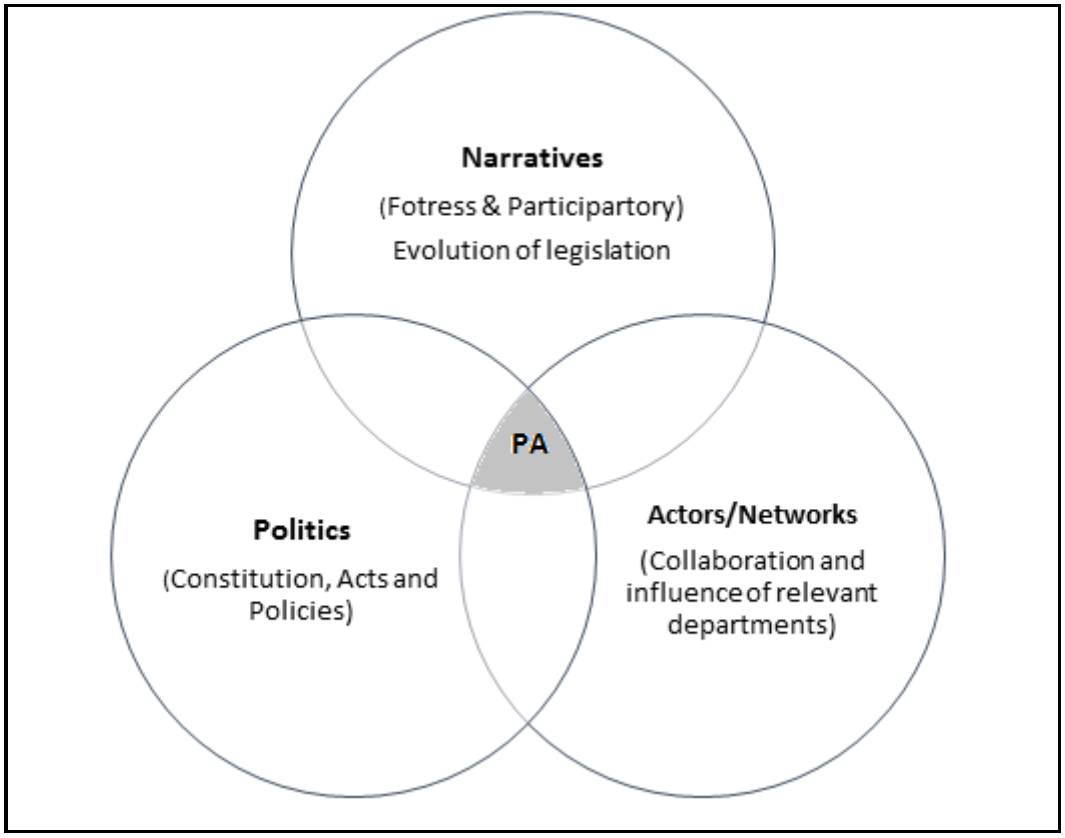


Figure 3.1: PA governance policy space in Zambia.
Source: adapted from (Keeley & Scoones, 1999)

All dimensions of governance are affected by policy. There are various factors that interact to influence the policy process and subsequently the PA governance outcome. The framework distinguishes the influence of narratives, actors and politics in shaping policy. The interaction of the three elements (i.e. politics, narratives and actors) allows exploration of how PA governance has been shaped in Zambia. Furthermore, the proponents of the framework argue that policies must always be seen in relation to the institutions and social relations through which they are articulated (Scoones, 2015).

3.3 Historical evolution of PA governance in Zambia

Historically, Zambia's PAG has been influenced by two main narratives in conservation. The fortress conservation approach famously known as "fences and fines" and the participatory community conservation approach (Bixler, Dell'Angelo, Mfune, & Roba, 2015). The fortress approach was promoted until the 1980s, thereafter there was a rise in advocacy for community participation in PA governance (Child & Barnes, 2010; Dressler, 2010; Petursson & Vedeld, 2015). The fortress model was characterised by local people being excluded, enforcement through "fences and fines" to ensure compliance; and non-consumptive use through activities such as tourism and research was allowed to minimise human impact (Hutton *et al.*, 2011; Robin, 2012). On the other hand, the participatory community approach to conservation, which was adopted later, involves the engagement of the local community in the governance process through various forms of participation (Bixler *et al.,*2015). These narratives have influenced how PAG has evolved in Zambia. Such widely shared ideas and constructs about policy are referred to as 'narratives' (Hutton *et al.*, 2011) and are presented in detail below.

In the early 1920s, the Kafue Game Reserve was formed to control the reduction in wildlife populations (Mwima, 2001). Furthermore, in a quest to protect wildlife the British colonial administration introduced the Game Ordinance in 1925 as wildlife legislation that provided for the creation of PAs (Matenga, 2002). The Game Ordinance, Chapter 106, was enacted in 1943, making wildlife the property of the state and governing its use (Chomba, Mwenya, & Nyirenda, 2011). Consequently, this policy resulted in the evictions of local tribes from their native lands that were converted to KNP (Mwima, 2001).The establishment of PAs that excluded people reflects a conceptual division between nature and human society that has its origin in Western conservation (Adams & Hutton, 2012). Therefore, conservation presently has to be understood in the context of the wider political structure of colonial societies and the extension of capitalism to the global periphery (Adams & Hutton, 2012). This historical influence has implications for the modern engagement with nature.

In 1949, following consultations with the provincial administrators of the western, central and southern provinces, native authorities and district commissioners of Mankoya (now called Kaoma), Kasempa, Mumbwa and Namwala districts, the boundaries of the proposed National Park (NP) were adjusted to include most of the Kafue game reserve and the Southern Province portion of the cordon-controlled areas (Mwima, 2001). The Nkoya-speaking people in the

study area were part of the negotiations for the creation of the KNP. The implication is that Nkoya-speaking people lost part of their traditional land that they used as hunting grounds to the establishment of the KNP (ZAWA, 2006).

The area included most of the Kafue game reserve and the cordon-controlled area which was formally claimed as the KNP in 1950 (Mwima, 2001). As in the case of establishment of KNP, conservation has led to the displacement of people who formerly lived, hunted, fished and farmed in areas now protected for wildlife, watersheds, forests or biodiversity hotspots (Agrawal & Redford, 2009). Emphasising the separation of people from nature and a technical government-centered approach to biodiversity conservation, 'fortress conservation' was characterised by conflicts between the need for conservation and realities of sustaining local livelihoods (Whande, 2004).

On the other hand, in the 19th century in Northern Rhodesia, the current Zambia tribal lands became buffer zones where subsistence and commercial hunting were allowed around most protected areas (Fabricius, 2004). In 1941 new legislation was introduced, initially to protect subsistence hunting (Arczambia, 2019). Later, Controlled Hunting Areas (CHAs) were declared to enable residents to be able to hunt freely but following minimum regulations, while non-residents needed special licences issued by the Zambian government (Arczambia, 2019). By 1953 these designated CHAs covered 56% of the country,16 game reserves were also established, covering 6.7% of the country, with the first being the Kafue Game Reserve, which was re-demarcated and gazetted as the KNP on 20 April 1950 (Arczambia, 2019; Chomba, Mwenya, & Nyirenda, 2011; Mwima, 2001).

In 1970 the UNESCO biosphere concept emerged based on zoning with a strictly protected core and surrounding buffer zones, where only appropriate economic activities could take place (Adams & Hutton, 2007). Such buffer zones in modern day Zambia are referred to as GMAs. Additionally, some of the CHAs were revised and restructured and in their place GMAs were created (Arczambia, 2019). CBNRM is the micro governance model found in GMAs in Zambia since the 1980s. According to Child and Barnes (2010), CBNRM was initiated in Zambia through the Luangwa Integrated Rural Development Project (LIRDP), and Administration Management Design for Game Management Areas (ADMADE). In the 1980s the LIRDP was initiated as a tactic to reduce poaching and gained the support of the government.

On the other hand, ADMADE was initiated as a community game-scout programme co-managed by chiefs and the wildlife agency through delegated authorities (Dressler, 2010). In early 1980s, subsidiary legislation was introduced to partially decentralise authority over wildlife to communities to enhance community participation as major stakeholders (Lindsey *et al.*, 2014). In 1993 the Government of the Republic of Zambia approved the first policy for wildlife that formalised the recognition of local communities as co-partners in the management of wildlife, reversing the centralised management of wildlife (Chomba *et al.,* 2011).

The CBNRM has evolved over the past two decades as an alternative approach to centralised forms of management. The Rio Declaration 1992 favoured a people-centred conservation approach and recognised local people as an integral part of conservation and as a vehicle for sustainable development. This was the beginning of the transformation towards the integration of a community participation approach to PA management. With Zambia's Wildlife Act No. 12 of 1998, the government of Zambia identified CRBs as institutions for the co-management of PAs through CBNRM (Lindsey *et al.*, 2014). As a local institution, CRB is supposed to be responsible for coordinating CBNRM activities.

During these formative stages, CBNRM operated without a government policy and legal framework for implementation. When implementing CBNRM, an elaborate legal and policy framework that ensures the successful implementation and its sustainability is a prerequisite. Without a good legal and policy framework, success might be undermined by problems with legislation or missing institutions. According to Child and Barnes (2010), lack of legislative champions for CBNRM in Zambia has contributed to its unsustainability. Conservation champions play a critical role in ensuring conservation goals are achieved at individual level (Yeboah-Assiamah, E., Muller, K., & Domfeh, K. A, 2018).

3.3.1 Implications of the paradigm shift from "fortress" to "participatory" governance for CBNRM

Initially the PAs were created through the fortress approach, which resulted in people being evicted from their native lands (Hutton *et al.*, 2011). The approach of excluding human settlement was developed and introduced by the colonial powers and inherited by the national governments following independence (Petursson & Vedeld, 2015). After independence, the Government of the Republic of Zambia, through the National Parks and Wildlife Act No.57,

1968, completely centralised control and management of wildlife in the country by vesting the absolute ownership of wildlife in the President on behalf of the public (Chomba *et al.,* 2011). Yeboah-Assiamah *et al.*, (2017) cited Osei-Tutu *et al.* (2015) contended that the fortress approach adopted by central governments overruled and undermined most of the then existing informal local institutions. Eviction subsequently resulted in the exclusion of the local communities from governance of PAs as local institutions were either weakened or eliminated.

Arising out of a desire to rectify the human costs associated with coercive conservation, CBNRM sought to return the stewardship of biodiversity and natural resources to local communities through participation, empowerment and decentralisation (Dressler, 2010; Child & Barnes, 2010). This conservation initiative drew on the premise of participatory engagement, indigenous knowledge and community needs in pursuit of combined objectives involving social justice, poverty reduction and biodiversity conservation (Dressler, 2010). However, the initial alienation also resulted in the loss of knowledge on how to locally manage and preserve wild resources which the participatory model places emphasis on. It is on record that little was written about traditional measures to conserve and regulate the use of wild resources before colonial era (Child, 2004), therefore this information may eventually have been lost.

Natural resource managers argued that people had the ability and traditional indigenous knowledge which could be developed and used for natural resources management (Dressler, 2010). Even though it can be said that traces of that knowledge still exist, a substantial and most critical part of this knowledge has been lost during the years of separation from nature. According to Child (2004), local knowledge about wild resources varies inversely with the extent of use and dependence and may have been lost over the years. After 70 years of separation, since the creation of the NP the introduction of the participatory approach requires more than good will, because the community needs a lot of capacity-building for them to be able to manage natural resources and meaningfully participate in governance. According to Child and Barnes (2010), capacity-building is critical for the followership more than the leadership to balance power and discourage elite capture.

Furthermore, local communities lost the earlier intrinsic attachment to natural resources management that they had and the relationship with those responsible for natural resources degenerated. Local communities are not involved in decision-making processes, resulting in their not being adequately empowered to manage wildlife resources in GMAs (Milupi *et al.*,

2020). In the study area the relationship between the local community and DNPW has been bad because during law enforcement local people suffer harassment and in isolated cases even death. It is evident that the traces of the fortress approach are still very visible in the organisational culture of the wildlife agency. To have 'buy-in' from the community there is a need for trust building so that the community transformation is complete.

Therefore, this paradigm shift from exclusion to inclusion needs careful examination to understand the gaps that the separation of people from nature created, to understand how the reverse process can be implemented. There are three main issues that arise from the fortress approach, namely; lost and weakened local institutions of natural resources governance, loss of local knowledge about conservation of natural resources, and the loss of attachment between "nature" and "people". The nature-people relationship and the trust between state departments and the communities were lost. In this regard, the paradigm shifts highlighted that there is a need to understand and strengthen existing local institutions associated with CBNRM, capacity building to enable local community to manage natural resource sustainably, and trust building through reciprocity among CBNRM stakeholders.

3.3.2 Structure changes and evolution of Zambia's wildlife legislation from 1950-2018

Zambia wildlife legislation has evolved through structural changes from 1950-2018 as illustrated in table 3.1 (Mwima, 2001; Chomba, Mwenya, & Nyirenda, 2011; Arczambia, 2019).

Table 3.1: Structural changes and evolution of the wildlife legislation 1950-2018 in Zambia

Year	Ministry	Department	Policy focus	Policy and legal framework
1950	Ministry of Agriculture & Natural Resources	Department of Game and Tsetse Control	Management and law enforcement with animal conflict control especially with disease control. Provided for the declaration: Game Reserves, Private Game Areas, Game Management Areas and Controlled Hunting Areas.	Game Ordinance Chapter 106 of the Law (Establishment of the national park) Fauna Conservation Ordinance, enacted 1954.
1963	Ministry of Agriculture & Natural Resources	Department of Game and Fisheries	Ecological approach to the conservation of wildlife and conservation through tourism'	Game Ordinance Chapter 106 of the Law

1963	Ministry of Game and Fisheries	Department of Wildlife Fisheries and National Parks	Wildlife and fisheries management	Game Ordinance Chapter 106 of the Law
1968	Ministry of Tourism	National Parks and Wildlife Service (NPWS).	No distinct policy changes, however, policy was gravitating towards tourism development and benefits for local people.	National Parks and Wildlife Act Chapter 316 of 1968
1991	Ministry of Tourism	National Parks and Wildlife Service (NPWS).	Was inevitable, in order to bring the wildlife legislation up to date with times after independence.	National Parks and Wildlife Act No. 10 of 1991, Wildlife Policy 1993
1999	Ministry of Tourism, Environment and Natural Resources	Zambia Wildlife Authority (ZAWA)	Law enforcement and co-management through CBNRM. Integration of wildlife policy with economic, environment and social policies to empower local people.	Wildlife Act No 12 of 1998 &Wildlife Policy 1998
2016	Ministry of Tourism and Arts	Department of National Parks and Wildlife (DNPW).	Law enforcement and co-management through CBNRM. Emphasis placed on collaboration with other relevant actors.	Wildlife Act No 14 of 2015 & Wildlife Policy 2018

The wildlife sector has undergone several legal and institutional reforms to adapt to the challenges of this dynamic sector. The Game Ordinance Chapter 106 of the Law of 1950 of Northern Rhodesia was the first piece of legislation leading to the establishment of national parks in the region. It focused on protecting wildlife from illegal offtake and consequently associated resources and community participation were not given enough attention. The policy focus was wildlife management and law enforcement. However, in legislation people have always been an important consideration as part of the landscape. The Fauna Conservation Ordinance enacted in 1954 paved the way for the establishment of Game Reserves, Private Game Areas, Game Management Areas and Controlled Hunting Areas (Chomba *et al.,* 2011). However, this piece of law, though enacted for the creation of GMAs, did not automatically provide for the CBNRM approach. Since in 1964 the government recentralised the control of protected areas with traditional leadership being left out of the governance of PAs (Chomba, *et al.*, 2011). Through the Zambia Wildlife Act, No. 12 of 1998 community participation was given due consideration. Policy has constantly and gradually been moving towards improving public-private partnerships with the role of community participation being emphasised.

Thereafter, all the wildlife structures also changed as legislation shifted to provide an enabling environment for the CBNRM model.

The initial mandate for the DNPW was wildlife management and law enforcement; in the restructuring process co-management through CBNRM was included to enable it to evolve and handle the changing roles and responsibilities. However, the changes to adapt to this process have been slow and sometimes off target. The 2018 wildlife policy is still considering the lack of staffing strength in terms of Wildlife Police Officers (WPO) whose main mandate is law enforcement, as this was one of the main failures of the 1998 policy. The focus on law enforcement officers rather than extension staff reflects the organisation's interests and priorities. Community engagement would require a policy shift in favour of extension officers whose mandate is community engagement if the CBNRM approach is to yield the intended results. Currently, the community contributes staff towards law enforcement through village scouts and other wildlife duties such as conservation education are not prioritised in line with policy.

The policy and legal framework are repealed and replaced from time to time. However, there is more emphasis on the use of this piece of law to replace one institution by another, more than it is about adapting to the challenges that the sector faces. According to Sichilongo, Mulodzi, Mbewe, Machala and Pavy (2012), the 1998 wildlife policy was much progressive regarding community participation. However, most of the policy recommendations were not translated into law. Consequently, the Zambia Wildlife Act, No. 12 of 1998 was said to be not fully aligned with policy with regards to CBNRM. The 1998 policy provided a strong foundation for CBNRM, although some of the key features, such as full revenue retention and diversification of revenue were not reinforced by the Zambia Wildlife Act, No. 12 of 1998 (Sichilongo *et al*., 2012).

The 2018 wildlife policy replaces the 1998 policy which was said to have provided more leverage in providing an enabling environment for the implementation of CBNRM governance model. One of the objectives of the 2018 wildlife policy is to foster the management of GMAs based on the principles of CBNRM and other innovative approaches that will enhance the conservation of wildlife and its habitat and improve the socio-economic welfare of local communities. Some of the issues the policy is set to address include inadequate incentives for

wildlife conservation on customary lands vis-à-vis lack of security of tenure, and inability to adequately access and benefit from wildlife resources.

In addition, it identifies weak sectoral linkages and coordination with other sector policies that have both direct and indirect bearing on the Wildlife and Tourism Sector. It remains to be seen if these wildlife provisions are fully implemented and the wildlife sector does not end up with a similar trend as the Zambia Wildlife Act, No. 12 of 1998. Policy guidelines and goals can only be implemented through the enactment of the law. Passing laws enables government to put in place the necessary institutions and legal framework to achieve their aim.

3.4 Policy and legal framework for Game Management Areas in Zambia

The Constitution of Zambia 1991 (as amended by Act No.2 of 2016) serves as the primary policy document by the government for the management of natural resources. The Constitution is the supreme law of the Government of the Republic of Zambia and any other written law, customary law and customary practice that is inconsistent with its provisions is void to the extent of the inconsistency (Republic of Zambia Constitution, 2016). Therefore, its provisions about PA governance have implications for policy formulation and implementation. Constitutional rules set the framework for decision-making on the middle level where co-management is predominately exercised (Carlsson & Berkes, 2005). There is a strong link between macro and micro governance through policy formulation at national level to implementation of CBNRM in GMAs. Child and Barnes (2010) emphasise that rigorous procedures for crafting effective CBNRM start with well-designed constitutions which place decision-making and governance in the hands of ordinary people by meticulously articulating roles and responsibilities. One of the core roles of government is to formulate policies, through which it can delimit the activities of PA governance.

3.4.1 The 2016 constitutional provisions on PA governance.

The Zambian Constitution (2016) provides for PA governance in Part XIX of the Constitution, although it does not categorically state or mention PAs. However, it provides for land, environment and natural resources in brief in Part XIX of the Constitution of Zambia. Land is a common denominator as any area designated as a protected area is situated on a piece of land. It is thus prudent to ensure the legislation on land management is clear to secure PA resources. However, the Constitution of Zambia 1991 (as amended by Act No. 2 of 2016) (Republic of

Zambia, 2016) is silent on the way land in a protected area shall be treated. According to Sichilongo *et al*. (2012), the policy framework within which GMAs operate has many flaws, such as in aspects of governance, resource tenure and accountability which need to be corrected through new policy.

One of the principles on which land shall be held, used and managed is equitable access to land and associated resources. In PAs such associated resources include mobile resources such as wild animals. In this case, the clause needs clarification on what equitable access to associated resources would mean for communities living in a GMA. According to Ribot and Peluso (2003), access is the ability to derive benefits from things, while in the literature on property rights it is the right to benefit from things. In property rights access is mainly through three main property regimes, namely private property rights, common property or open access. Depending on how access is defined, it can have profound implications for the benefits that communities living in GMAs derive. Consider Part of (g) of the Constitution as an example it states that ecologically and culturally sensitive areas (i) to be accessible to the public; and (iii) to be maintained and used for conservation and preservation activities. The type of accessibility to the resource and conservation goals should be carefully considered to avoid conflict.

The Constitution (Republic of Zambia, 2016) in Part *(a)*recognises natural resources have an environmental, economic, social and cultural values and this shall be reflected in their uses. However, the cultural value aspect is not fully respected as the local people have not always been allowed to use natural resources in PAs in relation to their culture. Furthermore, Part *(c)* recognises indigenous cultural rites, which is not being fully implemented in PAs currently. The cultural history of the community is not factored into the implementation of law enforcement for many PAs. In Mufunta GMA, the community indigenous cultural rites are tied to historical hunting practices, which if factored in could motivate the local communities to participate in the governance of natural resources.

A research participant tells how their son was killed when he went hunting for the sisters coming of age rites. It is their tradition to celebrate these rites with a hunt of an antelope. "*I was about to start the celebration then I was called by my neighbours that my son had been shot dead by the wildlife officers just for wanting to hunt a small animal for us to have meat for the celebration. Our lives are less important than that of wild animals?*" (Household survey (393) 2018, personal communication, 30 July). This is an indication that constitutional

provisions are applied selectively, recognising some while disregarding others. Fabricius *et al.* (2004) state that natural resources legislation has generally failed to consider the intricate relationships between people and nature that are typical of the culture of most African communities. This all hinges on how access to these resources is defined.

Furthermore, the Constitution (Republic of Zambia, 2016) does not clearly define the terms and conditions for cost and benefit sharing, as it only states the higher principles. It states that benefits shall be shared equitably among Zambians. When constitutional issues are unclear regarding who has a legal right to be a stakeholder, this would affect the feasibility of reaching a binding co-management agreement among parties (Carlsson & Berkes, 2005). Failure to do so does not give the communities living in the PAs an incentive to protect the resources. The interface between wildlife and people in GMAs suffers from a policy framework that does not align incentives, particularly in the ownership of wildlife resources, with the expected results (Sichilongo *et al*., 2012). The cost being borne by the person who causes the damage may not be the case for PA as sometimes the people that cause the damage are not around to experience the effects, since the communities that live in the PAs have no rights to alienate resource users but bear the costs of degradation. This results in cost shifting where the offender shifts costs onto the immediate community (Vatn, 2017).

The Constitution of the (Republic of Zambia, 2016), however, provides for community participation in Section 255 Part *(l)* effective participation of people in the development of relevant policies, plans and programmes and Section 257*(d)* encourages public participation. Therefore, this enabled the creation of CRB at the micro-level for communities to co-manage PA. However, the type of participation is not clarified as communities are not always treated as equal partners as this is not provided for in the legal framework. According to Lindsey *et al.* (2014), legislation does not provide for any of these clauses that would enable stakeholders to be equal partners in the governance process. Furthermore, Sichilongo *et al.* (2012) argue that CRBs as the official co-managers of GMAs are not properly structured, disciplined and supported.

3.4.2 Acts and policies of government ministries relevant to protected area governance compared

In Zambia land is either customary land (94%) under some measure of control by chiefs, or state land (6%) comprising PAs and land held under 99-year leasehold (Manning, 2012). However, other authors argue that land under customary control is approximately 54%, taking in account the creation of PAs on customary land that is now under state control (Sitko, Chamberlin & Hichaambwa, 2015). Land shall be delimited and classified as state land, customary land and such other classification, as prescribed in the Constitution (Republic of Zambia, 2016).

Although the Zambia Wildlife Act, No. 12 of 1998 provided for the management of GMAs in accordance with General Management Plans (GMPs) and recognises that GMAs are on customary land, it falls short on providing clarity on resource rights, management and planning responsibilities between the community, local and central government; this is a major disincentive to local communities (Sichilongo *et al.,* 2012). The scope of the 1998 policy limited the effectiveness of management in GMAs. Despite GMAs being meant to be reserved for wildlife, the habitats on which it depends are not under the jurisdiction of the Zambia Wildlife Act, No. 12 of 1998. Therefore, despite the adopted land use plans, both CRB and DNPW are unable to enforce laws to prevent agricultural encroachment in areas designated for wildlife conservation. Indeed, a more holistic definition encompassing wildlife and habitant will be necessary to counter these challenges.

The PAs are endowed with a variety of natural resources, including land, water, fisheries, forests and wildlife. According to Simasiku *et al*. (2008), the management and user rights of the various natural resources are governed by separate pieces of legislation and government institutions. It is stressed that although in principle natural resources are vested in the President, in practice the use of natural resources on customary land is determined by traditional authorities (Simasiku *et al*., 2008). The Lands Act chapter 184 of Zambia in Part II Section (4) states that the President shall not alienate any land situated in a district or an area where land is held under customary tenure without taking into consideration the local customary law on land tenure. This lack of clarity in terms of authority has created problems for PAG which depends on security of land for its management.

In addition, the Wildlife Policy of 1998 provides for the establishment, control and management of PAs and for the conservation, protection and enhancement of wildlife ecosystems and biodiversity, which is implemented by the wildlife agency through the wildlife policy (Jones, 2008). This dual-tenure system on land coupled with multiple pieces of legislation and/ or institutions hinders coordination, which has resulted in policy fragmentation. Sichilongo *et al.* (2012) point out in a policy analysis paper the need for synergies between the relevant natural resources departments to ensure collaborative governance.

3.4.3 Elements of collaborative governance in policy and legislation for improving CBNRM

Protected areas comprise various natural resources which present a good platform for collaborative PAG. The 2018 Wildlife Policy recognises the synergies as illustrated in table 3.2 (Wildlife policy, 2018).

Table 3.2: Elements of collaboration in policy and legislation

	LEGAL FRAMEWORK	PURPOSE	ELEMENTS OF COLLABORATION	DEPARTMENT
1	Zambia Wildlife Act No. 14 of 2015	The Act is the principle legislation that regulates the wildlife sector under which PAs fall.	The Act provides the legal framework for the implementation of CBNRM through CRBs. The wildlife sector has a mandate for coordination and to play a leading role CBNRM.	DNPW
2	Forests Act of 2015	The Act provides for the conservation and protection of forests and trees	The Forests Act recognises CRBs as defined in Wildlife Act and provides for community participation in forestry management. It also provides extra habitat for fauna. Examples of coordination include roles of forest management groups / community forests.	FD
3	Fisheries Act No. 22 of 2011	The Act enhances conservation by providing for conservation of fish biodiversity.	The Fisheries Act recognises CRBs and collaborative mechanisms and arrangements to enhance the CBNRM approach in GMAs.	FOD
4	Lands Act of 1995	The Act is responsible for the management and administration of land in Zambia	The Lands Act plays a major role in the administration of land in GMAs and in the devolution of wildlife user rights on customary lands and is one of the major legal frameworks that would	LANDS

			spur the growth of the private wildlife estate.	
5	Agricultural lands Act. Chapter 187	The Act provides for agricultural practices, development, investment and management	Agriculture is competing land use with wildlife management in GMAs and has resulted in the loss of critical wildlife habitats. In order to address this challenge, there is a need for collaboration to develop agriculture practices compatible with PA conservation.	AGRIC
6	Local Government (Amendment) Act No. 9 of 2004	The Act among others provides for decentralisation and resources planning at the local level	Spearheaded by the local governments, the promotion of decentralisation facilitates the devolution of wildlife management to the local level.	COUNCIL
7	Urban and Regional Planning Act 2015	Act to provide for development, planning and administration principles, standards and requirements for urban and regional planning processes and systems;	Collaborates planning activities for GMAs, through participatory mapping. Establish a democratic, accountable, transparent, participatory and inclusive process for urban and regional planning that allows for involvement of communities, private sector, interest groups and other stakeholders in the planning.	URPD

The 2018 Wildlife Policy recognises cross-sector linkages as key strategy for enhancing PAG collaboration. Considering the definition of a PA being a clearly defined geographical space, this gives collaborative governance a good platform. This is so because the area has geographical boundaries attached to it. Hence, all resources attached to this designated piece of land can be managed collaboratively if such an ecosystem is to be preserved. This simply means that the land and all other associated resources must be managed using a unified system of governance to avoid policy and ecosystem fragmentation. The 2018 Wildlife Legal Frame provides a collaborative platform for related departments to coordinate the governance of PAs.

Having policies with synergies where the related line ministries can co-manage PA resources could enhance monitoring and implementation. Fragmentation and lack of coordination among the various executing agencies represent a significant barrier to successful policy implementation (Muller, 2007). According to Mwitwa, Mwila and Mweemba (2018), the

fragmentation of institutions or departments across a number of Ministries is a weakness of the biodiversity sector in Zambia. The centrality of collaborative natural resource governance hinges on how the 'rules of the game' structure power, benefits and responsibility relationships between state agencies, local agencies, the people and other stakeholders (Yeboah-Assiamah *et al.*, 2017). However, in Zambia the biodiversity sector has a weak private sector and civil society involvement in the implementation of the biodiversity targets which are outlined in the National Biodiversity Strategy and Action Plan (Mwitwa *et al.*, 2018). Community-Based Natural Resource Management requires a radical redefinition of the roles and objectives of natural resource government agencies from controlling or preventing use towards making natural resources economically competitive (Child & Barnes, 2010).

CBNRM has three main elements, namely community, natural resources and management. Community participation is through CRBs as the micro governance institution. Full participation by the community has always been a challenge for CBNRM. Full participation, according to this study, means the community being involved from the conceptualisation of the governance model to implementation. It is not necessarily the highest level of local participation that is most appropriate at any time; rather the level of participation should be seen relative to the issue in question and to its context. Collaborative governance presents an opportunity for enhancing community participation. Since DNPW, FD and DoF recognise CRBs as local institutions of natural resource governance in PAs, collaborating community engagement activities will increase the area of coverage and frequency of community contact at a reduced transaction cost to an individual agency.

These departments are responsible for wildlife, forests and fisheries, which are key natural resources for local communities. CRBs collaborating with the Ministry of Lands will ensure tenure security of the land for these resources. This can be done by engaging the Department of Urban and Regional Planning through participatory mapping to ensure that local communities participate in the PA zonation and decisions over land rights. As such it is expected that farming and other activities will be conducted in the designated areas to avoid wildlife habitat degradation.

The local communities in GMAs are natural resource and agriculture dependent. Collaborating with the Agriculture Department is critical in ensuring that sustainable agricultural practices are applied. All the key departments relevant to governance of natural resources in PA are

engaging with the community at different levels through different institutions. Collaborative natural resources governance through CRBs will ensure that GMAs are managed using a holistic multi-stakeholder approach using the CBNRM model. The council plays a key role in governance through District Commissioners (DCs) due to decentralisation to local government in the current constitution. The council can play a coordination role for all relevant departments.

3.5 Existing governance structures in protected areas

In Zambia management of PAs is done through a multi-stakeholder approach. Among the stakeholders (i.e. actors) involved are the state agencies, local non-governmental organisations (NGOs), safari outfitters and the local community. Currently, the management of the PAs is done through co-management by the DNPW, NGOs and the communities (Lindsey *et al*., 2014). The local communities participate in the natural resource governance through CBNRM programmes. The programmes include resource protection, conservation education, planning and fire management. Resource protection is currently the most active in which community members participate in law enforcement through the village scout programme. Through the CRBs, whose formation is facilitated by DNPW, development organisations help improve communities' welfare while enhancing wildlife conservation (Simasiku *et al.,* 2008).

The respective local authority and the Chief are represented by one person each with the Chief serving as a patron of that CRBs (Simasiku *et al.,* 2008). A lower institution called the Village Action Groups (VAGs) is the one which engages directly with the members and is used for mobilisation of the local communities. Despite the recognition of communities as core partners in the governance process, there are no enabling polices that support the functioning of these structures. According to Lindsey *et al.* (2014), legislation does not provide for any of these clauses that would enable stakeholders to be equal partners, in the governance process. In the study area the CRB indicated that they are not treated as equal partners since most decisions about PAG are made by others. On the other hand, the community are of the view that the CRB does not consult when making decisions. In addition, the patron of the CRB states that even when the CRB makes decisions, they are not considered final as the DNPW still has the final say. "*They take us for workshops, and we put across the views of the people about natural resource governance, hoping that now our voices shall be heard. However, after the meetings*

these go nowhere – the DNPW do what they please" (Key informate interview (1) 2018, personal communication, 9 June).

A focus on institutions rather than communities may be more useful for those interested in CBNRM (Agrawal & Gibson, 1999). Below is an illustration of the existing governance structures in GMAs. According to Agrawal & Gibson (1999, p.629) "the community must be examined in the context of development and conservation by focusing on the multiple interests and actors within communities, on how these actors influence decision-making, and on the internal and external institutions that shape the decision-making process". In Chapter 5 the governance structure is assessed to illustrate the critical role of understanding the existing institutions and actors in enhancing co-management.

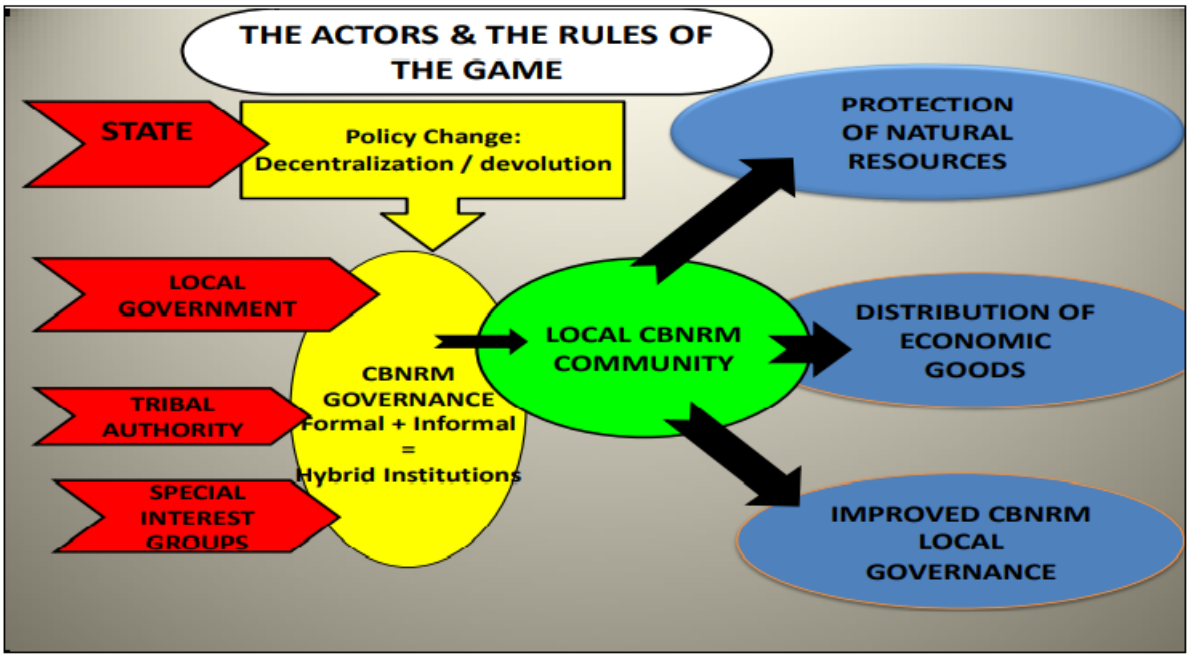


Figure 3.2: Governance structures in GMAs.
Source: adapted from Mupeta-Muyamwa (2012, p.52)

The current governance structure has been shaped by narratives, politics and actors in natural resource governance. There has been a deliberate shift in policy to enhance community participation and to improve PA governance. However, despite substantial progress, especially in so far as it pertains to the policy and the legal framework enabling progress towards this goal, implementation has not kept pace with these changes. If the intended purpose of this paradigm shift is to be achieved, it should be followed with implementation.

3.6 Conclusion

The gap that was created by the separation of people from nature may have resulted in the (i) loss of knowledge about natural resources conservation, (ii) the loss of traditional local institutions for enforcing conservation laws and (iii) a loss of trust between community and state agents. Understanding the implications of the paradigm shift from exclusion to inclusion of the community may hold the answers to understanding the operationalisation of CBNRM through a legal and policy framework lens. In this regard, there is a need to understand and strengthen existing local institutions for incorporation in CBNRM through policy and capacity building to enable a local community to manage natural resource sustainably, and trust building through reciprocity among CBNRM stakeholders.

Policies and legislation have evolved to adapt to the changes that have occurred in PAG. However, implementation has not kept pace in adapting to these changes. This may be in part due to the non-alignment of the wildlife policies with the wildlife Act. Based on transformative legal and policy reforms, the government needs to come up with a policy and legal framework which can enhance the scaling up and implementation of CBNRM. Such reforms require a thorough understanding of policy and legal evolution, and of the existing gaps in the policy and legal instruments. Institutional reforms that combine the devolution of power and delineation of property rights are among the many interventions that need to be tested (Child & Barnes, 2010).

Further, the Constitution (Republic of Zambia, 2016) does not have clear provisions on how PA resources are to be managed and how land in PAs ought to be treated. Constitutional choice rules, including the fundamental question of who owns the land and the resources therein determine collective choices that communities make (Yeboah-Assiamah *et al.*, 2017). Furthermore, the related line ministries involved in natural resources governance should develop harmonised policies to enhance collaboration. The government needs to align constitutional provisions with the mandated responsible line ministries to enable policy coordination. Based on the review, the study suggests some policy recommendations in Chapter 8.

3.7 Chapter summary

The chapter analysed PA governance from the Zambian perspective by reviewing the policy and legal framework that has shaped the current institutions. The transformative role of historical narratives, policies, acts and structural changes that have contributed to shaping CBNRM are assessed. This was done to put into context the understanding of governance in the study area. Mufunta GMA is a PA in the Kafue ecosystem in Zambia, thus the understanding of the policy and legal framework provides a contextual framework for understanding the current situation. The process of developing an enabling macro environment for CBNRM is historically, politically and economically specific (Child & Barnes, 2010). According to Child (2004), colonial history, economic imperatives, donor agendas, politics and war have shaped the development of CBNRM programmes in Southern Africa. The next chapter presents the methodology that is used in collecting data for the study.

CHAPTER FOUR: METHODS AND STUDY CONTEXT

4.1 Introduction

This chapter discusses the conceptualisation of the study and research design. The research is transdisciplinary and multi-sectoral at its core therefore, and in support both qualitative and quantitative approaches was applied for data collection. The conceptual framework guiding the research is described. The research design and strategy emboding the worldview, sampling techniques applied, data collection and data analysis are explained. Furthermore, data sources are indicated.

4.2 Conceptual framework

The main livelihood in a GMA is based on natural resources, access to which is mediated by governance structures. The "environmental entitlements" framework augured that institutions mediate access to resources, and it is access rather than resource abundance that explains some of the key governance dilemmas (Leach *et al.,*1999). Institutions are thus critical to understanding how some people gain access to resources while others are excluded (Scoones, 2015). According to Ribot and Peluso (2009), some institutions control resource access in a way that disadvantages others.

Interactions between governance and livelihood influence outcomes for PA conservation. The study was guided by the Sustainable Livelihood Approach (SLA). The approach suggests that a household's livelihood strategy is influenced by the assets at its disposal (DFID, 1999). A livelihood strategy is an organised set of lifestyle choices, goals and values, and activities influenced by biophysical, political, economic, social, cultural and psychological components (Walker, 2001). Livelihood authors allude to micro and macro contextual factors that transform and mediate access to assets and have an impact on livelihood strategies and the resultant socio-economic and environmental outcomes (Nathan & Philip, 2014; Scoones, 2015; Chambers & Conway, 1992). Figure 4.1 shows the interactions between governance and livelihoods.

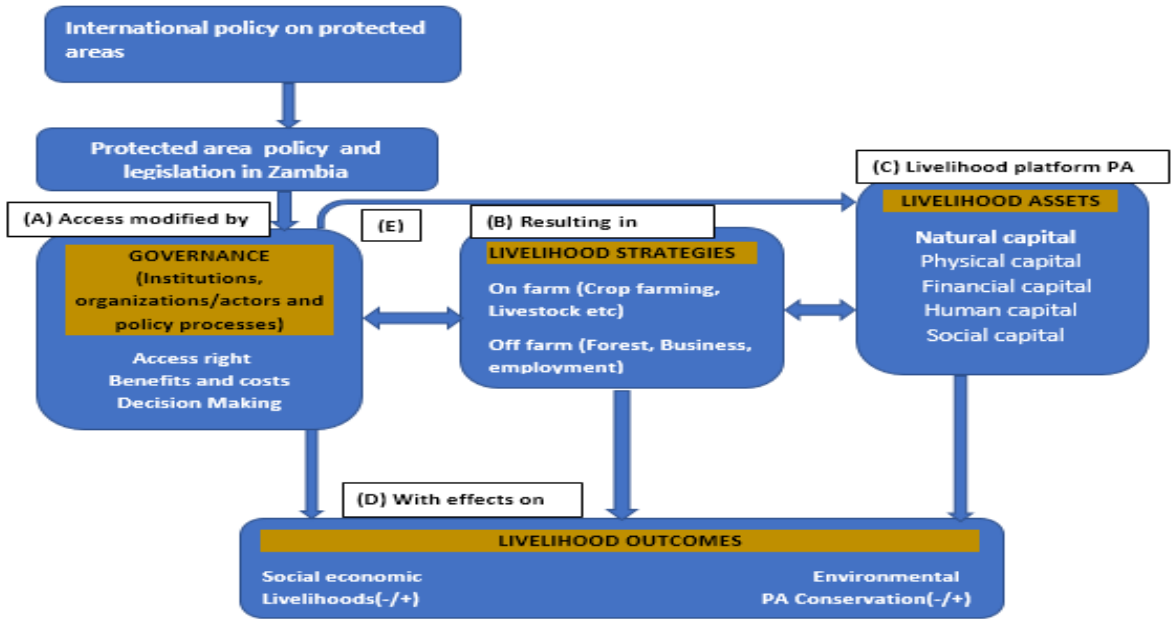


Figure.4.1: The conceptual framework.

Source: modified from SLF (DFID, 1999).

Rural communities have various livelihood assets: natural, physical, human, financial and social capital. According to Ellis (2000, p.21), the term livelihood "refers to the assets (natural, physical, human, financial and social capital), the activities and the access to these (mediated by institutions and social relations) that together determine the living gained by the household". A livelihood is classified as sustainable if it can cope with stresses and shocks and recover in a manner that enhances its assets and capabilities (Chambers & Conway, 1992).

This research is concerned with the natural capital which includes the forests, wildlife, fisheries and land, focusing on their contribution to livelihoods relative to other capitals. In CBNRM terms, natural resources correspond to natural capital (Fabricius *et al.,* 2004). For communities in GMAs, wildlife resources are key to their survival (Simasiku *et al.,* 2008). However, the access to these resources is determined by the governance structures in place. The hindrance in access to the most required natural resources may result in poverty for rural households. Poverty can be thought of as an "inadequate" livelihood outcome, which may be the result of the household having inadequate access to assets such as land, water, credit or social support (Messer & Townsley, 2003).

Assets should not be understood only as means that allow survival, adaptation and poverty eradication, but also as the basis of an actors power to act and change the rules that govern the control, use and transformation of resources (Scoones, 2015). Therefore, the framing of livelihoods is important for unpacking and questioning the institutional and policy imperatives that shape them (Jasanoff, 2004).

4.2.1 Research strategy and design

The research strategy and design outlines the plan and approach for answering a research question (see figure 4.3). This research was a case study that applied a mixed-method approach. An exploratory sequential mixed-method design was used. The data from focus group discussions and semi-structured interviews were used to explore the views of participants and the information incorporated into the questionnaires for the household surveys (Creswell, 2014). This enabled the adaptation of the research methodology to the context during data collection. Qualitative methods are better at exploring issues that cannot be clearly defined or measured at the beginning of the research. In theory, Mufunta GMA was known to have CBNRM as a governance structure in place. Therefore, to define how it works in practice, the target community was involved in the co-production of systems knowledge, especially in the identification of stakeholders and levels of engagement in the governance process. Most qualitative studies call for presenting the meaning of a social reality from the perspective of the study's participants (Robert, 2011). Figure 5.1 in the next chapter outlines the process of co-production of systems knowledge.

On the other hand, quantitative methods provide data in a format that is easy to express in numerical form. Therefore, results are easy to analyse statistically, which means that inferences can be made from a sample to a larger population, and hypotheses about cause-effect relationships or correlations between different variables can be tested rigorously (Newing, 2011). The second objective evaluates the link between governance and livelihoods. Such analysis is important for understanding the relationship between governance and livelihoods. According to the livelihood methodology, gaining insights into livelihood dilemmas from multiple perspectives is certainly a core aspect of any livelihood analysis (Scoones, 2015).

The benefits of using a mixed method is that each approach has its own strengths and weaknesses, and as such they can complement one another (Newing, 2011). According to Choy

(2014), complementarity between qualitative and quantitative research methodologies could provide better solutions, as references from both approaches in a same research topic may reduce or perhaps eliminate limitations and bias. In this research a mixed-method approach was adopted by applying both sequential and concurrent triangulation. In the sequential triangulation one method informs the next and in the concurrent triangulation both methods are used to collect information on the same thing, and then the results are compared. During preliminary data collection focus group discussions and semi-structured interviews were conducted and the data used to refine the household survey questions. Furthermore, focused group discussions, semi-structured interviews and questionnaires were used to collect information about the research and results were compared. According to Scoones (2015), triangulating across diverse forms of knowledge emerging from multiple perspectives can enhance rigour and ensure validation.

4.2.2 Sampling strategy and techniques

The sampling strategy for choosing participants for both qualitative and quantitative approaches used a CBNRM model as a guide (see Figure 5.1.1 for a detailed illustration). Using this strategy, members of the sample were chosen with a purpose to represent a phenomenon (Nieuwenhuis, 2016). According to Nieuwenhuis (2016), a key aspect of purposive sampling lies in the criteria used as a basis for sampling. For Focus Group Discussions (FGD) and Semi-Structured Interviews (SSI), the main stakeholders were identified by participants and sampled (see details in sections 4.2.2.1 and 4.2.2.2). On the other hand, for household surveys the CRB structure was followed using VAGs as data points for sampling units (see details in section 4.2.2.3). For remote sensing data, land cover maps were generated for 2006, 2014 and 2018. The baseline year is 2006, the year the GMA was gazette into a PA. This was done to monitor forest cover trends from the creation of the GMA to 2018 (see details on the methodology 4.2.2.4 and 7.3).

4.2.2.1 Focus group discussions

The study adopted a participatory approach to engage stakeholders for gathering information on the existing governance structure and participants' involvement (Figure 5.1). Participatory methods involved local people in collecting and analysing information (Mikkelsen, 2005). The method was useful in initiating dialogue, communication and awareness raising on the research topic. This also laid a foundation for knowledge co-production (Figure 5.1). According to

CBNRM theory, the main stakeholders are the community, government, conservation NGOs, and interest groups (church-based organisations, lobbying groups). During SSI and FGD participants identified the same stakeholder groups. In total, five FGDs were conducted (Figure 5.1).

Firstly, with CRB as community representatives in CBNRM, Mufunta CRB is composed of 10 VAGs as grassroots micro governance structures. Each FGD was constituted of 12 people and each of the 9 VAGs was represented, with the exception of 1 VAG, which was not represented because it pulled out of the CRB, citing the poor relationship with the wildlife authorities because they view the wildlife authority as enemies. "*They claimed they are not benefitting from natural resources, especially hunting quotas. They are hostile when you mention anything to do with DNPW, if you open up and say you are doing anything related to ZAWA then you can't dialogue. Once you start talking about animals you will not talk because they will say these are the same people who grabbed guns from us and have killed our family members"* (Key informate interview (5) 2018, personal communication, 10 June). Due to the nature of this research, concerns about the safety of the researcher and for ethical reasons, the said VAG could not be reached to get their side of the story. The other three present were CRB members, who included the Chairperson, Secretary and a committee member. The sampling was done in this way because each VAG chairperson is a member of the CRB, hence there was a fair representation of the villages in the meeting.

Secondly, with relevant government departments, local conservation NGOs and interest groups in Nkeyema District, participants were selected based on their roles and statutory functions at district level with respect to CBNRM. Thirdly, with government departments, local conservation NGOs and interest groups in Luampa District, the two districts were targeted because the GMA is situated in two districts. Hence, it was necessary to understand the effects of local administrative boundaries on GMA governance. Fourthly, a meeting was conducted with randomly selected members of the community. This was done to gain an independent view of CBNRM in Mufunta GMA.

Representatives were selected from each FGD for the fifth and final focus group discussion. Focus group meetings are formal group discussions involving six to ten people and are a good way of encouraging reflection and producing in-depth explanations of the reasoning behind the contrasting views that are expressed (Newing, 2011). Due to the nature of research involving

knowledge co-production with research participants, the FGDs provided a suitable platform. According to Goss and Leinbach (1996), through this interaction in FGD participants feel valued as experts and are given the chance to work collaboratively with researchers. Furthermore, the study set out to develop a governance model for the study area through consensus. As Morgan (1996, p.141) "has emphasised, such interaction produces valuable data on the extent of consensus and diversity among the participants". It's particularly useful for generating data on complex issues that require wide-ranging discussion to develop understanding and consensus (Reed, Graves, Dandy, Posthumus, Hubacek, Prell, Stringer & Quinn, 2009). However, there are several disadvantages of FGDs, which make them challenging in practice. Individuals may not want to disclose sensitive or personal information if others are present (Goss & Leinbach, 1996). Less structured therefore require effective facilitation for good results to be obtained (Reed *et al.*, 2009). In order to overcome such bias of participates feeling intimidated or uncomfortable to disclose sensitive information, meetings with each stakeholder group were conducted separately before bringing them together. The final FGD was to bring together the conclusions from all four meetings and to seek agreement on the ideal governance structure model for Mufunta GMA. See Figure 5.2 for the ideal governance structure for Mufunta GMA developed by study participants in the next chapter.

4.2.2.2 Semi-structured interviews

Semi-structured interviews for key informants were employed because they allowed for sufficient flexibility to approach respondents differently, while still covering the same areas of data collection (Noor, 2008). This was done to identify interactions and power relations among the various actors. Interviews were conducted with key actors in the governance structure such as the Chief as the patron of the CRB, the CRB chairperson, the DC (District Commissioner) as the local government representative following the decentralisation to local government in the new constitution. According to Part IX subsection 147 of the Constitution of Zambia (Republic of Zambia, 2016), the management and administration of the political, social, legal and economic affairs of the state shall be devolved from the national government level to the local government level (Republic of Zambia, 2016). The DNPW, which is charged with the direct responsibility for PA management, and the Japanese Tobacco International (JTI) were interviewed as it also has several households engaged in contract tobacco farming.

To understand the cultural and historical background of the GMA, two key informant interviews were conducted: firstly, with community liaisons assistant (CLA), who was there at

the inception of the GMA; secondly, with the Chief's prime minister as an elder and traditions gatekeeper who understands the culture and history of the area. A male and female outside the formal governance structure were interviewed to capture the views of people with less influence in the governance process. See Figure 5.2 for the illustration of selection of key informants for interviews.

The data from interviews was essential for the assessment of stakeholder interaction and the role of community organisations such as CRBs in CBNRM governance approach. Furthermore, detailed narratives of stakeholders about CBNRM as a governance approach for PA conservation were elicited. Interviews also highlighted some issues which may have been missed during FGD and to enable triangulation.

An interview guide was developed for the semi-structured interview. A list of questions that each interviewee was asked was standardised (Appendix 5), which improved the internal validity of the study. "This was useful for gaining in-depth insights into stakeholder relationships and to triangulate data collected in focus groups" (Reed *et al.*, 2009, p.1937). In addition, SSIs allow the flexibility to follow up with additional question, enabling the researcher to probe issues not included in the core questions (Cassim, 2017). However, the limitation of the method is that it can be very time consuming and hence not cost effective (Reed *et al.*, 2009). Having a guide for the questions helped in monitoring the time to conduct the interviews.

4.2.2.3 Household surveys

For household surveys, a stratified random sampling method was applied. A stratified sample can be obtained by dividing the population into groups called strata according to some characteristic that is important to the study, then sampling is done from each group (Bluman, 2009). In this study the population was divided into two groups, i.e. the two districts where the study was conducted and further divided into VAGs. Households within the strata were randomly selected. Six VAGs were sampled out of the 10 in the GMA; 3 in Nkeyema district, and 3 in Luampa district. Of the 6 VAGs, 3 were closer, while 3 were far from the NP in terms of distance. This was done to compare whether geographical location would influence their interaction with issues concerning the PA governance.

The total number of households in Mufunta GMA was 5,599. Therefore, using the Yamane formula for a known population, a total of 373 household surveys had to be conducted to have a representative sample (Figure 4.2). A total of 401 households were selected randomly and interviewed, 67 households from each VAG, to reduce the sampling error. Proportion sampling was used for each VAG, since each village had almost the same number of households and to ensure a probability sample. Furthermore 373, households are representative of the 5,599 households in the study area, which is the sample population (Figure 4.3). Confidence interval (CI) is 95% which is range of estimates defined as an interval with a lower and upper bound. The questionnaire (Appendix 5) was used because a large sample could easily be accessed. However, it has a limitation because the focus is on the numbers. To avoid this bias, a qualitative dimension to the questionnaire was introduced (Cassim, 2017).

$$Ny = \frac{N}{(1+Ne^2)}$$

Ny = Sample size
N = Population size
e = alpha level i.e. 0.05 if the CI =95%

$5599/ (1+5599(0.05)^2)$
5599/14.99
=373

Figure 4.2: Yamane formula for a known sample (Bluman, 2009)

4.2.2.4 Remotely sensed data

Land cover maps were generated through interpretation of Landsat 7 ETM+ for the year 2006 and Landsat 8 OLI and TIRS for 2014 and 2018, respectively as shown in Table 4.1. Landsat images of Kaoma district were downloaded from the US Geological Survey website (http://earthexplorer.usgs.gov/) using Earth Explorer. Different spatial resolutions were used as the primary source for this study from which Mufunta GMA was extracted. Image selection assumed that images of Kaoma were frost-free with less than 10% cloud and scene cloud cover respectively for each Landsat. In addition, these satellite images are uniformly projected to Zone 35S in the UTM (Universal Transverse Mercator Coordinate) with the datum of World Geodetic System 1984 (WGS84) using at least 25 well-distributed ground control points during acquisition from USGS see table 4.1.

Table 4.1: Data sets and specifications

Datasets	Year of observation	Path/Row	Format	Source
Landsat 7 ETM+ Satellite image	2006-05-27	174/070 174/071	Raster	USGS
Landsat 8 OLI/TIRS Satellite image	2014-09-10			
Landsat 8 OLI/TIRS Satellite image	2018-09-14			

4.2.3 Data collection

Data were collected from secondary and primary sources using an iterative process. Secondary data sources included journals, books, policy documents, periodicals, conference papers and various internet sources, while primary data were collected from focus group meetings, interviews, household questionnaires and geographical information systems (GIS) and remote sensing. During meetings and interviews, participants were encouraged to express their knowledge in the language they were comfortable with or through illustrations and drawings. All discussions were recorded in notebooks, flipcharts and audio recorders for transcription and translation. This was done to reduce data leakage.

The meetings and individual interviews presented an opportunity where knowledge was co-produced with the research participants. This shaped the basis for questions in the questionnaire for more probing and for making inferences. Household survey data was collected using the Open Data Kit (ODK) software, an open source android application that replaces paper forms used in survey data gathering. The application can be accessed (https://docs.getodk.org/collect-intro/). Questionnaires were programmed on tablets (see appendix 5), which allowed for automated data collection, which was uploaded immediately after collection onto the database. The database is sitting on a private computer since it is not public and data can only be accessed using a password to ensure data protection (see appendix 17). Furthermore, data will be made available on request from the author (See page 196).

For remotely sensed data, ground truthing was done during household survey data collection. Data points were collected as household data was being collected as the ODK software has a provision for collecting GPS points. Land cover maps for 2006, 2014 and 2018 were generated (see Table 4.1). Software used included:

- ArcGIS 10.7.1 for performing image classification and assessment of accuracy. This was also used to complement the display and processing of the data and the development of land-use changes, classes and subsequently for change detection as well as analysis of the study area;
- ENVI 5.3 was used for removing scan errors on Landsat 7 ETM+ satellite images of 2006 as well as for imagery enhancement (atmospheric and geometric correction).
- Google Earth for land uses and land cover identification during the classification;
- Microsoft Excel 2016 for the generation of tables, graphs and for the calculation of change detection.

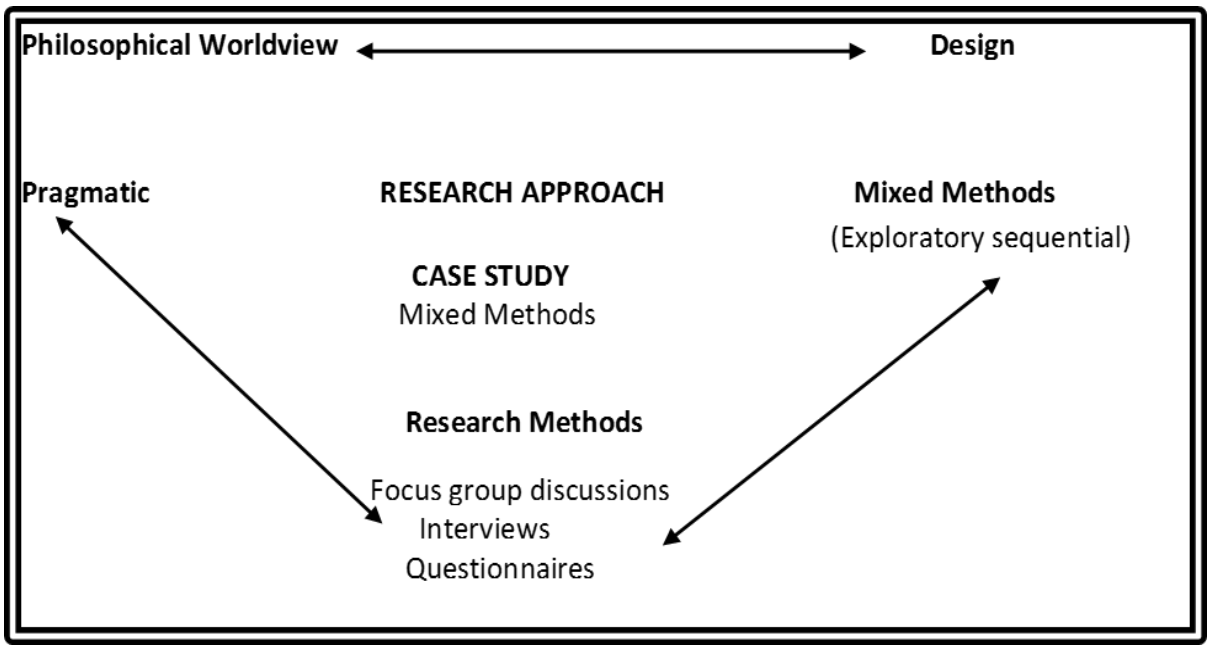


Figure 4.3: Research strategy and design.

Source: modified from (Creswell, 2014).

4.2.3.1 Data collection process: the "hybridisation" of the methodology

Advancing the concept of "hybridization" for data collection after reflecting on the experience gained during data collection. This is a process where one methodology is blended with another during data collection to produce relevant knowledge. It is not easy to draw a line between methods during data collection when in the field. Therefore, following guidelines to apply a specific methodology may reduce the agility that the mixed method approach requires. It is sometimes difficult to put knowledge into methodology boxes because the reality is complex and requires an adaptive approach.

The hybrid concept argues that methods are ingredients that are used to collect data for knowledge creation. During fieldwork, we blend them with their various traits knowingly or unknowingly. Reflecting on the data-collection experience of this research, how the traits of different methodologies are blended in a single investigation is illustrated. The study does not claim applying the said methodologies to the latter but recognises that the data collection process has traits resonating with the said methodologies. Governance research by its nature presents the challenge of scale. National governance can be at macro, meso and micro scale. The various scales are linked in the research to understand governance from the household perspective that is "householdfying governance" at the micro scale.

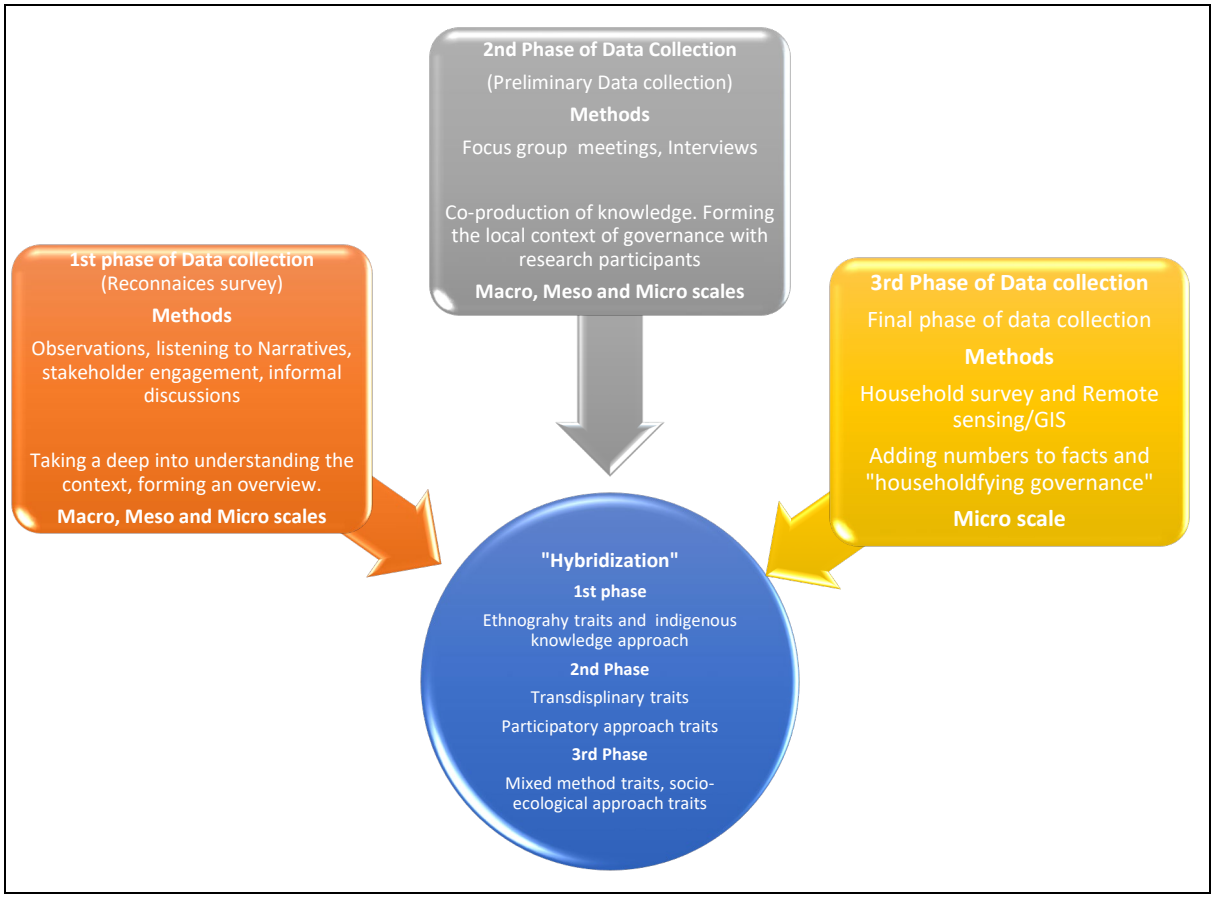


Figure 4.4: An illustration of data-collection process as "hybridisation of methodologies".

4.3 Data analysis

Social science research can be analysed in a deductive or inductive fashion. This means that some research draws on existing theory to guide research design and subsequently make sense of data. During the conceptualisation of the research, theory was used to guide the research design (see section 4.2). Livelihood theory states that institutions are critical in determining access to resources (Scoones, 2015). Drawing on this theory, the link between governance and livelihoods is evaluated. Furthermore, for research objective one an analysis framework by Margerum and Born (2000) was adopted to evaluate the co-ordination arrangement for CBNRM for the study area. On the other hand, research can also start with results and work to construct theory from the data. For all the research objectives, results have been used to construct theories. In this research, both inductive and deductive approaches were adopted.

A thematic approach was used to interpret qualitative data. The data underwent the process of aggregating the data into a small number of themes (Creswell, 2014). Interviews and FGDs transcripts were transcribed verbatim from the local languages into English. The transcribed text was entered into a spreadsheet according to themes related to the research objectives for analysis. A thematic approach for interpreting data by Dey's (1993) following the stipulated five stages: description, contexts, intentions, classification and making connections was adopted for analysis. The thematic analysis involved collecting the data, engaging with the data, coding, generating the code categories, conceptualising the themes, and contextualising and representing the findings (Peel, 2020). Manual coding was done using interview numbers and letters representing themes governance (G), livelihood (L) and natural resources (NR). Colour coding was used to isolate the data and link them to a theme and research objective (see appendix 18). The disadvantages are that it's time-consuming, subjective and may overlook an important piece of data that does not occur often (Scott, 1990 and Robson,1993, both cited in Charlesworth, 2000). On the other hand, the approach is good for eliciting hidden transcripts (Scott,1990).

For research question two on the link between governance structures and livelihood strategies, rights to resources is one of the factors that determine access therefore, the research question on what factors determine access to land, wildlife, fisheries and forests? is advanced. Schlager and Ostrom's (1992) definition is used for the analysis of the bundle of resource rights that resources users have and their limitations. According to Vatn, 2017 (p.135) "Property and user rights define access to benefit streams from a resource". Schlager and Ostrom (1992)

emphasise rights to access, withdrawal, management, exclusion and alienation. This definition was adopted for the analysis of our results on the bundle of rights for resource users in the study area. The position of various actors in relation to the resource is dependant on the combination of rights that they possess (Vatn, 2017). The application of broader good governance principles is evaluated by examining the procedure for licence acquisition to identify challenges to access.

For research question number three on what is the impact of livelihood strategies and PA governance on the conservation of the buffer zone? the focus is on forest loss. Loss of forest occurs because of the interaction of different drivers resulting in change. The causes of land use change in the study area are compared and measured against the 5 typologies of causes of land use change proposed by Lambin, Geist and Lepers (2003). People's perceptions about drivers of forest loss are evaluated against Lambin *et al.* (2003) criteria.

For quantitative data excel, Statistica and SPSS statistical packages were used for data analysis. The data analysis followed the three steps preparation, editing and coding. Data preparation involved data validation as the first step. Data validation involve checking for authenticity, ensuring respondents were chosen according to criteria, check if data collection procedure was followed, completeness to ensure that respondents were asked all the questions. This was followed by data editing typically, large data sets include errors, such as incorrectly filled in fields, skipping data accidentally. Therefore, basic data check was carried out to look out for outliers and identify and clear any data points that may hamper accuracy of the results which was part of data cleaning process. Finally, data coding was done by grouping and assigning values to responses from the survey to ensure data was manageable. Descriptive statistics was used to describe and summarise raw data by giving frequencies, means and standard deviations. Frequencies of access to livelihood assets are used as indicators of how accessible livelihoods assets are for households. Furthermore, categorical data analysis was done using cross-tabulations and Chi-squared (χ^2) test of independence were conducted to establish statistically significant variables ($P<0.05$). Pearson's Chi-square test was used to test associations between independent variables. Relationships between two continuous variables was analysed with regression analysis and the strength of the relationship measured with Pearson correlation, or Spearman correlation if the continuous variables are not normally distributed.

For research question number one on the issue of the effectiveness of coordination of CBNRM governance structure in enhancing input legitimacy, a Chi-square test is used to compare

participation in governance between two districts to see if the administrative boundaries influence participation. Furthermore, the relationship between traditional authority and participation is also tested. The test for independence between having awareness (information) and participating in CRB decision-making was done using a Chi square test. The Chi-square test is also used to test if there was a relationship between being aware or having information and being a member of the VAG. The Mann Whitney U test is a popular nonparametric test to compare outcomes between two independent groups. Mann, Whitney U test is used to test the relation between education and participation in CBNRM.

Research question two addresses the link between governance structures and livelihood strategies. On the question of institutional factors impeding access to natural resources, firstly, a licence is a requirement for accessing high-value natural resources in the PA. Therefore, a correlation measures the degree to which two variables are associated. Pearson's correlation is used to test the relationship between environmental income and licence fee. This was also done for individual wildlife products i.e. fish, bush meat, grass and timber to test the strength of the relationship for each product. A simple regression was also run to see the overall fit of the model for the relationship between environmental income and licence fee and the percent contribution to variations in environmental income as an explanatory variable. ANOVA was also done with and F-test as a measure of significance. A one-way analysis of variance is a statistical test that determines whether the means of two or more groups area statistically different. There is one dependent and one independent variable F-statistics.

Secondly, to assess the relationship between power relations and access to land a regression is run. A linear regression is a statistical technique used to find linear relationships between one or more continuous independent variables and a continuous outcome variable. Multiple R is the statistic. The regression explores the influence that the number of plots of land, wealth, education, age of household head and number of years lived in the GMA has on determining access to land by households. A t-test was done as a measure of significance for the selected variables. This was to determine which variable contributed significantly to the variations in accessing land. Furthermore, access to livelihood assets may be due to gender, education or wealth a Mann Whitney U test is used to test the relationship between gender and assets and Spearman's rank order correlation and Pearson's correlation were applied to test the relationship between wealth and level of education.

On the question of natural resource dependency by households, environmental dependency is measured using percent contribution by natural resources to household income and the Gini coefficient is calculated as the measure of equality. The most widely used measure of income inequality is the Gini ratio it is derived from the Lorenz curve it relates to the distribution of income in relation to the distribution of the population (Thirlwall, 2011). “Inequality is about the disparities in levels of living by looking at the ratios of individual incomes to the overall mean” (Ravallion, 2016, p.221). The Simpsons index is used for calculating diversity of livelihood options in the study area. Location of the households may expose it to more wildlife conflict costs than other households. Therefore, a Chi square test was done to test the relationship between cost due to wildlife conflict and distance from the national park.

For the research question on the impact of livelihoods on PA habitat conservation indicators of forest loss per household are calculated using acres (a) of land converted per year, the variables used are number plots of land, land size used for farming, shifting cultivation, years taken before shifting and plans for future expansion. Area converted per year was used to project forest loss if agriculture expansion as a driver is not controlled.

For research question number three on the impact of governance on PA conservation, vegetation change detection using GIS and remote sensing was used to analyse this relationship. Land-cover conversions are measured by a shift from one land-cover category to another, as is the case in agricultural expansion, deforestation or change in urban extent (Lambin, Geist & Lepers, 2003). For Land Use Land Cover (LULC) Classification and Change Detection, the study was dependent on the use of ArcMap 10.7.1 interpretation of Landsat imageries and Envi 5.3 for image quality enhancement.

The images were acquired free of charge from the United States Geological Survey and registered under the Universal Transversal Mercator (UTM) on the zone 35 S with datum World Geodesic System of 1984. Each band has a resolution of 30 m. A field survey was also performed in order to obtain accurate location point data for each LULC class included in the classification scheme as well as for the creation of training sites and for signature generation to obtain the required information from satellite image data.

The satellite images were obtained after processing two scenes of Landsat Images TM 7 for the year 2006 and Landsat OLI for 2014 and 2018 under the path/row 174/070 and 174/071 the

data were enough to cover the entire shape file of Mufunta GMA, to which radiometric and atmospheric correction were applied respectively as recommended by Jensen (1996). To compare images of different years the Top Atmosphere (TOA) process was used to convert digital numbers (DN) to values of reflectance. Differences of atmospheric conditions were corrected with the dark object subtraction method (DOSM) (Song *et al*., 2001). To adjust the localisation error, a geometric re-sampling with a linear polynomic of first grade was used until obtaining the square root of the medium error at 1.0 pixel.

Table 4.2: Land class descriptions for the supervised classification

No.	Class Name	Description
1	**Water**	River, permanent open water, perennial lakes and reservoirs
2	**Settlement**	Residential area, including the surrounded enterprise area, entertainment area, all kinds of road and airport.
	Farmlands	Agriculture lands
3	**Grasslands**	Savanna, trees, shrub lands
4	**Forest**	This describes the areas with evergreen trees mainly growing naturally in the reserved land, along the rivers, and on the hills.
5	**Barelands**	Areas without any vegetation and water, rocky areas

Land use land use classification. Source: Anderson, Hardy, Roach & Winter (1976)

ArcMap was also used to determine the extent of land use and land cover in Mufunta GMA. The classification scheme was based on the land use and land cover classification system developed for the interpretation of remote sensing data at various scales and resolutions. In addition, the land use classification and vegetation were determined through the supervised classification method using the Euclidian distance to measure pixels' similarity (Richards, 1999). The satellite images of each band were composited, and the study area image was extracted by clipping using ArcGIS 10.7.1 software with the aid of administrative shape files obtained from the Central Statistics Office (CSO) website.

Definition of the training sites, extraction of signatures from the image and then the classification of the image was done. More than one training area was used to represent a class. The training sites were selected in agreement with the Landsat Image, Google Earth and Google Maps. In the digital classification process, training areas for different classes were defined for the satellite imagery on spectral response patterns in the different spectral bands generated. Training data extraction was a crucial step in supervised classification and thus data were collected from relatively homogeneous areas consisting of those classes.

The collection of training data involved field surveys and accumulation of reference data from Google Earth and Google maps, respectively. Finally, the classification methods were applied. From the literature it was noted that Maximum Likelihood Classification (MLC) gave good results as compared to the other supervised widely used classification techniques. Therefore, it was applied to the images. Based on these training areas, satellite imagery was classified into four different classes to determine land use and land cover changes in Mufunta GMA.

Area was calculated in hectares (ha) of the resulting land uses in Microsoft Excel with information (class and count) obtained from the classified images in ArcMap. The comparison of the land-use changes statistics assisted in identifying the percentage change, trend and rate of change between 2006, 2014 and 2018. In achieving this, a table was developed showing the area in a square kilometres, area percentage and the percentage change for each year measured against each land use type. Supervised classification was performed to produce land use land cover maps from the Landsat satellite data.

Classification accuracy assessment is essential and the most crucial part of studying image classification for LULC change detection to understand and estimate the changes accurately. It is, therefore, important to be able to assess accuracy for individual classification if the resulting data are to be useful in change detection analysis. The formula used in this study for the accuracy assessment is from Landis & Koch (1977). The accuracy measurement was done as follows:

Overall Accuracy = (Total number of correctly classified pixels/ Total number of reference pixels) *100

User accuracy = {Number of correctly classified pixels in each category / Total number of classified pixels in that category (the row total)} * 100

Producer Accuracy = {Number of correctly classified pixels in each category / Total number of classified pixels in that category (the row total)} * 100

Kappa Coefficient (T) = [{(TS*TCS)-$\sum$ (Column Total *x* Row Total)} / {TS^2-$\sum$ (Column Total *x* Row Total)}] *100

4.4 Ethical considerations

Ethics clearance was applied for and approved prior to data collection see (Appendix 1). Respondents were given a written consent form to sign before they participated in the study, in line with the University's ethical policy. This was done for interviews, FGDs and household surveys (see attached data collection tools Appendices 3, 4 and 5). To ensure confidentiality, for household surveys only questionnaire numbers were recorded and not the respondent's name. For interviews and FGDs, respondents are referred to only as participants and no names are mentioned to protect their identities when reporting the results. All research assistants were duly trained prior to commencement of field work to ensure the research was conducted within the standards of the field research guidelines and in an ethical manner. All teams worked close to each other to enable the researcher as team leader to monitor compliance with the ethical protocol.

4.5 Chapter summary

The chapter explains the conceptualisation of the study, which anchors the three main objectives of the research. The first objective focuses on the assessment of governance structures. Secondly, the study evaluates the links that these structures have on livelihoods and PA conservation in the second and third objectives respectively. The chapter elaborates on the methodology that was applied for data collection to achieve the three main objectives in the study. A pragmatic approach was adopted where both qualitative and quantitative methods were used to address all the three objectives. The CBNRM model was used for sampling purposes to ensure a justifiable representative sample was selected for the study. Furthermore, the results were triangulated across methods for analyses. The next chapter addresses the first research objective, which is an assessment of governance structures in place and the link between the various layers of governance. Chapters 5, 6 and 7 deal with Objectives 1, 2 and 3 respectively.

CHAPTER FIVE: AN ASSESSMENT OF THE EXISTING GOVERNANCE STRUCTURES IN THE MUFUNTA GAME MANAGEMENT AREA

The role of co-ordination in improving community-based natural resources management implementation

5.1 Introduction

The chapter presents the findings of the assessment of governance structures in Mufunta Game Management Area (GMA). The assessment focuses on collaboration and coordination for improving co-management. There is no clear distinction in literature regarding the difference between collaboration and coordination (O'Leary & Vij, 2012). In this study, collaboration and coordination are applied in relation to co-management of natural resources. According to Muller (2010), co-management systems should be understood as governance structures which may be composed of a variety of actors connected by a significant number of relations involving the state, local resource users, commercial actors, NGOs, and many other public and private actors. Vatn (2017) defines governance structures as actors and institutions. The actors in this research are individuals in governance and organisations. On the other hand, institutions are the rules and norms in use.

Governance involves decision-making and implementation of decisions made. Understanding the two processes requires an analysis of the actors involved and institutions established for making and implementing decisions. The study analyses how actors in CBNRM are guided by socio-political structures as apparatus in the implementation process. Therefore, through a transdisciplinary approach of knowledge co-production with the research participants, the actors are identified, and the coordination arrangements evaluated.

CBNRM is a micro governance structure at local level; however, it is nested in the three levels of governance. At national level, CBNRM is influenced by macro-, meso- and micro-scale governance, through decision making. The roles and responsibilities of actors at each level of governance and institutions in place for making and implementing decisions are assessed. CBNRM is a multi-stakeholder approach which requires coordination. Co-management is a process by which representatives from different levels of organisations coordinate their activities in relation to a resource system (Carlsson & Berkes, 2005).

Three important structures are identified which are supposed to be linked through collaborative governance. They are the state, traditional and CRB structures. Areas of attention to improve implementation of CBNRM are outlined. The understanding of the CBNRM concept, cross-scalar linkages, the link between the state and traditional structures, and the politics involved in each structure in relation to authority and decision-making are explored. This will ultimately improve participation, which is key for coordination and implementation of CBNRM. Mukwada and Manatsa (2012, p.70) argue that "the success of CBNRM initiatives could be enhanced by providing a conceptual framework within which it can be better understood and implemented".

CBNRM being multi-stakeholder in nature implies that coordination between different structures that are linked is critical. The concept of societal coordination of social systems manifests in different types of networks and partnerships (Carlsson & Berkes, 2005). The main challenges hindering coordination in Mufunta GMA are highlighted. Finally, the research proposes an approach for overcoming the identified challenges and achieving co-management for Mufunta GMA, which could also be applied to other GMAs country wide. The chapter aims to describe a CBNRM model that will inform practice in Zambia through the Mufunta GMA case.

5.1.1 Background

In this study CBNRM is analysed from the perspective of co-management. "Community-based natural resource management (CBNRM) is an emerging international model for natural resource management" (Gruber, 2010, p.52). In relation to natural resources, the term management can be understood as the right to regulate and transform resources to make improvements and these activities can be performed by single actors or jointly by groups of individuals or as a result of cooperation (Carlsson & Berkes, 2005). The World Bank defines co-management as the sharing of responsibilities, rights and duties between the primary stakeholders, specifically, local communities and government (ibid.). The assessment focuses on collaboration and coordination for improving co-management. Co-management can be improved through coordination to enhance the collaboration strategy. A real life co-management systems might be described as self-governing partnership networks that can be manifest in different ways according to its quality (Carlsson & Berkes, 2005). One basic feature

of social networks is that activities of two formally separated parties that can be coordinated by a third party. Similarly the polycentric approach recognises that effective governance often requires multiple links across scales and overlapping centres of authority (Berkes, 2009). Therefore, the study evaluates co-management as a governance approach.

To understand the qualities of the co-management arrangement, the initial step was to define the social-ecological system under focus that is the unit of analysis. In this case our focus is the Mufunta GMA CBNRM co-management arrangement. This was followed by a clarification of who the participants are in the co-management activities and related problem-solving process. This was done using a stakeholder analysis and looking at the theoretical structure of CBNRM in the study area. The study participants then mapped using a transdisciplinary approach the essential management tasks to be performed by the different linked governance structures. Finally, the linkages were analysed and capacity-building needs were evaluated. Research has shown that "country-specific contextual realities play vital role in theorising governance, which has always been overlooked" (Asaduzzaman & Virtanen, 2016, p.2).

Co-management is based on broad levels of cooperation. It relies on the collaboration of a diverse set of stakeholder networks operating at different levels, from local communities, local, regional and national organisations and government (Olsson *et al*., 2004). An integrating term, adaptive co-management, combines the dynamic learning characteristics of adaptive management with the collaborative networks (Plummera & Armitage, 2007). Research on CBNRM has focused on resource management rather than managing the stakeholder relationships that are crucial for effective co-management.

5.1.2 Data-collection methodology

Data was collected using a combination of methods, Figure 5.1 illustrates the data collection process and co-knowledge production.

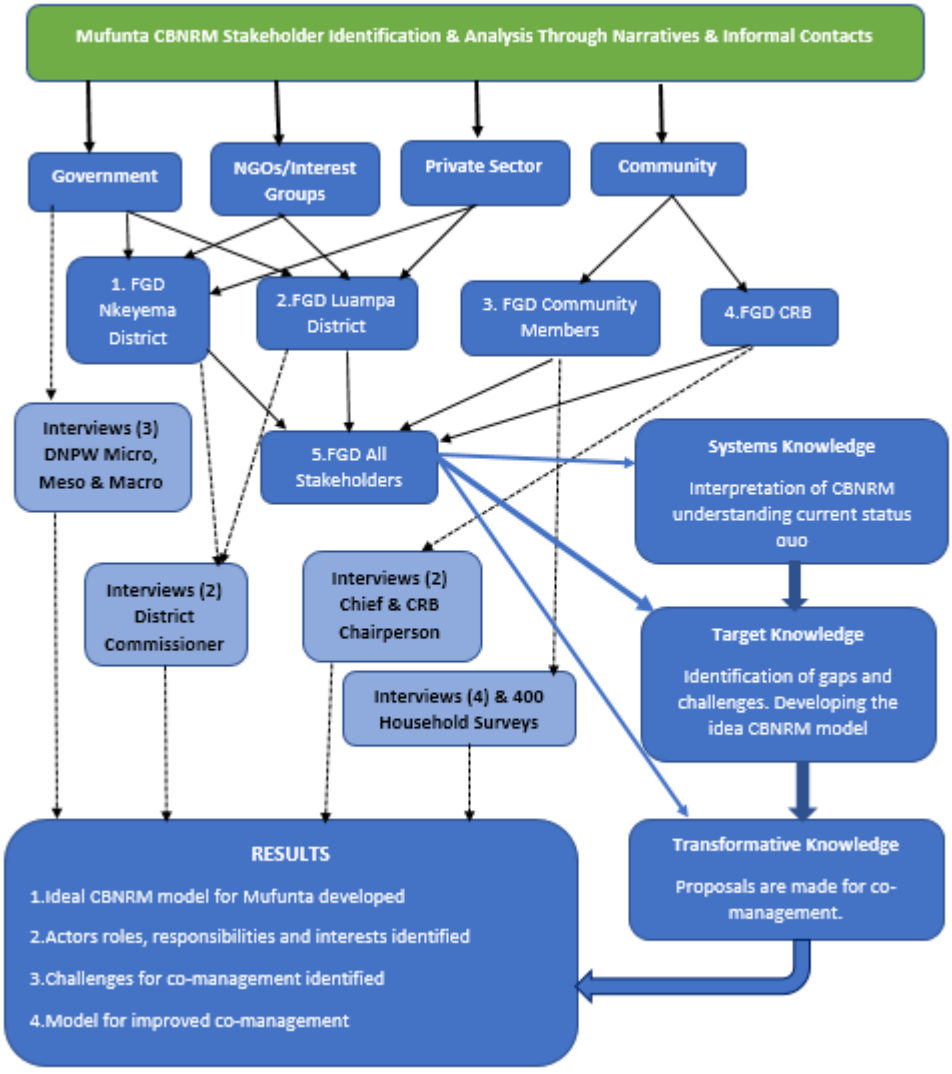


Figure 5.1: An illustration of the data-collection process and co-knowledge production

The TD approach through knowledge co-production for natural resources governance is adopted from Yeboah-Assiamah *et al.*(2018). The process involved active consultation with and participation of the CBNRM communities of practice, inter alia the research team, practitioners and community members. This was achieved through a TD process whose outcome produced three main forms of knowledge: systems, target and transformation knowledge, as illustrated in Figure 5.1 and explained below through the results obtained from the research indicated in section 5.2.

5.2 Results and analysis

In this study a three-step approach was taken to assess the governance structure as adapted from Margerum and Born (2000) diagnostic analysis tool. In addition, a pragmatic approach advanced by Dewey which involves recognising the problem, considering the nature of the problem, suggesting a solution, considering the effects of solution and acting is applied (Morgan, 2014). Considering the effects of the solution and acting which are stages four and five respectively are beyond the scope of this study.

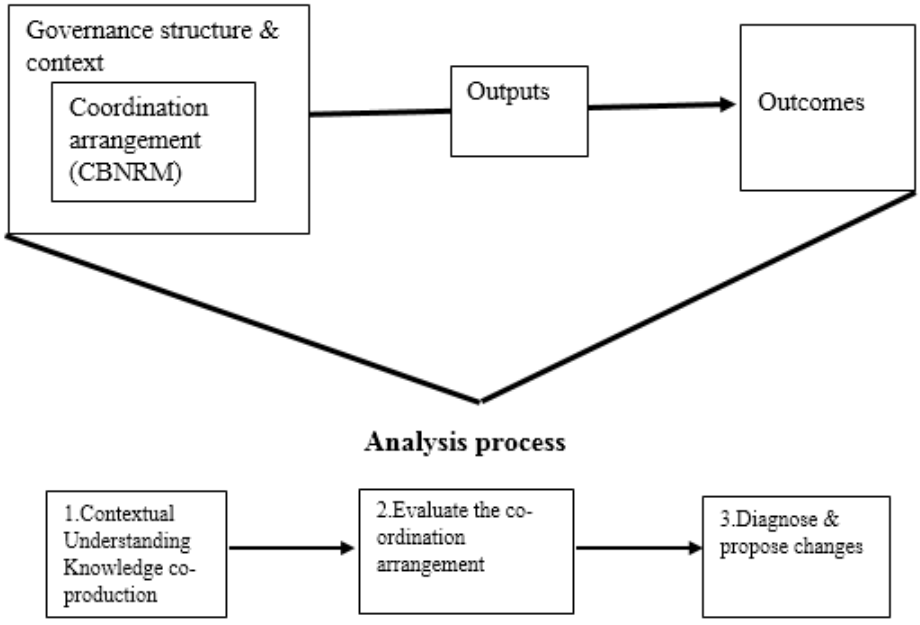


Figure 5.2: A diagnosis and analysis tool.

Source: adopted from Margerum & Born (2000)

5.2.1 Co-producing the CBNRM model: A Mufunta stakeholder's perspective

(i) Local actors' definition of CBNRM (systems knowledge)

According to Child and Barnes (2010, p. 284), "CBNRM means different things to different people". As indicated by our results (see table 5.1). The focus is the understanding of CBNRM by local stakeholders, the people who are supposed to be part of the CBNRM and the way that decisions are being made.

Table 5.1: Definition of CBNRM from focus group meetings

Actor Group	CBNRM Definition
Community Resources Board (CRB)	A mandate to sensitise the community about the benefits that come from conserving natural resources
Local community in general	They could not define what it is?
The government departments, NGO's and interest groups - Luampa district	As co-management of natural resources
Government departments, NGO's and interest groups meeting - Nkeyema district	Natural Resources Management by the community supported by responsible departments.
All stakeholders	As co-management of natural resources

Lack of conceptual understanding has been cited as a factor for failure of CBNRM in Southern Africa (Child & Barnes, 2010). The range of different definitions of what CBNRM is could be an indication that stakeholders may not share a common objective for PA governance, making coordination elusive. To achieve coordination, participants must first achieve a common base of understanding by using the same information, comparing goals and objectives (Margerum & Born, 2000). This helps in harmonising divergent interests that may lead to conflicts. Due to interdependencies, environmental issues are characterised both by conflicts and great needs for coordinated action (Vatn, 2017). "*When the GMA was established, WWF were working mainly with the CRB. However, these representatives did not explain well what CBNRM was, which created problems because the community did not get the concept too well*" (Key informate interview (2) 2018, Personal communication 10, June). The data indicate that the community members, especially those in Village Action Groups (VAGs) do not understand the

CBNRM concept (see Table 5.2). Ansell and Gash (2008) found that shared understanding was one of the crucial factors for a collaborative process to succeed.

Table 5.2: Household survey data on awareness of CBNRM

Knowledge	**Knowledge about (….)**			
	living in the GMA (%)	*Planned Zones (%)*	*CRB (%)*	*A member of VAG (%)*
No	56	84	69	83
Yes	44	16	31	17

Note: (Yes) indicate levels of awareness about CBNRM, n = 401

(ii) A Mufunta perspective of CBNRM governance structure the current scenario (systems knowledge)

According to the data collected through focus group meetings, there was an agreement that co-ordination of CBNRM is seen as a role of NGOs that have been facilitating activities of CBNRM programs. Initially, Mufunta GMA was established with the facilitation of Worldwide Fund for Nature Conservation (WWF). However, since its establishment there has been no permanent actor that has taken up the role of a CBNRM coordinator. One of the key elements in operationalising the concept of integrated environmental management such as CBNRM is stakeholder coordination (Margerum & Born, 2000). Co-management agreements serve the purpose of constituting linkages among organisational groups that might not be otherwise connected.

During all the focus group meetings, the stakeholders could all easily identify the collaborating partners. However, there was consensus that there is little or no coordination among stakeholders, and lack of coordination is ranked second among the governance challenges identified for Mufunta GMA (figure 5.12). In an interview, the CRB indicated that "*Collaboration was difficult because other stakeholders take it that only DNPW is the one concerned with CBNRM*" (Focused group discussion (4) 2018, personal communication 9 June). They linked the problem to the absence of provisions for community involvement in several natural resource sector-based legislation. According to Malasha (2007), some natural resources such as wildlife have had a longer experience of involving users in management compared to others, such as fisheries in Zambia. CBNRM in Zambia was initiated in the wildlife sector in the 1980's, while in the forest sector the process began only in 1999 and the

legislation for involving fishers has not been forthcoming since the early 1990s (Malasha, 2007).

Figure 5.3 illustrates the current Mufunta governance structure scenario through the interpretation and understanding of the local people.

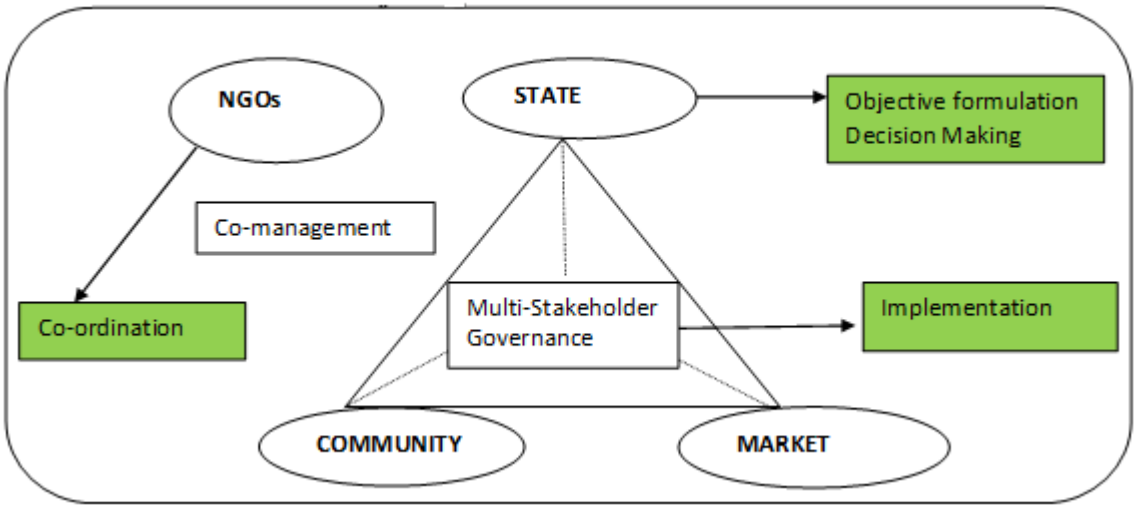


Figure 5.3: A Mufunta perspective of CBNRM governance structure current scenario.
Source: Modified from Lemos & Agrawal (2009).

In the current governance structure, the coordinating role of CBNRM programmes is done by NGOs who are in the area only during the project life span. Once the project phases out, CBNRM programmes suffer from lack of continuity. Mostly, the projects they start remaining as “white elephants” (See figure 5.4).

Figure 5.4: An abandoned CRB office in Shikela VAG.

Source: Fieldwork, 2019; photograph taken by Elina Mukumbwa (data-collection assistant)

WWF and Global Environmental Facility (GEF5) have played the coordinating role so far. According to the CRB, "*GEF 5 organised a meeting for all CBNRM stakeholder to come together in 2016 and in May 2017 at regional level. At local level (i.e., district level), a meeting is being planned for December 2018*" (Key informate interview (3) 2018, personal communication, 30 July). Objective formulation and decision-making in CBNRM are mainly done by the state through government departments. The community is left out of making critical decisions such as objective formulation and planning for the GMA. On the other hand, implementation of the governance objectives is expected to be the responsibility of all the stakeholders.

(iii) The Mufunta perspective of CBNRM governance structure: the future scenario (target knowledge)

Figure 5.5 illustrates the proposed governance structure as conceptualised by the stakeholders through identification of gaps and challenges. Some of the gaps identified in the governance structure include firstly the lack of a permanent coordinator for CBNRM programmes. To this effect, stakeholders propose that coordination should be done by the CRB and DNPW. The CRB would concentrate on the community and traditional governance actors while, on the other hand, the DNPW could focus on state actors, NGOs and interest groups. This will result in a boundary organisation, as an institutional arrangement that functions as mediator between different parties, such as the state and resources users, and between these actors at different scales (Carlsson & Berkes, 2005). Secondly, the formulation of objectives and decision-making for management of the GMA are developed without the consultation of all stakeholders through to implementation, when all stakeholders need to be involved but are not empowered to do so. Therefore, stakeholders propose that all stakeholders should be involved in objective formulation, decision-making and implementation.

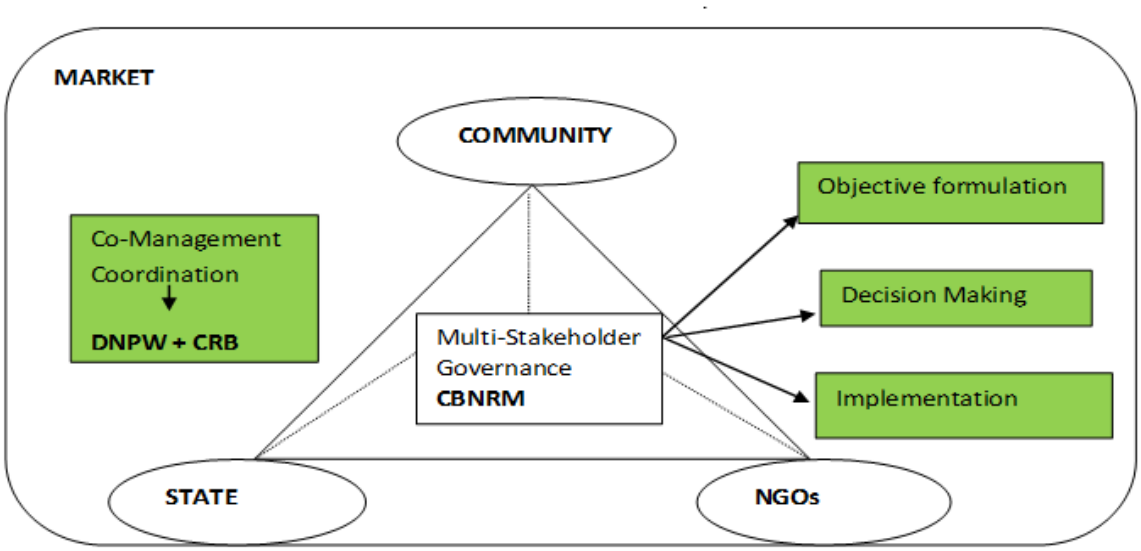


Figure 5.5: The Mufunta perspective of CBNRM governance structure future scenario.
Source: Modified from Lemos & Agrawal (2009).

(iv) Proposals for Mufunta CBNRM governance structure future scenario (transformative knowledge)

Stakeholders propose that empowering stakeholders should begin with sensitisation and information sharing among stakeholders. Effective communication is a crucial aspect of successful CBNRM initiatives which fosters information sharing, transparency and trust (Gruber, 2010). Furthermore, having a permanent stakeholder to coordinate CBNRM activities is critical. Objective formulation and decision-making should be done by involving all stakeholders in the process. Involving all stakeholders in the process will result in a Mufunta-driven conceptualisation of CBNRM for PA governance. Some authors advocate for hybrid institutions and stress that the emergence of hybrid forms of environmental governance is based on the recognition that no single agent possesses the capabilities to address the multiple facets of environmental problems, that may appear simple at first sight (Muller, 2007; Lemos & Agrawal, 2009 & Mupeta-Muyamwa, 2012).

5.2.2 The roles and responsibilities of various actors in CBNRM

From the focus group meetings and interviews, the main stakeholders for CBNRM in Mufunta GMA were identified as government, community, NGOs, interest groups and the private sector. These operate at national, regional and local level according to their roles and responsibilities.

Table 5.3: The roles and responsibilities of various actors in CBNRM at different governance levels

Governance level	Stakeholder/Actor group	Roles and responsibilities	Types of Decisions
Macro Level (National)	Government, NGOs	Policy formulation	-Creation of the GMA** -Quota setting (hunting)** -Preparing of General Management Plan (GMP)** -Awarding a hunting concession -Sharing and disbursing hunting revenues**
Meso Level (Regional)	Government-DNPW-Extension Department	Mediatory role between Macro and Micro governance. *** Policy implementation through community engagement***	-Issuance of licences -The dissolution of the CRB due nonconformance and financial misappropriation

		External auditing of finances and elections	
Micro Level District (Local)	Government-DWNP-Park Ranger Community-CRB-VAG NGOs, Interest groups and private sector	Policy implementation through community engagement Facilitation and monitoring Community programmes and schemes Planning and Monitoring** Objective formulation** Co-ordination***	-Election of CRB Leaders -Recruiting of Village scouts -The dissolution of the CRB due non-conformance and financial misappropriation. -Propose hunting quotas** -Selection of a hunting outfitter** -Expenditure of hunting revenues**

Stakeholder engagement revealed the various roles and responsibilities

** denotes lack of community participation

*** denotes a missing role

5.2.2.1 The roles and responsibilities for DNPW in CBNRM structure cross-scalar linkages

In CBNRM the DNPW plays a key role on behalf of the government as a stakeholder. The structure within DNPW for CBNRM is illustrated in Table 5.4 and Figure 5.6

Table 5.4: DNPW CBNRM governance structure

Position	Location
Principal-NERMO	HQ-National
Senior-NERMO	HQ-National
Extension officer	Regional Office/AMUs
CRB	Communities

Notes: **NERMO (**Natural Resources Management Office)

AMU (Area Management Unit)

CRB (Community Resource Board)

HQ (Headquarters)

Government operates at the national level where policies are formulated as one of their roles in CBNRM is policy formulation. In Chapter 3 the policy and legal framework that government has put in place in terms of NRG was reviewed. The chapter reviewed how these have shaped PA governance and CBNRM outcomes. In Zambia the DNPW is charged with the direct responsibility of PA. The DNPW has an extension department which is mandated with the

responsibility for all matters involving community engagement. This structure is supposed to operate at macro, meso and micro level, at least in theory. However, in practice there seems to be a missing link in the governance structure, since extension officers are at meso level (Regional) and not at micro level (District). Consequently, they do not have frequent direct contact with the community.

To fill the gap at micro level the department has engaged the park ranger to act as a link with the community. The ranger oversees law enforcement and in addition in this case this office is given the extension responsibilities, which may compromise community participation due the lack of capacity in community engagement and perception that people have in relation to the role of law enforcement.

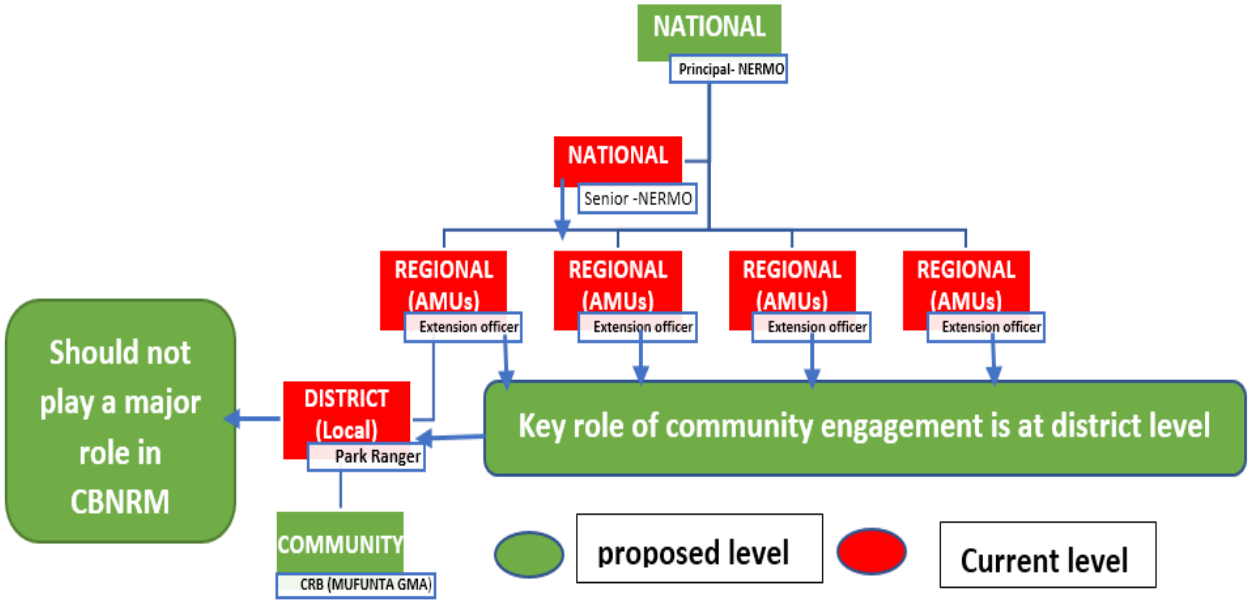


Figure 5.6: DNPW CBNRM governance structure the missing links and proposed changes

5.2.2.2 Traditional authority in CBNRM governance structure

According to the structure outlined in Figure 5.7, decision-making about the GMA takes place through the CRB without the consultation of the traditional ministers (*indunas*) and headmen, which has become a source of conflict.

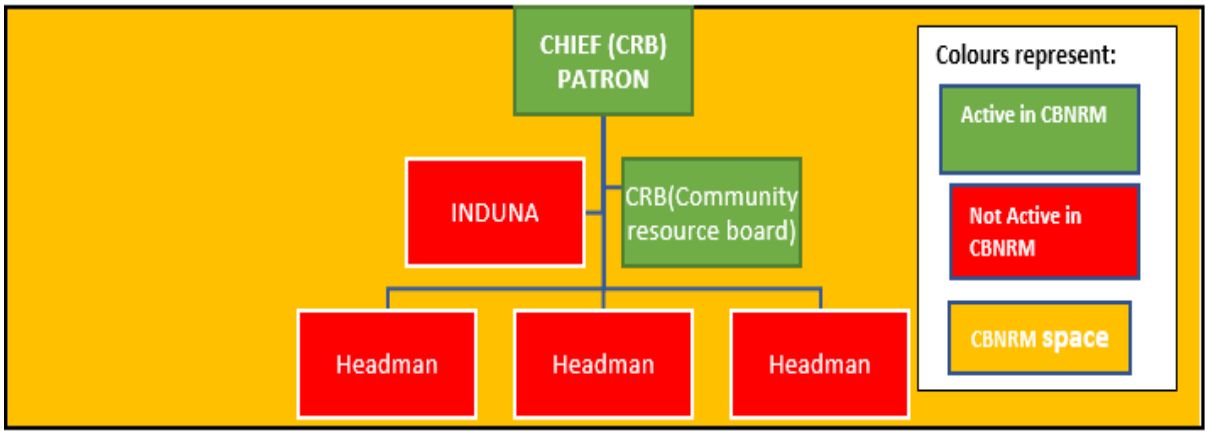


Figure 5.7: CBNRM governance structure in relation to traditional authority

The headmen and indunas have no direct interaction with the CRB, which is a missing link in the traditional governance structure. The data from the interviews and FGDs indicate that they have the power to allocate land and sometimes even contrary to the Chief's instruction. It is on record that some of the headmen have allocated land in the GMA's preservation zone, which is supposed to be set aside for conservation. Household survey data also illustrate acquisition of land by households through different actors. The traditional governance structure shows the indunas, headmen and the Chief exercise powers to allocate land (see Figure 5.8 and Table 5.5).

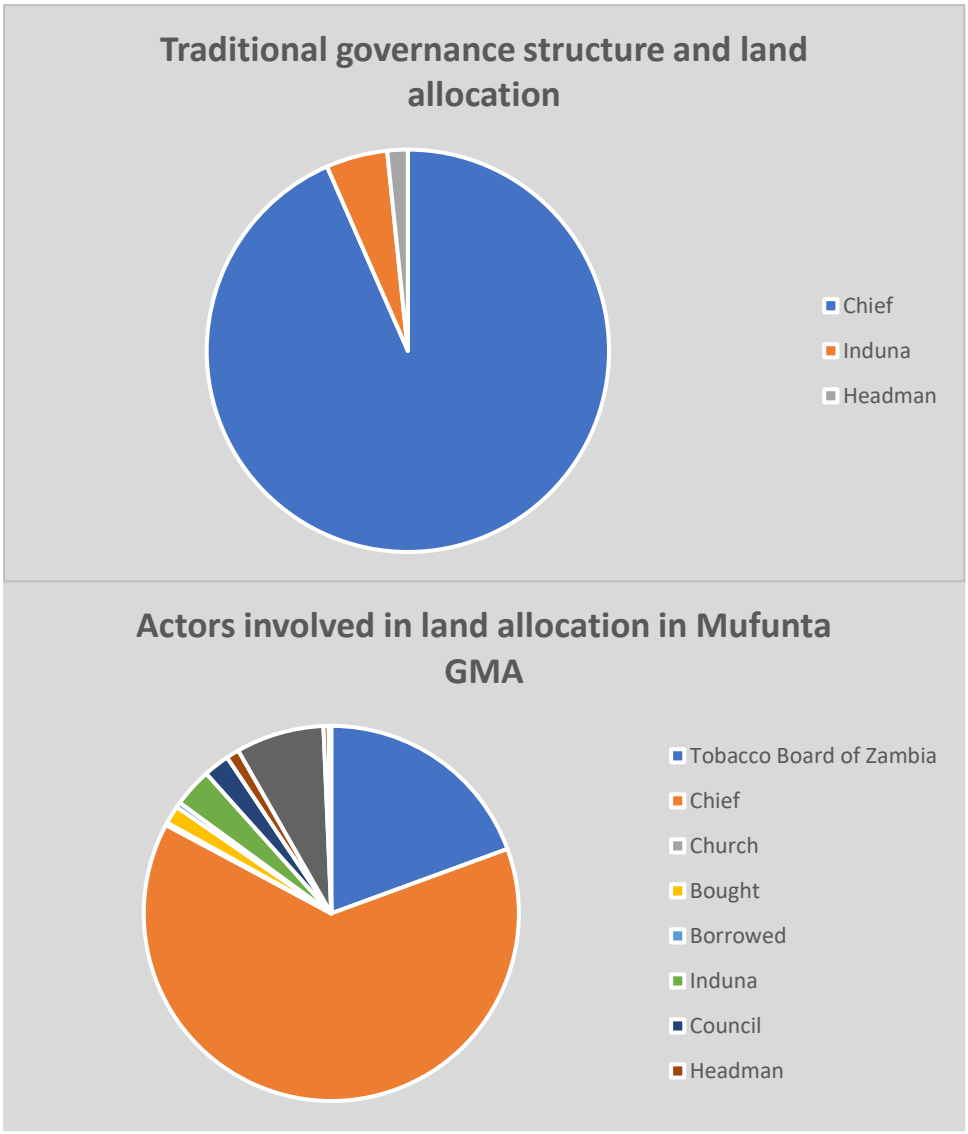


Figure 5.8: Traditional governance structure and actors involved in land allocation

The lack of coordination in decision-making within the traditional governance structure has resulted in a loss of natural resources. When allocation of land is not coordinated, actors involved may give out land without due consideration for the planned zones and natural resource conservation. Land is the fundamental asset as the basis for agriculture dependant livelihoods as well as forest conservation (Vatn, 2017).

Table 5.5: Actors involved in land allocation in Mufunta

Land allocation in the study area suffers from legal pluralism were multiple actors are involved in land allocation. This has resulted into conflicts among the actors with authority for land distribution and resources users. Conflict range from disagreements on boundaries, evictions to land ownership which lead to land insecurity. Challenges of land problems are as a result of lack of coordination among actors.

Method	**Decision maker on land**	**Land acquisition**	**Land Problems**
Household survey	Household	inheritance	Conflict with neighbours due to unclear boundaries Insecurity due to lack of title deeds Encroachment by neighbours
Traditional Authority	Chief	Chief	The chief threatening to repossess land The chief demands a lot of money for land When the chief dies a new chief comes then you have to pay tribute again to secure land. (*"Kushowelele"*)
	Induna	Induna	Indunas selling land without consulting households Part of our farmland was taken by the induna Indunas giving one piece of land to two people Indunas asking for bribes for the land
	Headman	Headman	Headmen asking for bribes Headmen selling land without consulting households Headman wants to put his son on our land
Government	Government	Council	Fear of eviction by DNPW and the forest department Verbal conflict with council Displacement due to developmental project Conflicts between household and DNPW officers.
	Tobacco board of Zambia (TBZ)	TBZ	Land wrangles about land ownership with TBZ
Other	Conservation Farming Unit (CFU)	Rented	
	CRB	Borrowed	CRB wants to move people with land near the stream
Focus group Discussion	Community		Encroachment on prohibited zones Lack of implementation and compliance of collective choice rules
Traditional Authority	Chief		The chief making decisions without collaborating with the CRB

	Indunas	Indunas give land without consulting the chief
Government	DNPW Forest Department District commissioner Council Lands Department	CBNRM stakeholders not collaborating when it comes to land allocation and management.
Other	CRB	No implementation of collective choice rules
Semi-structured interviews		
Traditional Authority	Chief Indunas Headmen	Traditional leaders not collaborating land use and allocation Allocation of land in the preservation zone by headmen
Government	DNPW Forest Department District commissioner Council	CBNRM stakeholders not collaborating when it comes to land allocation and management.
Other	CRB	

CBNRM commonly retain elements of traditional authority which must address the whole landscape for which they are responsible, with all its component resources, sectors and livelihoods (Turner, 2004). Therefore, it is critical that decision-making should be harmonised through the CRB being integrated within the existing traditional structures to avoid land use conflicts.

5.2.2.3 Community Resource Board a micro governance structure for CBNRM

The community, in terms of CBNRM governance, operates mostly at the local level. Their role in governance is fulfilled through the CRB, which is composed of local community leaders, traditional authority, District Council and DNPW. The community leaders are the direct link to the grass roots in CBNRM and are elected by the community members to represent them on the board. The community has been divided into VAGs, which is the smallest unit of governance at grass root level.

Each VAG elects a committee, within which the chairperson automatically becomes a member of the board (i.e., CRB). Although such structures are in place, the interaction between the community leaders and their communities is limited by logistical challenges faced by the CRB. This lack of constant interaction with their constituencies has resulted in non-responsiveness of members in participation. Effective CBNRM strives towards participatory democracy, which entails the community sitting together to make decisions. Currently what is being implemented is representational governance (committee-based-management) as illustrated in Figure 5.9. However, representational governance is strongly associated with low participation, inequitable benefit sharing and elite capture (Child & Barnes, 2010).

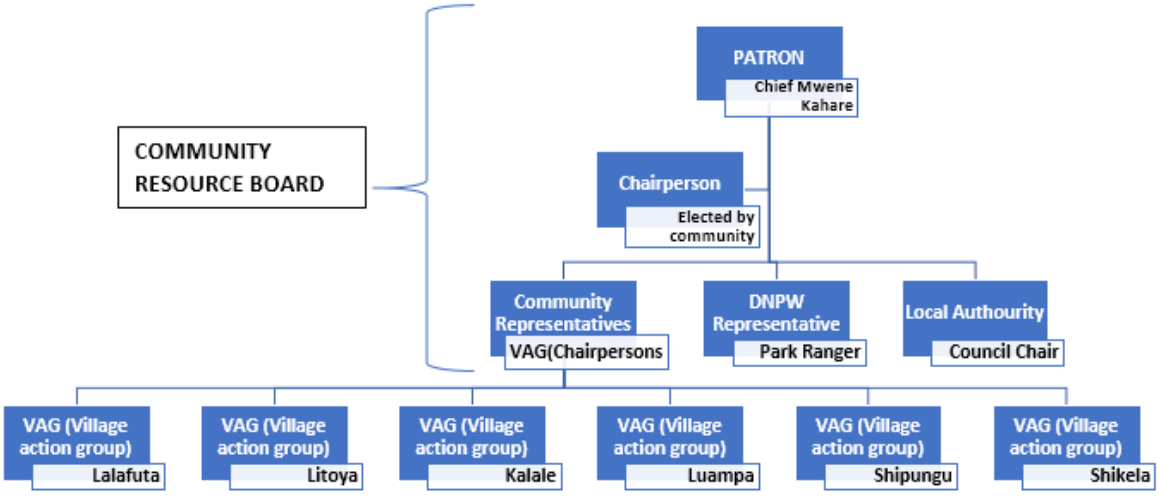


Figure 5.9: Community Resource Board for Mufunta Game Management Area

The illustration in Figure 5.9 includes only the VAGs that were covered by household surveys. They are 10 VAGs in total in the GMA. During the qualitative data collection, all VAGs were represented in FGD. The Figure shows a hierarchy to indicate levels of authority in CBNRM. The patron said during the interview "*I don't usually attend board meetings because my presence alone can make other members uncomfortable. They may not participate fully"* (Key informant interview (1) 2018, Personal communication, 9 June). The Chief sends a representative to attend the meeting on his behalf. This is due to power dynamics where actors exert varying powers in terms of influence and decision-making, indicating that even as they sit as a board, chances that the actors influence decision-making as equal partners are debatable.

5.2.2.4 An intersection between the State and traditional structures as the CBNRM operating space

CBNRM functions at the interface of the state and traditional structures. To understand CBNRM holistically an assessment of both the state and traditional structures is essential. The operations of both should be understood independently to unravel the dynamics involved in each. Furthermore, the roles that the two play and the links of interaction at micro level through the CRB should be unpacked. Often the respective roles of traditional and state institutions are unclear (Turner, 2004). "It is usually unclear on the ground which authority structures should be doing what" (Turner, 2004, p.16) as is the case with Mufunta GMA.

The traditional and state governance structures operating parallel to each other in the GMA often result in conflicts when decision-making is uncoordinated. The understanding of the interface between the two and implications for CBNRM is critical. Natural resources institutions suffer from legal pluralism where *de facto* practices are dealt with under customary law while government relies on civil law for its legal processes (Child & Barnes, 2010), which complicates CBNRM decision-making. Figure 5.10 illustrates the linkages within and between the two structures and actors who are critical connectors for the CBNRM to function effectively.

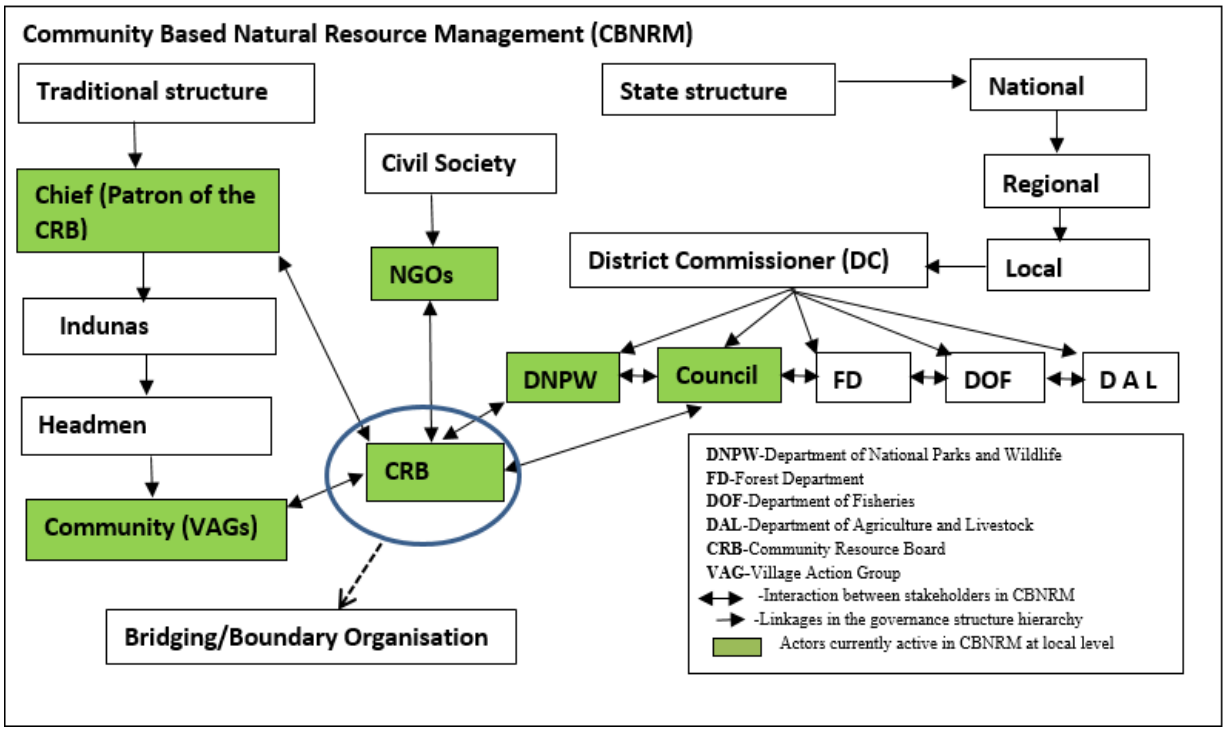


Figure 5.10: Linkages between the state and traditional governance structures co-management networks

All the actors and departments in Figure 5.10 are involved in natural resource governance in Mufunta GMA in one way or another. However, CBNRM interactions are only taking place between the actors highlighted in green. If the coordination of natural resource governance must improve, then all the actors in Figure 5.10 must be involved as illustrated. Especially the government departments at local government level. Although rules and incentives are important for successful CBNRM, an improvement in interactions and coordination is cardinal. The CRB can play the bridging and boundary organisation role in the network to link the traditional and state structures. For more details on bridging and boundary organisation see (Carlsson & Berkes, 2005; Berkes, 2009).

5.2.2.5 The role of NGOs, interest groups and private sector

These operate at meso, macro and micro level and can influence policy at international and national level as well as influence implementation at local level. Their role has mainly been advocacy for conservation, facilitation and initiation of the establishment of the Mufunta GMA. Initially WWF facilitated the mapping of Mufunta GMA and establishing the CRB. At the end of the project the micro governance structure was in place. Currently there is the Global Environmental Facility (GEF) 5 project running in the area until 2021. The main objective of the project is to enhance governance effectiveness of the GMA. However, according to the CRB, the objectives of GEF 5 project are improperly aligned with WWF objectives to ensure continuity.

The CRB cite the mapping exercise that the GEF 5 project is carrying out in an area which is not aligned with the map created by WWF. This has implications because the people are now confused on which boundaries to respect as the new maps are not in line with Mufunta GMP. Harmonising the two would have been more cost effective in terms of time and resources on the part of community members which could be allocated to other economic activities. Furthermore, the GEF 5 project is working with Community Liaisons Officer (CLO) and not directly with the CRB. In the old DNPW extension structure, CLOs were the contact persons for community mobilisation. Hence, some have retained their influence and contacts with NGOs. Therefore, the CRB is left out of the process. This affects continuity in terms of the role that CRBs plays in CBNRM. The implication is that NGOs initiate programmes and when they leave things fall apart afterwards. The CRB is a permanent governance structure which can ensure continuity of programmes.

On the other hand, the private sector *inter alia* JTI the tobacco in the study area is mostly in business and focuses on profits. These stakeholders influence the livelihood of the people and affect how households participate in governance. The influence that these stakeholders have on governance of natural resources in the study area should not be underestimated, because data on organisations that contribute to the wellbeing of the households indicate the influence that private sector, CRB and NGO, s have as illustrated in Figure 5.11. With NGO, s having considerable influence on household wellbeing.

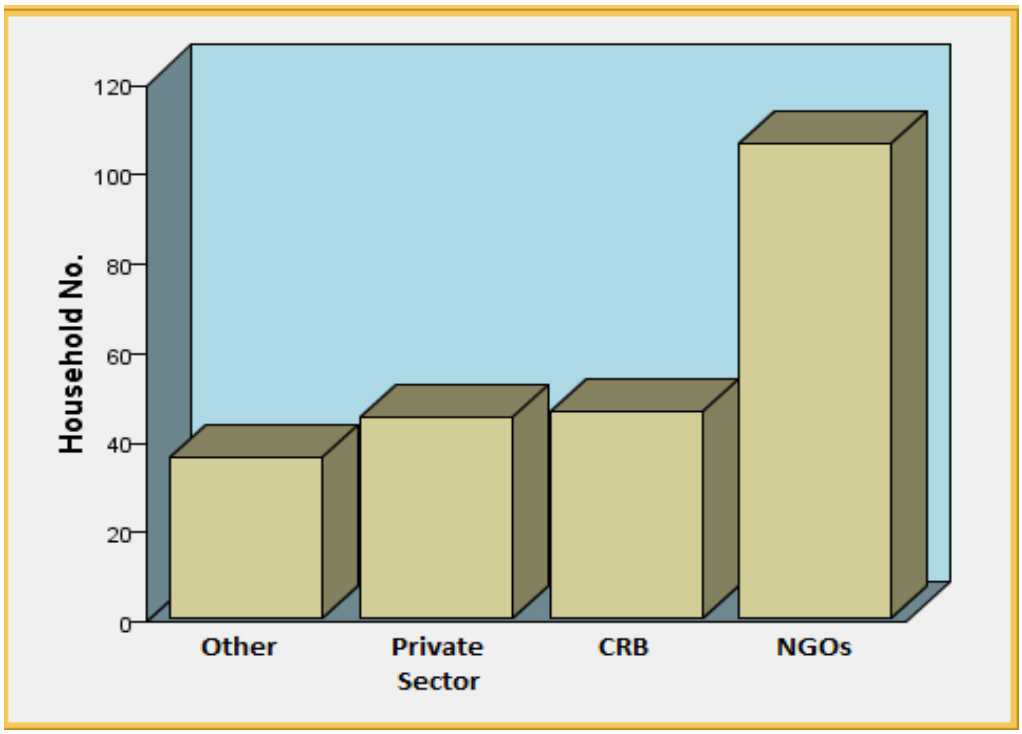
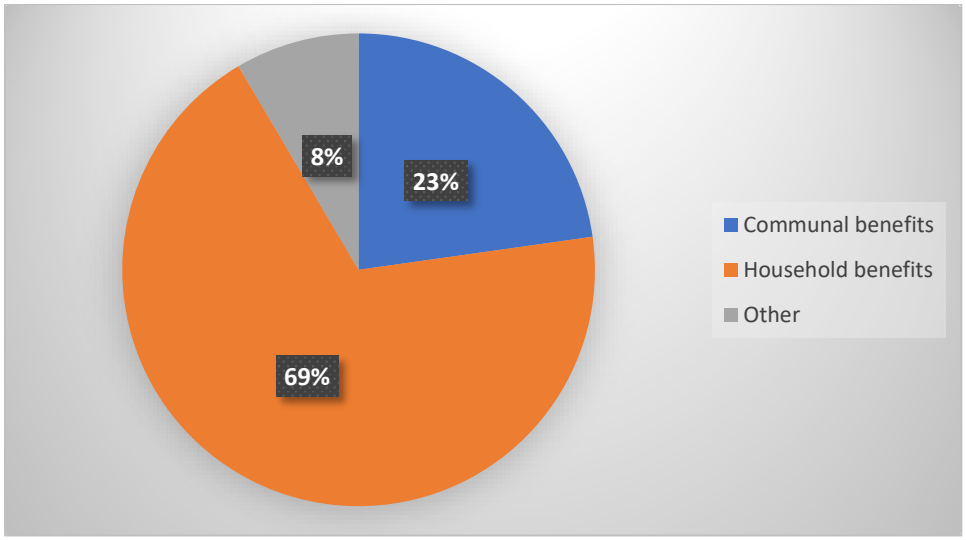


Figure 5.11: Contribution to household well-being by different stakeholders

Furthermore, motivation for participation in governance activities is linked to the benefits that accumulate directly to the household. Sixty-nine percent (69%) of respondents were motivated to participate because of household benefits such as food, income, education and employment, as these improve household wellbeing while 23% were motivated by communal benefits such as revenue, development and projects as these improve the livelihood of the community at large. Only 8% were motivated by other benefits such as tourism, knowledge and information that contribute to national development. Therefore, to increase participation CBNRM should be designed with focus on tangible benefits to local communities that improve household wellbeing.



Note: n = 401

Figure 5.12: Motivation for participation in governance activities

5.2.3 Challenges of effective co-ordination for natural resources governance in Mufunta GMA

5.2.3.1 Fragmentation due to administrative boundaries and politics

Mufunta GMA is located in two districts, namely Nkeyema and Luampa. Therefore, there are decisions that are made independently at district level which may conflict with the holistic management of Mufunta GMA. In an interview the DC for Nkeyema indicated that there is no coordination between the two districts. The DC for Nkeyema stated that *"in the two years of working in the district, no one has come from Luampa to sit together concerning the management of Mufunta GMA"* (District Commissioner 2018, Personal communication 10, June) Therefore, data for household surveys were collected from the two districts Luampa (n=203) and Nkeyema (n=201) to make a comparison of the two data sets based on administrative boundaries in relation to participation in CBNRM (Figure 5.13). Those who participated (n=238) and those who do not participate (n=162) the district makes a significant difference on the participation or non-participation in CBNRM programmes (χ^2 (4) = 138.8, P< 0.041). Households from Nkeyema district are more inclined to participate than those from Luampa district since Participation was Nkeyema (n=129) and Luampa (n=109).

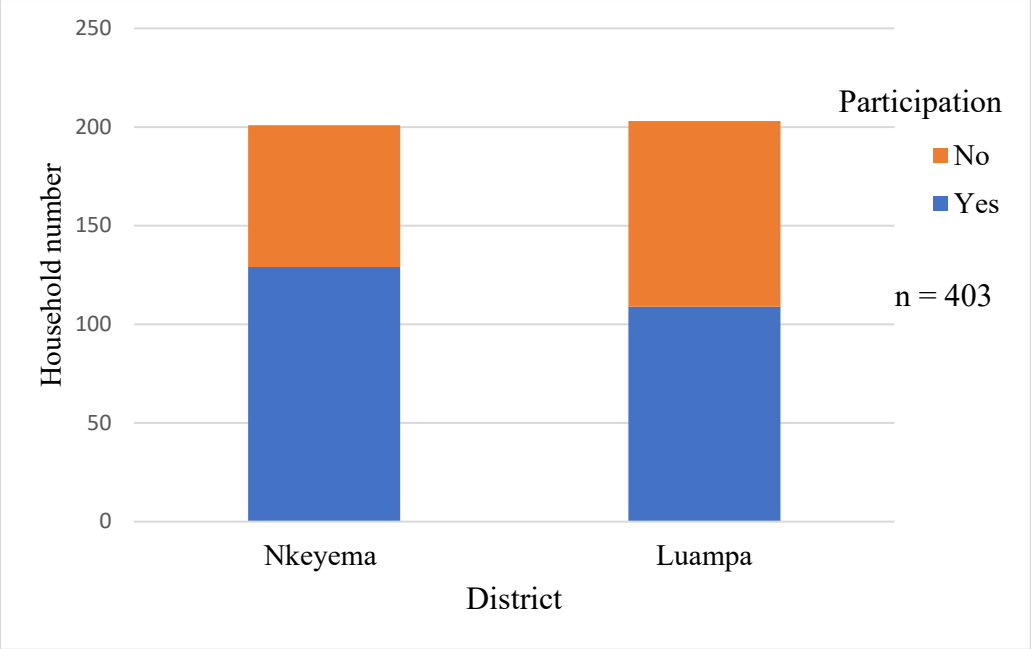


Figure 5.13: Participation levels by district

5.2.3.2 Fragmentation due to tradition power structures and power dynamics

The patron for Mufunta GMA CRB is Sub-Chief Mwene Kahare. However, within Mufunta GMA there are also Sub-Chief Mwenetete and Sub-Chief Siakalongo (Figure 5.14). These other two traditional leaders also claim powers to control the natural resources under their jurisdiction within the GMA, but they are not part of the CRB. Power is defined as the capacity to act and as entailing a relationship between actors (Vatn, 2017). The two Sub-Chiefs do not recognise Mwene Kahare as the overall Chief for Mufunta GMA, since they are autonomous and can independently control parts of the GMA. It became evident that the GMA is fragmented because of the traditional leadership powers when respondents gave varying answers with respect to the name of the Sub-Chief. In total, respondents from four VAGs – namely Lalafuta, Kalale, Litoya and Shipungu – indicated Mwene Kahare as Sub-Chief (Figure 5.14), while respondents from the other two VAGs – Luampa and Shikela – indicated Sub-Chief Mwenetete and Siakalongo respectively (Figure 5.14).

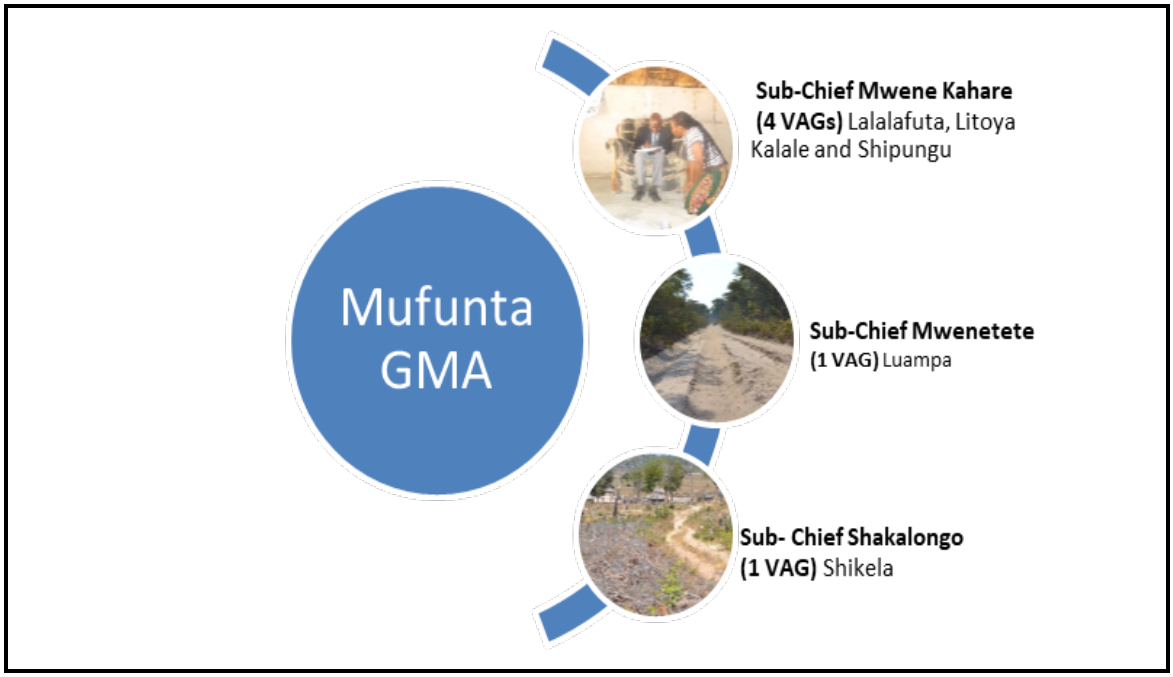


Figure 5.14: Illustrates fragmentation of the GMA due to traditional power structures

Responses from households regarding the Sub-Chief in the area were useful to test if people recognised the patron of the CRB as the only traditional authority in Mufunta GMA (Table 5.5). The results show that there are three recognised traditional leaders within the boundaries of the GMA.

Table 5.6: The proportions of recognition of traditional authority in the study area

Sub-Chief	Frequency (n)	Percentage (%)
Mwene Kahare	268	66.3
Mwenetete	67	16.6
Shakalongo	69	17.1
Total	**404**	**100.0**

To test if recognition of authority influences whether people participate in CRB activities according to the Sub-chief in the area, the participation levels for those who say their Sub-Chief is Kahare (patron) against those who say Mwenetete or Siakalongo is their Sub- Chief were compared (Figure 5.15). In Sub-Chief Kahare's area, more people participate in comparison with the other sub-chiefs. However, participation for the other two Sub-Chiefs is balanced (Figure 5.15).

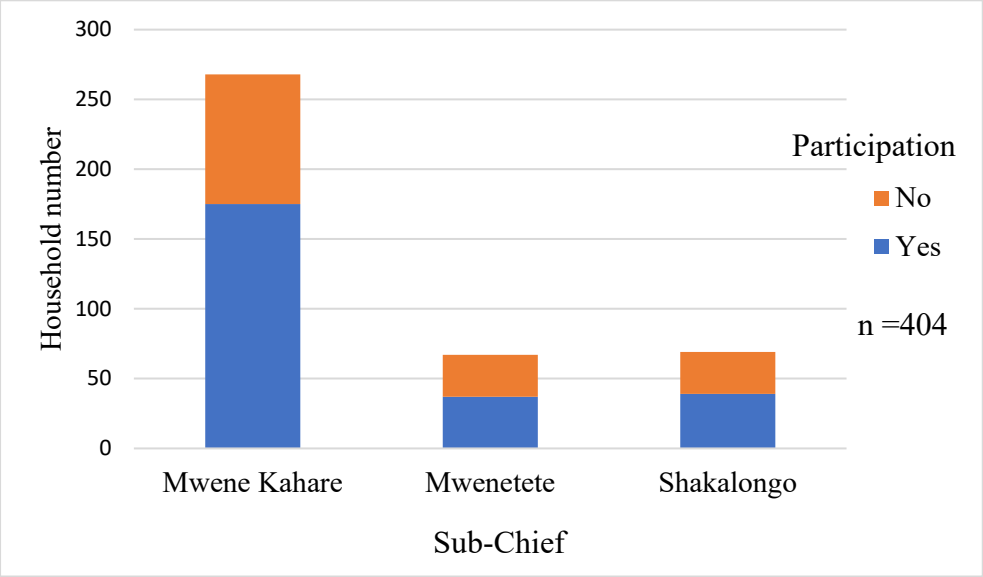


Figure 5.15: Participation levels by Sub-Chief

To test if there is a relationship between participation and traditional authority, the relationship between being a VAG member and the sub-chief was tested. A cross-tabulation indicated a clear relationship between the area Sub-Chief and someone being a member of VAG (χ^2 (6) = 407.6, P< 0.000). VAG members Kahare (n=47), Mwenetete (n=9) and Shakalongo (n=15).

5.2.3.3 Multi-stakeholder decision-making challenges

A total of 5 FGDs and 8 semi-structured interviews were conducted, and the numbers in Figure 5.16 below represent from how many interviews an issue was identified as a challenge. Community voice is ranked highest as a challenge for multi-stakeholder decision-making (Figure 5.16).

Community voice is not heard in decision making	8
They are a lot of stakeholders involved therefore decision making is difficult	5
Low participation by the community in decision making meetings about natural resource management and use	5
Takes too long to make decisions	4
Community participation in decision making is mainly through elections when electing leaders	4
Multiple decision making contributing to encroachment	4
Decision making is subjective because it depends on the type of decision	3
There is no blueprint for decision making	1

Figure 5.16: Multi-stakeholder decision-making challenges

In addition, according to household survey data, over (300) 75% out of the 401 respondents said they did not participate in decision-making. The highest mode of participation was through meetings, which is also relatively very low at 33% (Figure 5.17).

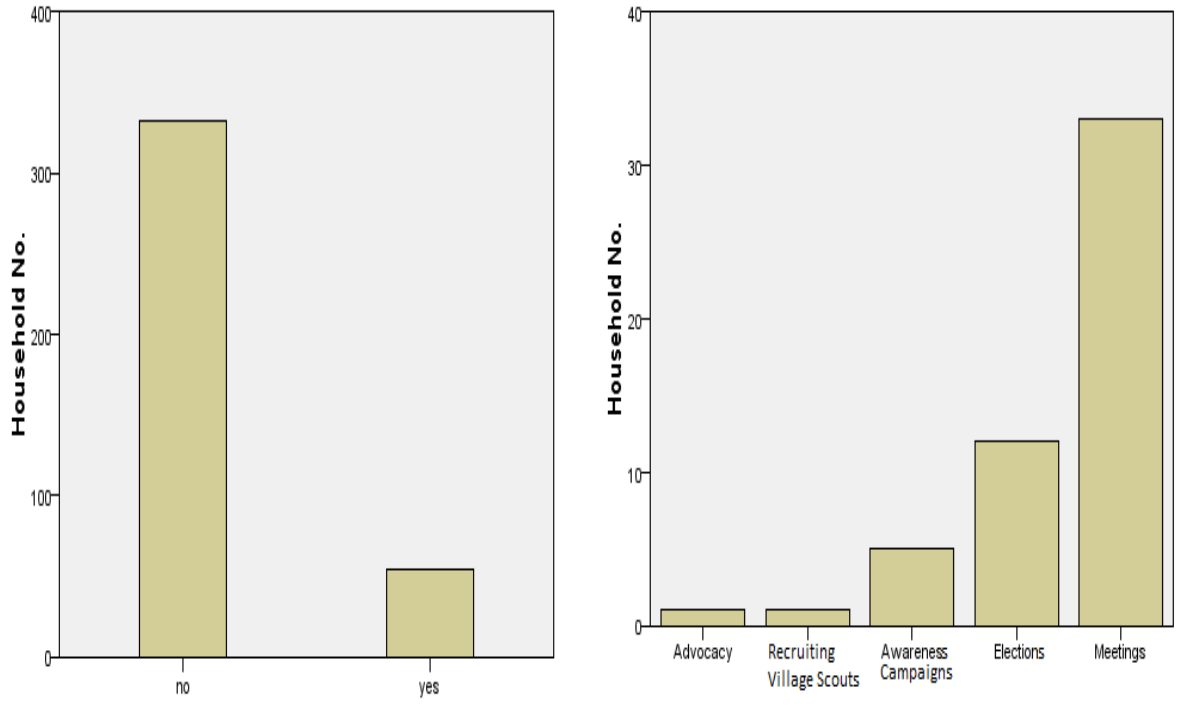


Figure 5.17: Levels of participation in decision-making and mode of participation

5.2.3.4 Other CBNRM governance challenges in Mufunta GMA identified by stakeholders

A total of 5 FGDs and 8 semi-structured interviews were conducted, the numbers in Figure 5.18 indicate from how many interviews an issue was identified as a challenge. Corruption and low levels of awareness about CBNRM are ranked highest as governance challenges (Figure 5.18).

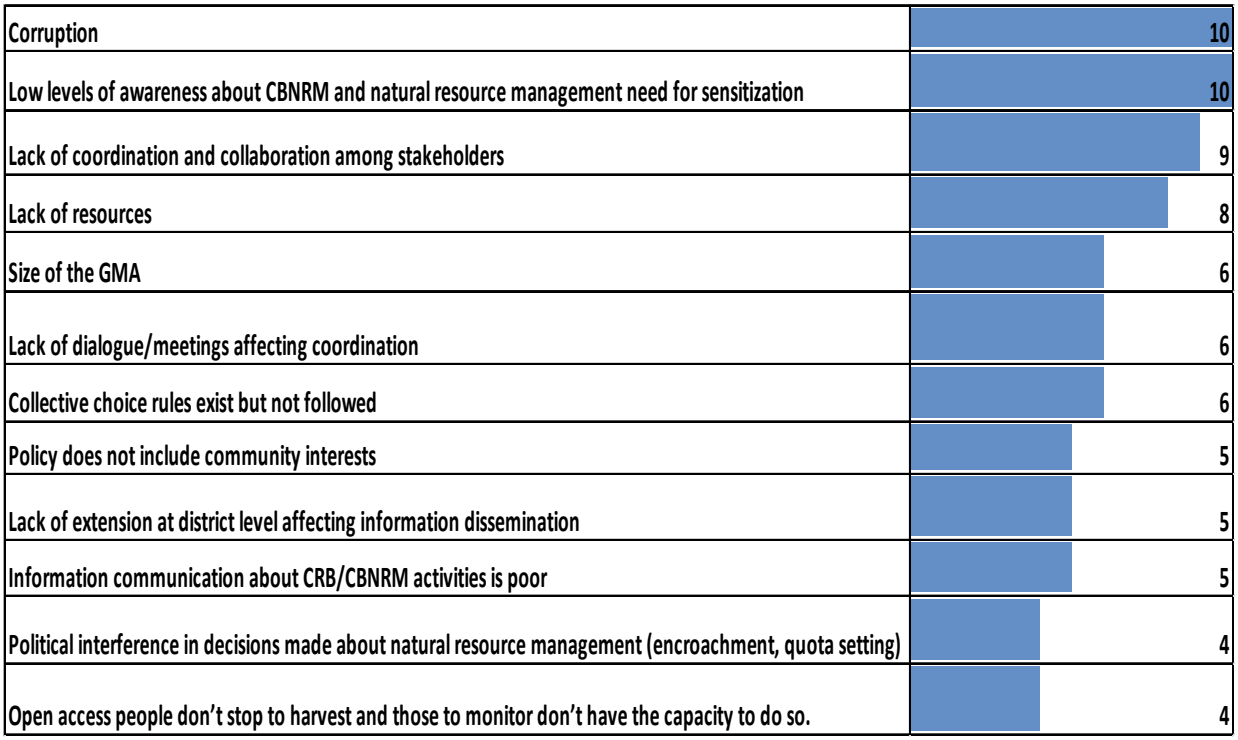


Figure 5.18: Other CBNRM governance challenges in Mufunta GMA identified by stakeholders

Household survey data indicate that 44% from the sampled population are aware that they live in the GMA. However, the number of people who are aware about the CRB is lower at 31% and 17% for households that are VAG members. Therefore, the relationships between awareness and participation in CRB decision-making and between awareness and being a VAG member were tested. There was a significantly strong association between awareness or having information and being able to participant or not in decision making (χ^2 (4) = 15.1, P< 0.004). Similarly, the association between awareness or having information and being a member of the VAG was significantly strong (χ^2 (2) = 16.6, P< 0.001).

The main reasons for not participating in VAG activities include: no benefits (33%), no information, lack of interest and other reasons at 17%, and exclusion at 16% (figure 5.19). The

highest percentage was lack of benefits at 33%, which is an indicator that participation is dependent on benefits that accrue directly to the households. Those who did not participate due to lack of benefits thought they had better things to do with their time than invest in VAG activities.

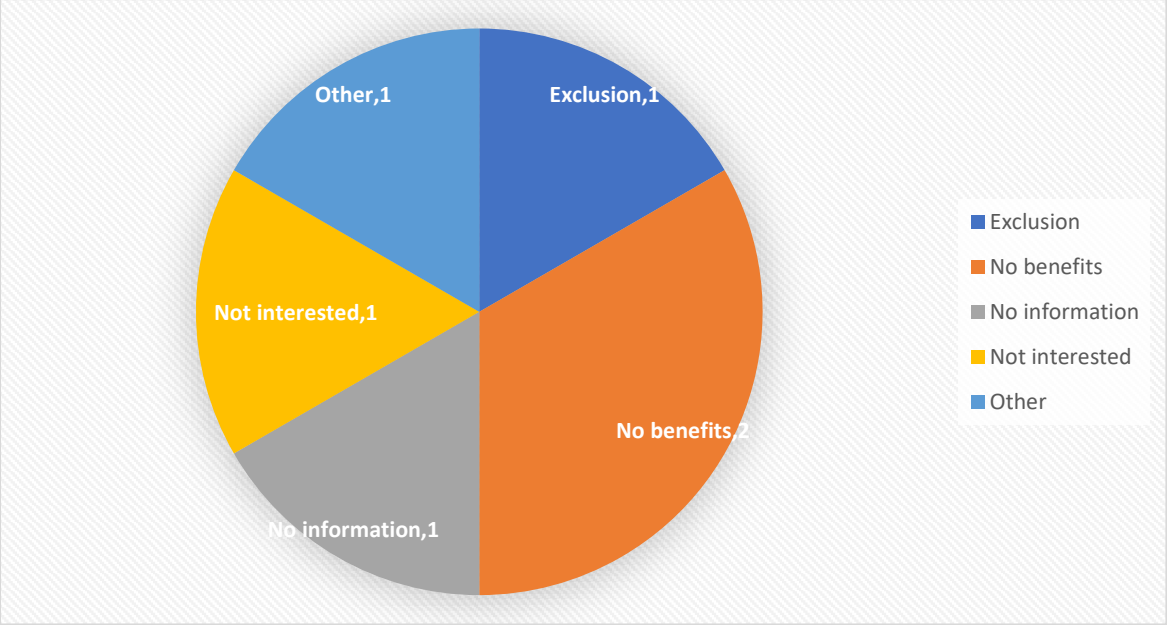


Figure 5.19: Reasons for not participating in governance

Those who alluded to lack of information for not participating included those that felt information about meetings was not properly disseminated and those that were not aware that the group even existed in the area. Those not interested cited corruption, lack of transparency and accountability in the way the affairs of the CRB were being handled. Information dissemination is key to improving transparency and accountability, which may help to prevent corruption.

Those who felt excluded included the young and the old, the poor and the uneducated, as well as those who felt excluded due to nepotism and tribalism. They felt their voice was not heard so they did not see any point in participating in meetings (Figure 5.19). "*They don't listen to my ideas, because I am poor, and they just want to be with those who are doing well. So, even in meetings even if I speak, they can't listen"* (Research participant 2018, personal communication, 12 July). There is a significantly strong positive relationship between education and participation in decision making ($F_{(1,383)} = 10.080$, $P < 0.01$).

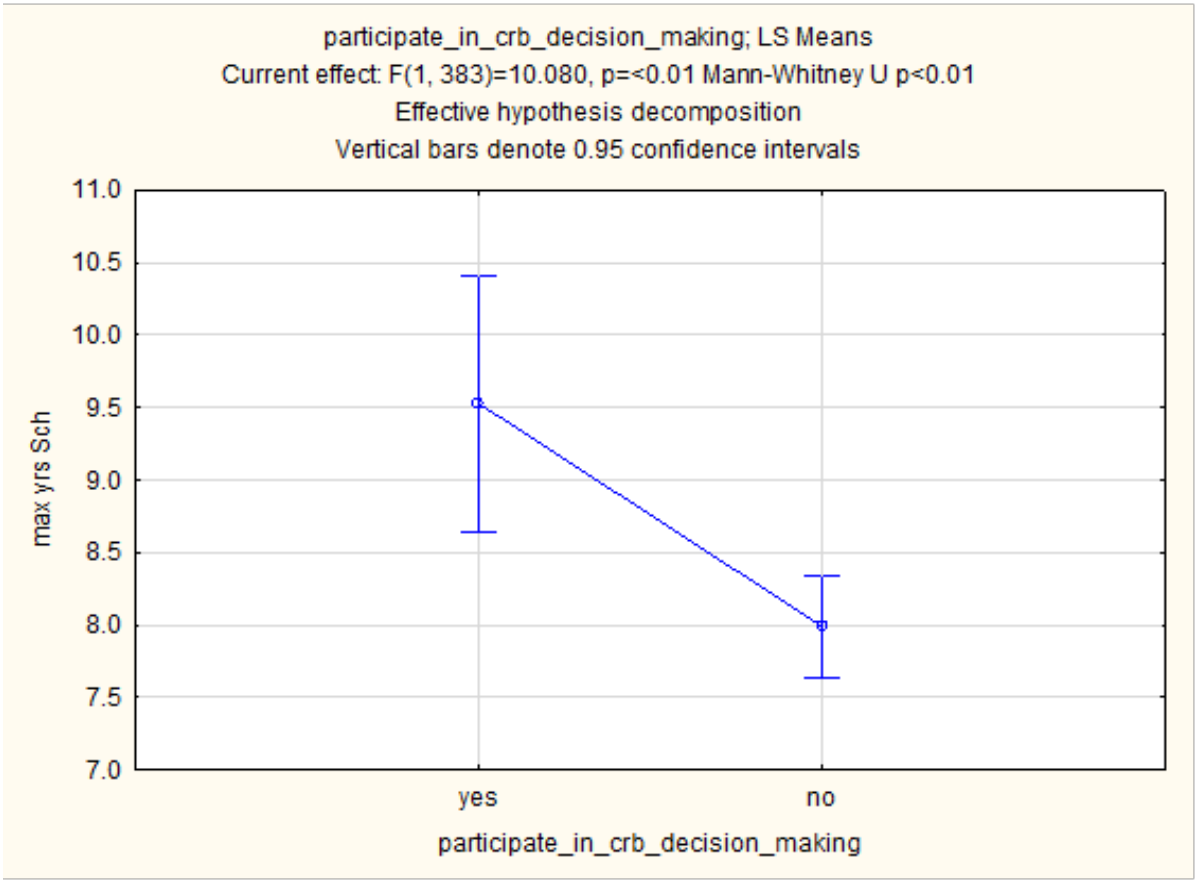


Figure 5.20: Relationship between education levels and participation

5.3 Discussion: steps towards developing an enabling environment for CBNRM

5.3.1 "A whole is greater than sum of the parts": the role of collaborative adaptive governance in achieving coordination

The CBNRM as a governance model should not be developed in isolation from already existing structures. According to Scoones (2015), rural development and natural resource management efforts are well known for developing organisations without an effective understanding of existing institutions. But the coordination effectiveness in CBNRM is dependent on crafting them to fit within the context of existing structures. Turner (2004) promotes the integration of specific CBNRM initiatives within the broader local governance framework.

This study presents key elements for improving the coordination effectiveness through the understanding of the context of application. The conceptualisation of the governance model from the start by the stakeholders and the understanding of existing structures are key to enable the micro governance of the CRB to function, linking the traditional and state structures which is the CBNRM operating space and overcoming fragmentation within the CBNRM governance structure are key for more effective outcomes. "Emerging CBNRM initiatives support the principles of participatory democracy and of building networks and linkages among different constituency groups, interdisciplinary groups, levels of governments and economic sectors" (Gruber, 2010, p.52).

The assessment of CBNRM through the transdisciplinary approach offers an opportunity to understand the local community's perspective on the governance approach. Participatory evaluation of CBNRM by the communities have been clearly absent, such that their voices have not been articulated and heard (Blaikie, 2006). Through knowledge co-production, the community conceptualises the ideal co-ordination model for the study area. They identify the main actors that are key for the co-management arrangement to function and their roles and responsibilities in the governance structures. Most importantly, what links them together for the common purpose of CBNRM.

Researchers generally accept that co-management entails consensus building among stakeholders as partners to develop relationships and knowledge which will enable them to generate sustainable solutions to new challenges (Muller, 2010). Furthermore, if the

conceptualisation of the model is community driven, it improves participation and chances of success. Ogbaharya (2006) in his paper on capability theory identified community-driven resource management as essential for sustainable wildlife management.

The involvement of many governmental and non-governmental actors operating at different spatial and jurisdictional scales makes coordination in natural resource governance problematic (Angst *et a.l,* 2018). Using the principle that a whole is greater than the sum of its parts, the governance structure was split into understandable parts of multiscale and cross-scaler governance linkages that fit together to make a functional whole. Child and Barnes (2010) contend that the initiation and endurance of local institutional complexity depends on critical cross-scale linkages which are only beginning to be understood. These are a network of actors which is important to understand. Hence, "the network context appears to be crucial for the implementation of innovations in co-management" (Muller, 2010, p.144).

The GMA is fragmented at three levels because of the institutional framework, administrative boundaries and traditional power struggles. Fragmentation across scales in natural resource governance can impede coordinated action and decrease innovation capacity (Angst *et al.,* 2018, Muller, 2007). Firstly, the three layers of governance in CBNRM in Zambia are supposed to be linked through the DNPW. However, the DNPW structure for CBNRM currently has the Principal and Senior Natural Resource Management Officers at national level, and extension officers at regional. But they have no extension officers at district level and consequently the link between the layers of governance is broken, leaving the grass-roots level with no extension services to engage the community. The information flow is thus reduced, which has greatly affected participation in CBNRM programmes. Such an absence of essential staff at local level has implications for governance as it determines the type and level of participation in governance. Child & Barnes (2010) report that were meso level is missing or weak CBNRM might collapse.

Furthermore, the department has not been able to provide the necessary institutional framework for CBNRM to thrive. CBNRM requires the harmonisation of power and accountability across micro, meso, and macro levels (Child & Barnes, 2010). The DNPW, through the extension department at district level, can play the bridging role to connect actors at the micro level in the governance structure, such as the CRB to the national government at macro level. According to Angst *et al. (*2018), in instances where the institutional setting presents barriers

for hierarchical coordination, overcoming fragmentation through collaboration remains a task that is mediated by state-level actors. Therefore, there is a need for structural adjustments to the department to enable them to play the critical role of cross- scalar governance coordination. Accountable, transparent and equitable micro governance can only be achieved if linked to meso-level support and monitoring as well as cross-scale linkages between central government and communities (Child & Barnes, 2010).

Secondly, following the structure laid down for the state at district level, there are DCs who are politically appointed district heads to which all government department heads report. Since the heads of departments report to the DC, the DC could thus act as a central coordinator for government departments at local level for CBNRM. However, Mufunta GMA is located across two districts, Nkeyema and Luampa, leading to fragmentation due to administrative boundaries. Consequently, the governance of the PA becomes a complex issue that spills across jurisdictional boundaries (Cook, 2014). However, since there is one CRB for the entire GMA, it can act as the bridging organisation for the two districts through the DCs to ensure that administrative decisions are coordinated.

Thirdly, traditional leaders play a key role in CBNRM in Mufunta GMA as Sub-Chief Mwene Kahare is the patron of the CRB. However, the traditional leadership conflicts and power struggles on the ground have fragmented the GMA's governance. This has a lot of implications for natural resource governance. Conflicts on who is the overall Sub-Chief and who is supposed to be subordinate or superior have diffused down to the community members, who take instructions from whoever they recognise as their leader. This has influenced community participation patterns in CBNRM programmes. Institutional fragmentation can result in governance outcomes that are conflictual or reactive (Cook, 2014). The creation of CRB should have taken cognisance of these power dynamics. The internal struggles within the traditional governance structure make it complex and difficult to co-ordinate CBNRM activities in Mufunta GMA.

The existing local governance structures were probably not taken into account prior to positioning Sub-Chief Mwene Kahare as patron for Mufunta CRB for the entire GMA. The traditional structures and underlying historical cultural background of the PA were overlooked. Local communities still have governance institutions that have been marginalised but still functional and influential Mukwada & Manatsa (2012). These complexities make the

governance of the PA a daunting task. To overcome this challenge, the patron can engage the other leaders so they can also participate in the governance of the GMA. The Sub-Chief can play the role of a central coordinator for the traditional governance structure to connect other leaders to the CRB.

Furthermore, there have been administrative challenges because the Chief who is the patron has mostly been running the affairs of the CRB without involving the indunas and headmen. These are critical role players in the traditional governance structure, since they make key governance decisions on natural resources management, such as land allocation. Side-lining them introduces a serious flaw in CBNRM decision-making and community engagement. Involving headmen in the CRB activities through the VAG can strengthen their presence among the local people. The VAG structures are good on paper but practically challenging for the CRB to reach members due to lack of resources over expansive areas. If the already existing structures could be used to facilitate VAG activities through headmen, they would be more cost effective.

Finally, CBNRM in Zambia is characterised by an interaction between two independent parallel structures of governance. The intersection between the state and the traditional governance structure is the operating space for CBNRM. The authority and power that these structures have can sometimes be equal and pull in opposite directions. The Chief is the custodian of the customary land where the PA is located. However, jurisdiction powers over PAs are vested in DNPW by law. It is, therefore, critical that the interactions between the two in relation to CBNRM decision-making is clarified and resolved. The international development institutions, such as the World Bank, have come to the realisation that good governance in sub-Saharan African cannot be accomplished without first bridging the structural disconnect between formal institutions, such as the state and traditional institutions (Ogbaharya, 2006).

The fragmentation in the governance structure affects participation in CBNRM programmes. Due to the cross-scalar fragmentation in the DNPW, the inadequate interaction between the community and the extension department negatively affects the awareness of people about PA governance. The lack of information and low education levels were the main factors affecting participation levels in CRB activities. In addition to the provisions of the current legislation, the future of CBNRM in GMAs is dependent largely on how different actors collaborate and

share information (Milupi *et al*., 2020). According to (Kazungu, Zhunusova & Kabwe, 2021) in order to increase participation in forest programmes the focus should be on households with low levels of education. Furthermore, age, gender and social class are also on record as factors that affect participation. According to Cleaver (1999), age, gender, class and individual agency shape people's perception and the desirability to participate in development projects. Communities participation in CBNRM is low because they are excluded from the decision-making processes hence, they feel disenfranchised (Milupi *et al.*, 2020). Cook (2014) concluded that governance patterns to address issues fraught with jurisdictional fragmentation are variable over time depending on the presence of four elements: an institution that facilitates coordination, clear roles and responsibilities, agreement on the issue and its proposed resolution, and the scope of the issue.

With this background, it is evident that coordination can play a key role in overcoming the challenges of jurisdictional fragmentation that CBNRM has been experiencing in Mufunta GMA. Furthermore, the results of the assessment resonate with Cook (2014), as demonstrated in this study area that there is fragmentation which can be overcome by having an actor to facilitate and co-ordinate CBNRM activities, understanding the roles and responsibilities of actors and the context of application.

5.3.2 Lessons from Mufunta that are key to improving coordination

A coordination evaluation Table 5.7 reveals that the coordination arrangement for Mufunta CBNRM is not effective. Thus, the identified gaps need to be addressed to improve the coordination arrangements between the stakeholders in the study area. Furthermore, this could be applied to other GMAs in Zambia, since the policy and contextual arrangements are similar.

Table 5.7: Coordination evaluation lessons from Mufunta that are key to improving coordination. Source: adopted from Margerum & Born (2000).

	Rule	Question	Mufunta Case	Rating
Problem domain	Scope	Have the participants clearly identified the substantive breadth of their coordination activities?	**Yes:** the scope is defined in legislation and GMP, but the community are not privy to this information.	**X**

Rules governing structure	Positions	Do participants have a clear understanding of who is involved in the coordination process of CBNRM?	**Yes:** during interviews and focused group meetings, the participants all agreed and identified the same stakeholders	√
	Boundary	Do stakeholders have a clear understanding of how individuals and entities become participants?	**No:** there seem to be no clarity on how individuals and entities become participants.	**X**
Rules governing process	Authority	Do participants have a clear understanding of the authorised co-ordination activities and authority base? These include:	**Varies** among stakeholders	X
		an understanding of the co-ordination activities that have been authorised;	**Variable:** generally, the authority to share information and activities is with the CRB which is inadequately equipped for the task.	**X**
		an understanding of the limits on autonomous action (binding permissive);	**Variable:** generally permissive, but some are more binding	X
		an understanding of the binding enforceability of any binding authority (law, informal pressure agreement).	Binding authority is based on legislation and traditional authority but enforcement is weak and very subjective. (formal and informal rules)	X
	Information	Do participants have a clear and common understanding of what and how information exchanged (including such factors as type, format, participants, timing)?	**No:** stakeholders rarely meet and there is no regular exchange information, and no clear procedures for information sharing.	**X**

	Decision	Do participants have a clear and common understanding of how they make collective decisions and resolve conflicts at various points in the management arrangement?	**Variable:** stakeholders have no clear rules for collective decision-making or have not defined their processes clearly.	**X**

(√) Criteria that have been met: (X) Criteria that have not been met; variable needs improvement

From the evaluation most of the criteria indicators for improving coordination have not been met and a lot of improvements must be made to achieve coordinated action for CBNRM in the study area.

5.3.3 Proposing the equilibrium model for protected area governance in Mufunta Game Management Area (Bottom-Up – Top-Down)

After assessing the governance challenges faced in Mufunta GMA the research developed a Bottom-Up-Top-Down equilibrium model for improving coordination and collaboration of stakeholders for CBNRM in Mufunta GMA, which can also be applicable to CBNRM in Zambia. This model enables the synergies of macro, meso and micro governance by harmonising the bottom-up and top-down approaches. It presents an opportunity to find a balance between state and non-state governance structures for co-management of PA. Because some types of decisions are best made at particular scales, the research stresses the value of networks that enable collaboration among governance actors operating at different spatial and temporal scales (Borrini-Feyerabend & Hill, 2015). This phenomenon is referred to as scale-dependent comparative advantage (Borrini-Feyerabend & Hill, 2015). Chapter 8 gives more details about the model.

5.4 Conclusion

The study suggests that most of the problems that CBNRM is experiencing are due to poor understanding and coordination by stakeholders, which affects implementation. According to Carlsson and Berkes (2005, p.72) "although ecosystem and institutional systems show wide diversity, the tools for conceptualisation and analysis of co-management are strikingly blunt and more research needs to be done to refine these tools". In this study using a TD approach the role of resource users is highlighted as a key to conceptualisation of a co-management arrangement, such as CBNRM. "Legitimacy and compliance, justice, equity and empowerment are also relevant, because the basic idea behind co-management is that people whose livelihoods are affected by management decisions should have a say on how decisions are made; hence co-management is not merely about resources but it's about managing relationships" (Berkes, 2009, p.1692). CBNRM, as the name suggests, has mostly been focused on resource management than managing stakeholder relationships. Therefore, this study contributes to literature on a practical approach to the conceptualisation of co-management and the understanding of co-production of knowledge and relevance of stakeholder interactions. Additionally, a conceptual framework within which CBNRM can be better understood and implemented was developed. Using a transdisciplinary approach, the study developed a community-driven model for improving co-ordination in Community Based Natural Resources Management using a 4-step approach: (1) conceptualisation by the local community; (2) understanding existing local structures; (3) linking traditional and state structures; and (4) overcoming fragmentation within the CBNRM working space.

Furthermore, the research developed an analysis tool using a three-step approach of evaluating the coordination arrangement which involved understanding of the context through knowledge co-production, evaluating the coordination arrangement and proposing changes which resulted in a theory of Bottom-Up-Top-Down arrangement of co-management. According to the "whole is greater than parts of the sum principle", the governance structure is broken apart in order to understand how these parts fit as a functional whole in a fragmented governance landscape. Through the evaluation of the coordination patterns, the governance structure was evaluated by looking at coordination linkages that connect the structures through exchange interactions between separate domains and overlapping sectors. This is where CBNRM currently operates in Mufunta GMA, where representatives of the state and groups of resource users have formed a joint management body through the CRBs for making joint decisions. This is the formalised

arena for PA governance in Zambia. Using the research findings from the assessment of the governance structure, the study proposes a combination of community and state-nested approach to governance of PAs using the "Bottom-Up-Top-Down" approach in order to enhance CBNRM performance. According to Muller (2007), institutions should be designed and adapted to fit the resource regime in question through co-management. Adapting a governance model ensures that the context for which it designed is considered.

5.5 Chapter summary

The study has demonstrated that stakeholder participation in research for the assessment of the co-management governance approach is key to gaining an understanding of the study context. "Management processes can be improved by making them adaptable and flexible through the use of multiple perspectives and a broad range of ecological knowledge and understanding including those of the resource user community" (Carlsson & Berkes, 2005, p.62). Through the understanding of the study context the actor's responsibilities and roles can be assigned and interactions better understood. Furthermore, the governance structures that are linked to the micro governance structure should be explored to improve the coordination for CBNRM.

The study has illustrated that the coordination arrangements in the study area are weak due to lack of understanding of the concept and a fragmented governance landscape. Coordination can be improved by understanding the context of application of the governance models, evaluating the links between actors and structures to improve understanding of the coordination arrangement, and applying the outcomes of the evaluation process in the local setting. The study acknowledges that there are no simple answers to achieving collaborative governance to natural resources governance. However, we are inductively compelled due to the results of the study to propose an equilibrium model for CBNRM for Mufunta GMA. Using the adaptive Bottom-Up Top-down model approach may help in getting the balance right in ensuring coordination between government and non-government actors.

The next chapter evaluates the links between the assessed governance structures and the livelihood strategies of the local people in the study area. Is CBNRM a factor in determining household's access to natural resources, influencing the choice of livelihood strategies for households and making natural resources available through cost and benefit sharing? The facilitation role that governance plays in achieving sustainable livelihoods will be illustrated.

CHAPTER SIX: LINKING NATURAL RESOURCE GOVERNANCE TO RURAL LIVELIHOODS: THE GATEKEEPER ROLE

6.1 Introduction

Rural livelihoods are made up of different assets, such as natural, social, physical, human and financial that make up a living. Therefore, this chapter will establish the link between governance and rural livelihood by focusing on the gatekeeper role of governance in making these assets accessible. The importance of natural resources to livelihoods explain the dependency of households on these resources. Research recognises that the poor are particularly dependent on natural capital and this has given rise to increased empirical attempts to capture its importance (Sjaastad, Vedeld & Bojo, 2005; Mamo *et al.,* 2007).This study demonstrates the role that natural resources play in local livelihoods by analysing access, dependency, diversification and distribution.

Firstly, household livelihood profiles are assessed focusing on differentiated access to livelihood capitals. The influence of social-economic factors such as gender, wealth, education and social status on making assets accessible for households is evaluated. Furthermore, diversification in terms livelihood strategies in the study area is measured by analysing the range of livelihood options per household. Months of food shortages and trends in the collection of wild resources are correlated to demonstrate natural capital dependency. Factors that impede household food security illustrate the role of policy and institutions in improving livelihood (Kamanga *et al.,* 2009).

Secondly the poverty levels in the study area are measured using income distribution among households. If poverty is to be diagnosed correctly, its causes understood and solutions arrived at through policy to alleviate it, we need to analyse environmental income (Sjaastad *et al.*, 2005). To emphasise the contribution of natural resources, the contribution of environmental income to total household income is calculated. The Gini coefficient is used to measure the equalising effect of environmental income. Furthermore, the Simpson's Diversity Index is used to demonstrate income source diversification among households in the study area.

Finally, institutional factors such as licences, access rights, land reforms and power relations are analysed for their role in enabling access to natural resources. These parameters are used

to demonstrate the link between NRG and livelihoods. When institutions impede access, they affect the distribution of benefits and costs for households living in PA areas. It is resources that are key to rural livelihoods that are of concern to this study, and therefore the livelihood profiles are analysed to understand the level of dependency on natural resources available to households.

Furthermore, the social-economic and contextual factors that influence rural livelihoods are examined as they affect variations in income and livelihood strategies. Governance structures through institutions, rules in use, resource rights and decision-making act as a gatekeeper for households to access the resources needed for livelihood sustainability. In this chapter, therefore, a livelihood analysis is done with a focus on the role of governance structures in achieving a sustainable outcome.

6.2 Background

The chapter presents the findings on the link between governance structures and livelihood strategies. According to Scoones (2015, p.46), a central but often missed feature of livelihood analysis is the role of institutions, organisations and policies in mediating access to livelihood resources and defining the opportunities and constraints of various livelihood strategies. Access is defined as the ability to derive benefits from resources, broadening from property's classical definition as the right to benefit from them (Ribot & Peluso, 2009). In using this approach, access is analysed as a "bundle of powers", of which rights are just one.

According to Ribot and Peluso (2009), the study of access is concerned with understanding the number of ways people derive benefits from resources, including but not limited to property relations. The chapter demonstrates the importance of natural resources to households in the study area, the factors impeding access to these resources, the role of decision-making and the implications for livelihood sustainability. Focusing on natural resources as the "things" in question, the range of powers contained in and exercised through various mechanisms, processes and social relations that affect people's ability to benefit is explored (Ribot & Peluso, 2009).

There is a shared understanding among researchers, policy makers and development practitioners that many rural households in developing countries are dependent on

environmental resources (Mamo *et al.*, 2007). "A central concern of any livelihood analysis is to understand who is poor and who is better off and why?" (Scoones, 2015, p. 15). The environmental income concept can enhance poverty diagnosis by focusing attention on neglected sources of livelihood (Sjaastad *et al.*, 2005). The study assesses livelihood outcomes by focusing on material factors emphasising income from natural resources and asset holdings.

Analysing the influence that variations among household income sources have on dependence, diversification and distribution is key to understanding livelihood outcomes (Vedeld *et al.*, 2007). "Knowledge about the significance of environmental income is important to the environmental conservation debate and the trade-offs and synergies that exist between use and protection" (Vedeld *et al.*, 2007, p.870). Environmental income can be defined as earnings from wild or uncultivated natural resources (Sjaastad *et al.*, 2005). The study focused on forest-related environmental income, since the study area is a forested PA. Strictly speaking, the study is primarily concerned with income which is derived from wild resources (Kamanga *et al.*, 2009).

Furthermore, the analysis is extended to the multi-dimensional approach of measuring livelihood outcomes. Governance has to do with participation to access the decision-making arena. As demonstrated in Chapter 5, participation has been linked to benefits that the household derives and from the results both participation and benefits are very low. According to Zyambo (2018), CBNRM in Southern Africa is premised on benefits accruing from management and utilisation of natural resources being able to sustain livelihoods; then the community will have the incentive to conserve the resources. The benefits should include all social economic factors that create an enabling environment and motivate communities to participate (Zyambo, 2018). To address this question, the study engages with the social perspective that emphasises empowerment, voice and participation as these affect benefit flow (Scoones, 2015). Decision-making at household level involves time allocation and resources available to the household.

To evaluate the link between governance and livelihoods, the analysis focuses on access rights, decision making, and cost and benefit sharing. Firstly, factors that influence household's access to natural resources are determined. Secondly, the study evaluates how institutions influence livelihood strategy choices for households. Finally, the question of how cost and benefit sharing affect available resources for the household is explored. The access theory is used to understand

the ability of households to gain access to natural resources, focusing on the factors that affect the ability of households to derive benefits from natural resources. Both household characteristics and contextual factors influence the utilisation of available forest resources (Mamo *et al.*, 2007).

6.3 Results and analysis

6.3.1 The Livelihood Profile of Households in the study area and deferential access factors

(a) Livelihood profiles and deferential access to capitals for a household in the study area

From the household profiles (Table 6.1), all households have access to natural capital, which is mainly land, with every household having at least one piece of land of 32 acres on average. Despite access to natural capital being at 100%, access to environmental income is 60% for the study area. Constraints such as licences reduce access to stocks, such as timber, thus limiting the natural capital for households. Financial capital is very low, since the access to savings and loans is at 25.4% and 22.8%, respectively. Human capital in terms of the average household age is at 25 years, indicating a young population. Access to education is at 99% however, education levels are low with households having only some primary education on average. Only 30.1% of respondents had knowledge about the CRB signifying the need for sensitisation and information. Low levels of awareness about CBNRM and the need for sensitisation were cited among the governance challenges in the study area (Figure 5.12). Social capital is low with the 58.8% percentage access to participation in community programmes, and lowest participation in VAG activities at 17.5 %. Low social capital is a challenge to the effective functioning of CBNRM, as it denies households access to the decision-making arena. Seventy-five percent of households said they did not participate in decision-making for CBNRM programmes (Figure 5.11).

Table 6.1: Livelihood profiles and deferential access to capital for households in the study area

Capitals	*Variables*	*Mean*	*SD*	*Coefficient of Variance*	*% access*	*Number of Observations*
Physical	Assets	2.6	1.5	2.53	83.7	336
	Asset value (K)	8316	71594.6	5125798778	83.7	335
Natural	Plots of land (No.)	1.4	0.6	0.3	100	404
	Land size (a)	32.9	38.37	1472.3	100	403
Human	Age of HH head	50.4	16	276.3	-	403
	Average age per HH	25.4	10.9	120.7	-	404
	Number of HH members	6.8	3.4	11.8	-	404
	Education (Max # yrs.)	8.1	3.3	11.1	99	403
	Knowledge about CRB	-	-	-	(√√)30.1	404
Social	Number of years in PA	23.7	18.4	341.1	-	404
	Participation in community programs	-	-	-	(√)58.8	405
	VAG Membership	-	-	-	(√√√√)17.5	405
Financial	Savings	9610.9	61828.8	3822805585.0	(√√√)25.4	403
	Loans	-	-	-	(√√√√)22.8	404

(√) indicate the most significant results in relation to deferential access to capitals the more the ticks the lower the access

The capitals are not comparable or easily measurable; however, the goal of the analysis was to look at the things that people have access to, more than just the commonly use variables of land, labour and capital. It therefore "includes various social and political resources, as well as skills and aptitudes central to any human endeavor" (Scoones, 2015, p.40). Hence, broadening our understanding of the deferential distribution of assets among households using the percentage access measure.

(b) Household physical assets and gender relations

The number of physical assets that people have in the study area range between 0 to 9, and most of the households having at least one asset. These include mainly bicycles, motorbikes and cell phones. The higher the number of assets, the lower the number of females-headed households in that category, indicating that gender might have an influence on the household's acquisition of assets.

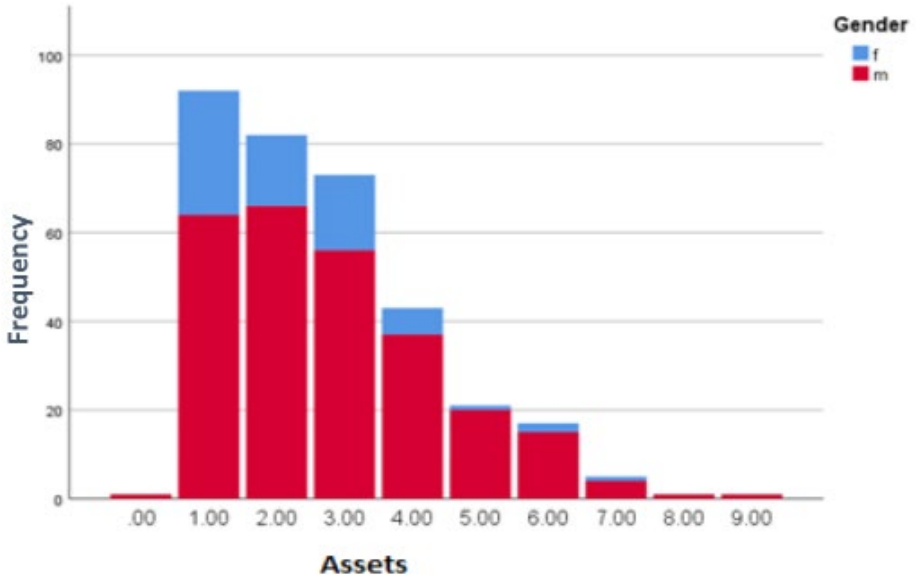


Figure 6.1: Assets per household by gender of the household head

A correlation analysis was done to test the relationship between gender and assets using a Mann Whitney U Test and the test was significant at $p < 0.05$ (see Appendix 6). The gender of a household head has an impact on asset acquisition among the Mufunta community.

(c) Asset value and social status

Asset value is an indicator of how wealthy a household is; the results show that there is a correlation between the value of assets and the level of education of a household (Figure 6.2; Spearman's correlation, r=0.2057, p=<0.001, and Spearman's, r = 0.29 p= <0.001). Since both rank wise and Spearman's correlation have p=<0.001, there is a significant relationship between wealth and education. The Pearson's correlation is also significant P<0.001. Furthermore, the level of education affects participation in decision-making; thus poor households have a low probability of participating in governance. Therefore, improving wellbeing of households may be key to improving effectiveness of CBNRM through increased participation (Figure 5.14).

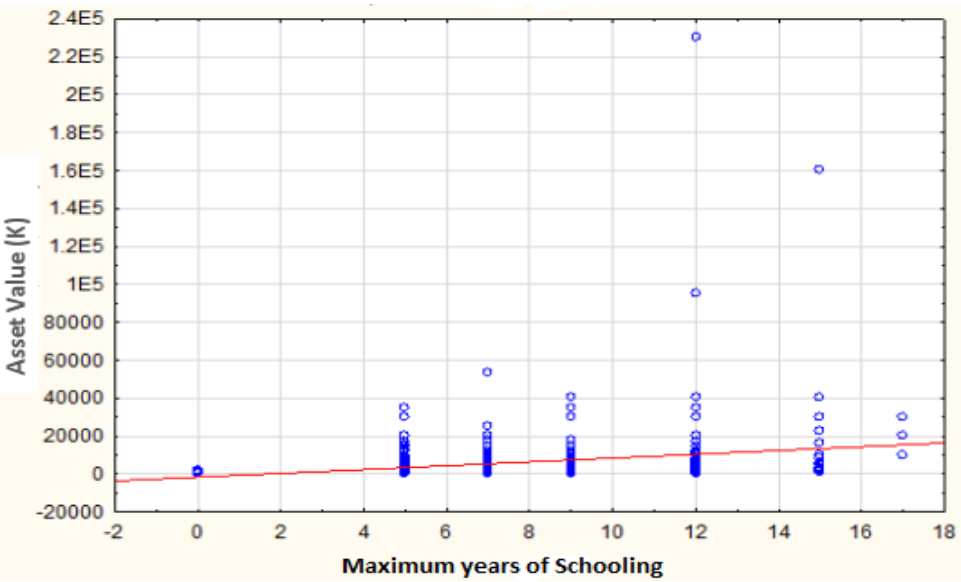


Figure 6.2: The relationship between wealth and education

(d) Livelihood options per household and their implications for sustainable outcomes

Most households have only 1-3 livelihood options with farming as the main livelihood option as most of the strategies are mostly farm-related (Figure 6.3). Households having a low number of livelihoods options reduce their capability to adjust to shocks, such as droughts, therefore making them more vulnerable. Farming is the main occupation in the study area and mostly rainfed (Figure 6.3).

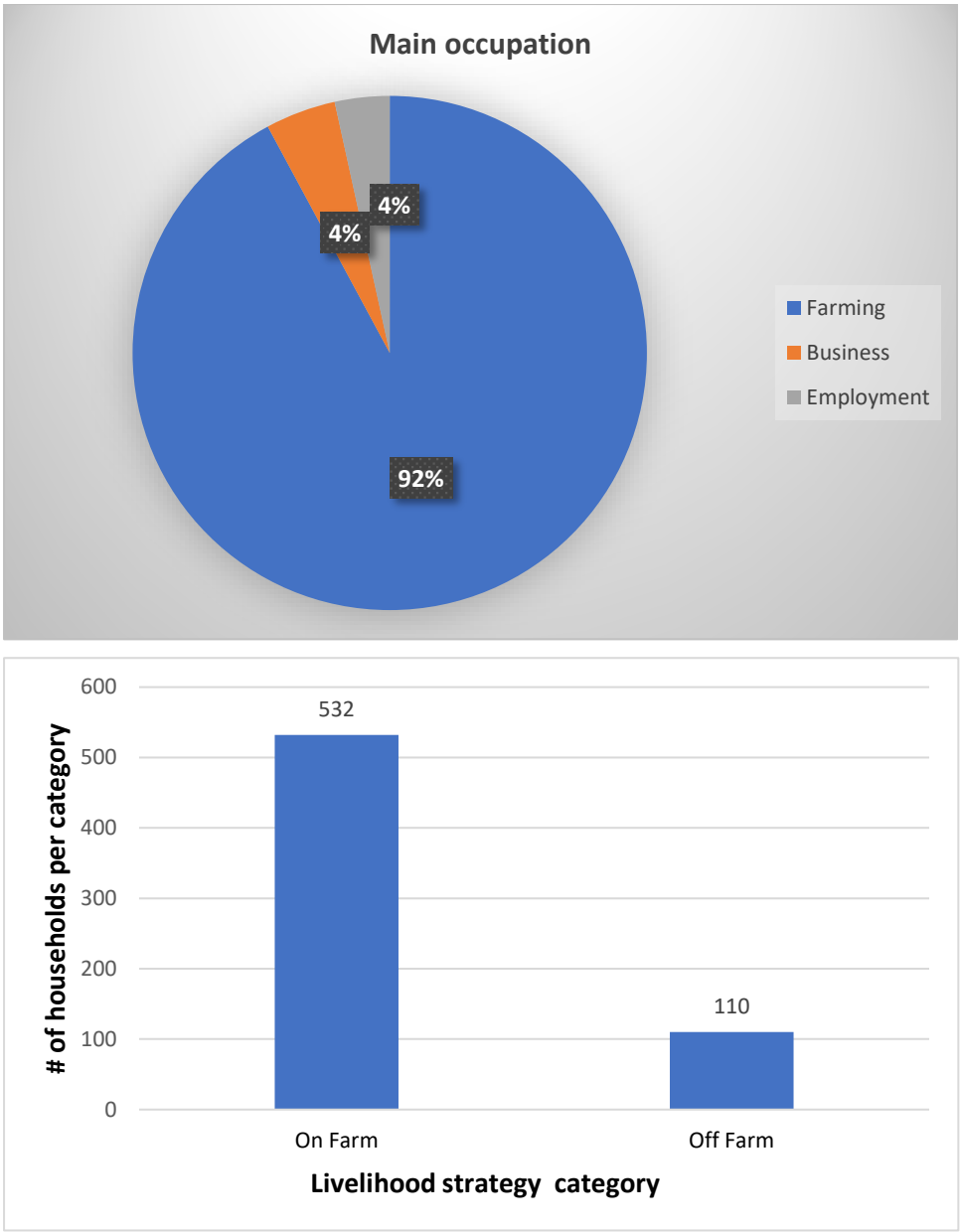


Figure 6.3: Livelihood strategies per household

Households in the study area are mostly dependent on the natural capital. They rely heavily on crop and livestock production at 53% and 17%, respectively (Figure 6.4), which are both dependent on the availability of land. Maize, tobacco, groundnuts, cassava, sorghum, sweet potatoes, soybeans, rice, cowpeas, millet, beans and vegetables are the main crops grown in the order of economic importance. Cattle, goats, chickens and pigs are the main livestock in the study area. Furthermore, households experience human-wildlife conflicts and costs are highest from crop damage and loss of livestock (Figure 6.21).

Businesses consist of charcoal production, beer brewing, fish, poles and grass trade, which are mostly derived from wild products. Beer is made from a local wild fruit called “Mumbole”

(Lozi language) *Vangueriopsis Lanciflora*. Crafts include carpentry, lumbering and artworks, which are also highly dependent on the availability of trees. Formal employment in the PA accounts only for 1% contribution to livelihoods, an indicator that households are not benefiting much from PA-based employment (Figure 6.4). Although there are diverse strategies, the main source of sustenance is the natural resource base (Figure 6.4).

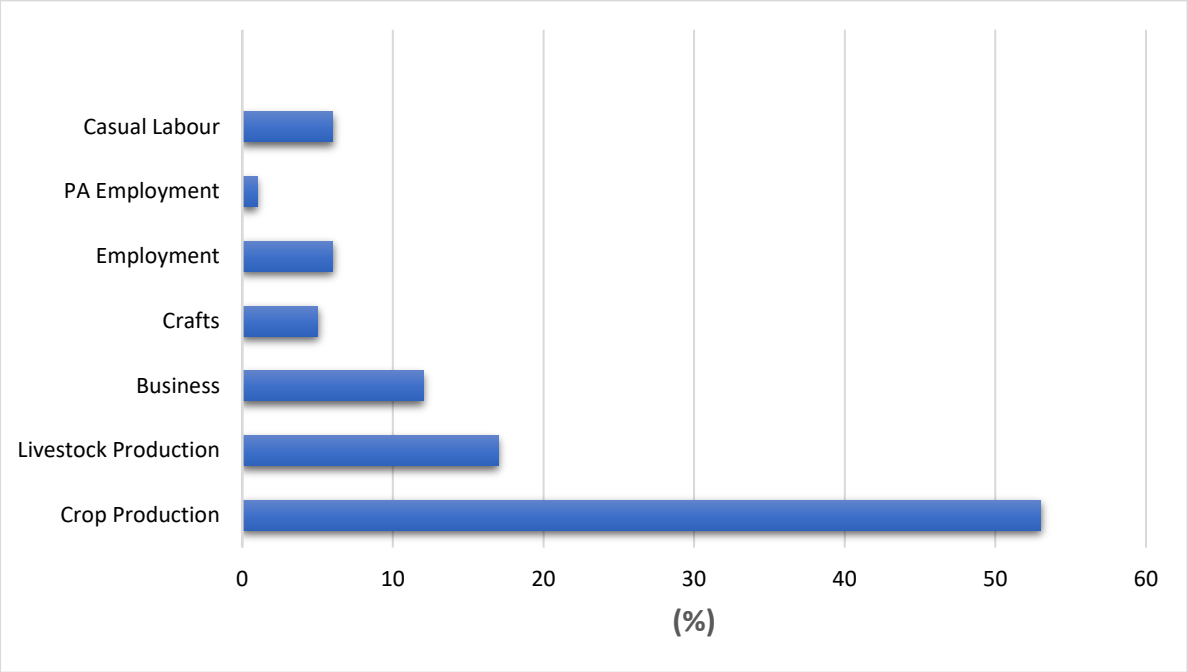


Figure 6.4: Proportions of aggregated livelihood strategies

6.3.2 Food shortages and dependency on wild resources

The collection trend of wild resources is throughout the year and it is done daily for most households (Figure 6.5). The main ones from which households derive income include charcoal, mushrooms, grass, timber and fish.

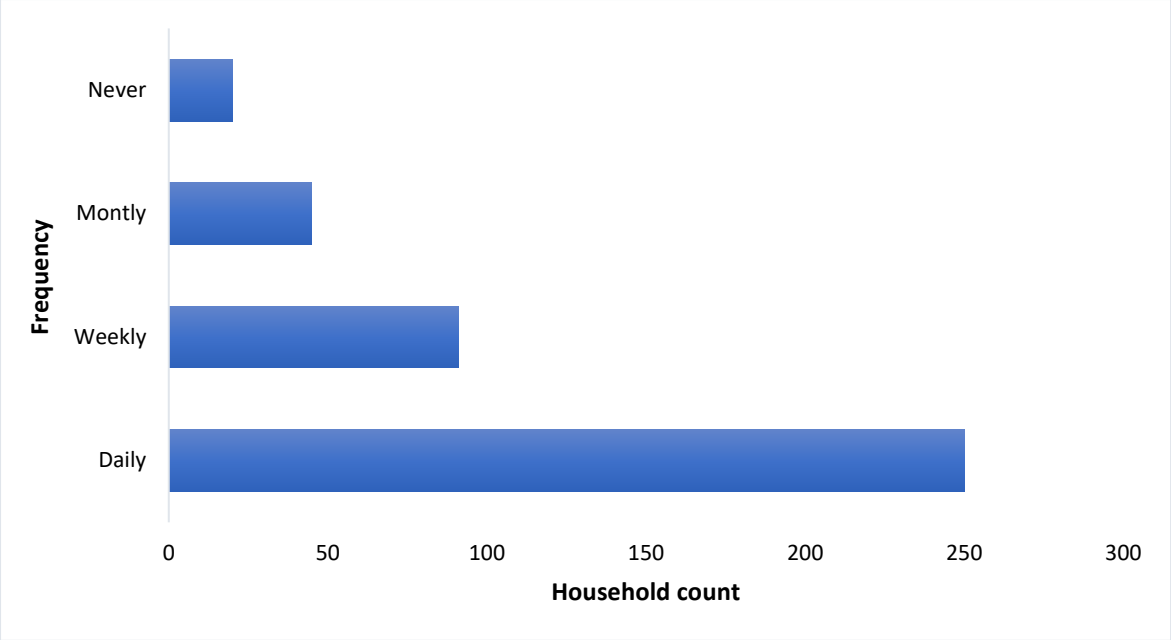


Figure 6.5: Frequency of collecting wild resources

When the trend for wild resources collection is compared with the times when household experience food shortages, there is an indication that wildlife resources provide a buffer for households as a coping strategy during food shortages (Figure 6.6). The higher the number of households experiencing food shortages, the higher the number of households collecting wild resources (Figure 6.6). The trend in food shortages is similar to the trend in the collection of wild resources. Mamo *et al.* (2007) in their paper on economic dependence on forest resources reported a positively significant relationship between dependency on forest resources and the number of food deficit months.

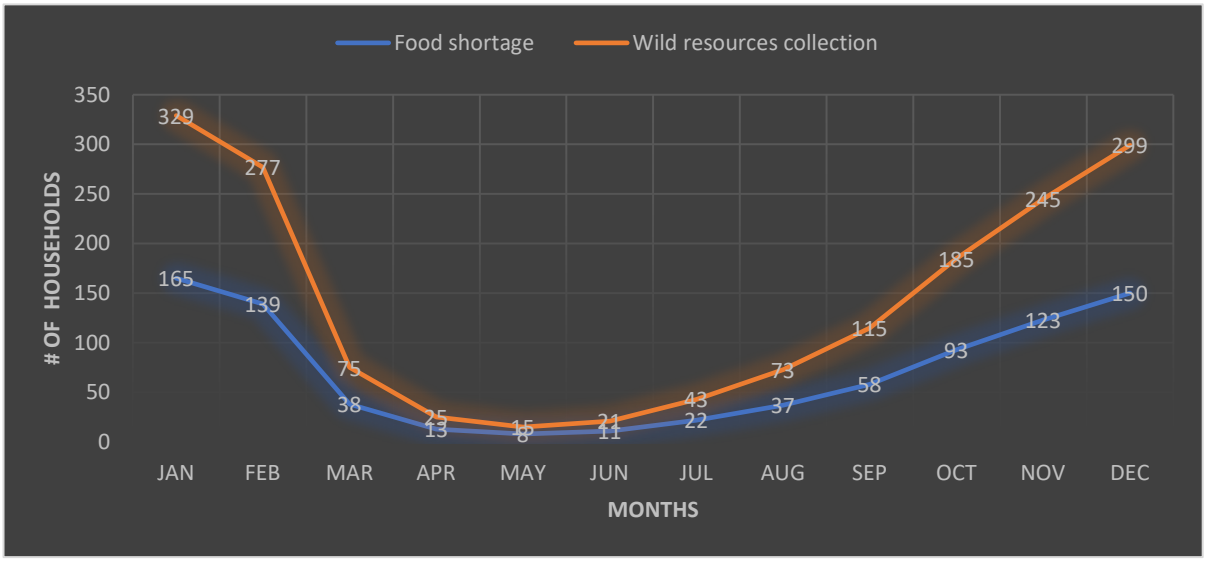
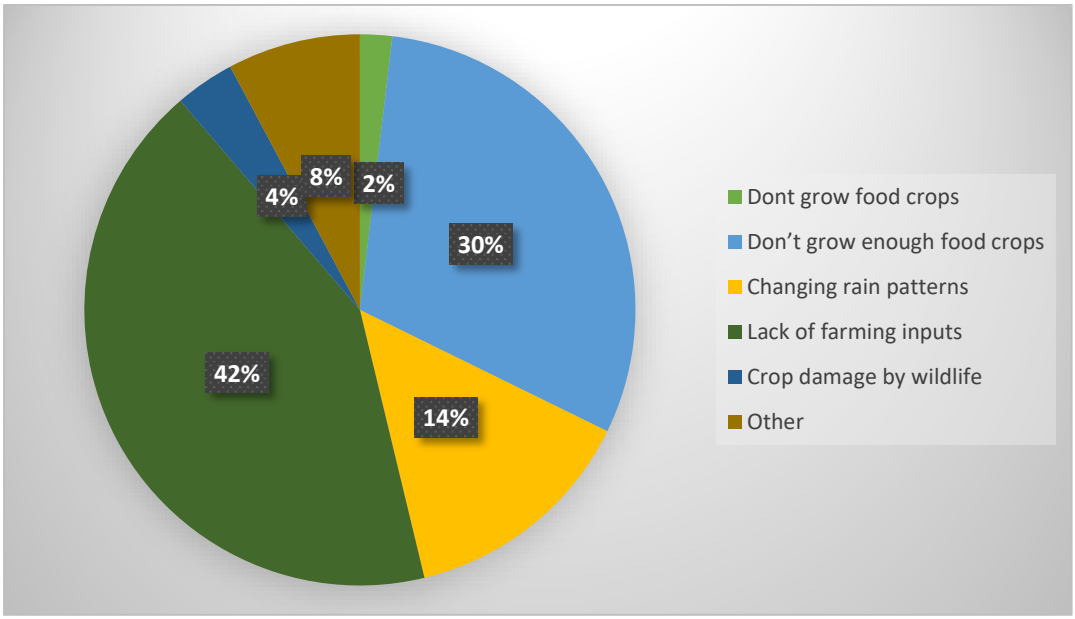


Figure 6.6: Comparing food shortage trend to collection of wild resource

The main reason for food shortages is lack of farming inputs for the household to boost production (Figure 6.7). Without a deliberate government policy to deliver adequate farming inputs on time, the farmers have insufficient capacity to produce food.



Note: n = 401

Figure 6.7: Causes of food shortage

Low food production is compounded by low soil fertility in the study area, which was categorised as mainly medium and poor (Figure 6.8), requiring fertiliser for food production to be improved. Consequently, when the household experience food shortages, they depend on wild resources, hence increasing pressure on the natural resource base (Figures 6.5 and 6.6). A shortage of agricultural inputs among poor households leads them to rely more heavily on forest-based income (Angelsen, Overgaard Larson, Lund, Smith-Hall & Wunder, 2011). According to Vedeld *et al*. (2007), better access to quality land means less need for forest income, which reduces pressure on the PA.

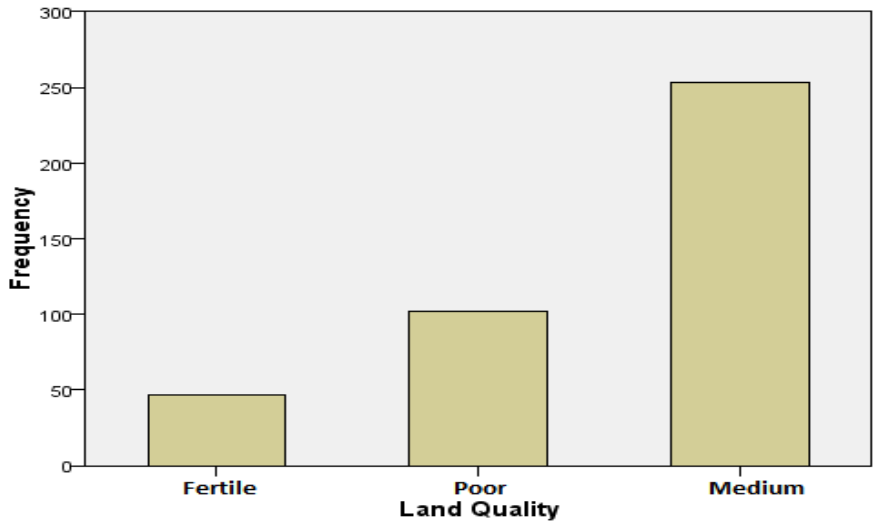


Figure 6.8: Land quality in the study area

6.3.3 Natural resource income contribution to household income

Agriculture income contributes 60% to total household income and is the most important source for the total sample, followed by environmental income and wage labour contributing 13% (table 6.2). Kamanga *et al.* (2009) in a similar study found that forest income contributes 12% to total household income. However, this excluded forest income from household's own farm which when added brought the total forest income to 15.3%. A meta-analysis of 51 studies from 17 developing countries found that forest income represented on average 22% of total income in the population sampled (Vedeld *et al.*, 2007).

Timber, charcoal, fish, poles, fruits, caterpillars, mushrooms and honey are reported as the major sources of environmental income. Only 1% of households reported income from bush meat, because of avoiding prosecution as bush meat harvesting is illegal unless by licensing. From the analysis of the livelihood options, except for wage labour, remittance and government support, about 80% of the income generated is dependent on access to natural resources.

The average monthly income for Mufunta is K1,659 (USD130). Without environmental income, the average household income drops to K1,440 (USD113) per month. Even percentage contributions that are relatively "small" may be of vital importance to households living close to the survival line (Sjaastad *et al.*, 2005; Vedeld *et al.*, 2007). The average number of people per household in the study area is 7 and if USD130 is divided by 30 days a month, the amount is USD5 to be divided among the 7 household members on average. Therefore, most

households are living below the poverty line, surviving on less than one dollar a day as defined by the world bank.

Table 6.2: Average share of total household income

Income source	Frequency (f)	Income share (%)
Agriculture	368	60
Environmental	243	13
Wage	154	13
Business	133	6
Remittance	76	6
Government support/Social welfare	53	1
Employment (PA)	16	1

(f) Frequency income source per household (n = 401)

Income sources diversification was calculated using the Simpsons Diversity Index. The value of D = 0.8, which is an indicator for high diversification since the value of D ranges between 0-1, with this index 1 represents infinite diversity and 0 no diversity (see Appendix 7). The relationship between diversity and household income is complex, because wealthier households face both a richer range of livelihood choices and a potential for specialisation (Vedeld *et al.*, 2007). 60.1% of households acknowledge making some income from wildlife products such as timber and NTFP, is an indicator of the importance of environmental income for households in the study area (Table 6.3).

Table 6.3: Percentage of households that generate income from wild resources

Income from wildlife		
	Frequency	Percent
No	161	39.9
Yes	243	**60.1
Total	404	100.0

(*) Significant result

There were substantial variations in the level of annual environmental income between the households with mean at K219.4 (4410) and the SD of K552.6 (7665). The maximum was

K48,000 (USD2,177) per household per annum while the minimum was nil. The distribution was quite skewed with the mean 4410 and the median 600. Environmental income contributes 13% to total household income and has an equalising effect on household income. The Gini-coefficient with and without environmental income was 0.68 and 0.73, respectively. When environmental income was excluded, the Gini coefficient increased by 0.05 (see Appendix 8). According to a world bank meta-study, the average increase in the Gini coefficient when forest income was excluded was 0.13 (from 0.36 to 0.49) (Mamo *et al.*, 2007). Households trading in wild products point to challenges such as accessing licences and penalties placed on high value products, such as timber and wild meat (Figure 6.11).

6.3.4 Institutional factors impeding access to natural resources

6.3.4.1 Accessing natural resources and rules in use

About 68% of households that were interviewed alluded to having difficulties accessing various natural resources due to challenges in obtaining licences (Figure 6.9), which is a requirement to access especially high value natural resources. The factors that contribute to the challenges that households face in accessing licences are mostly governance-related and are illustrated in Figure 6.10.

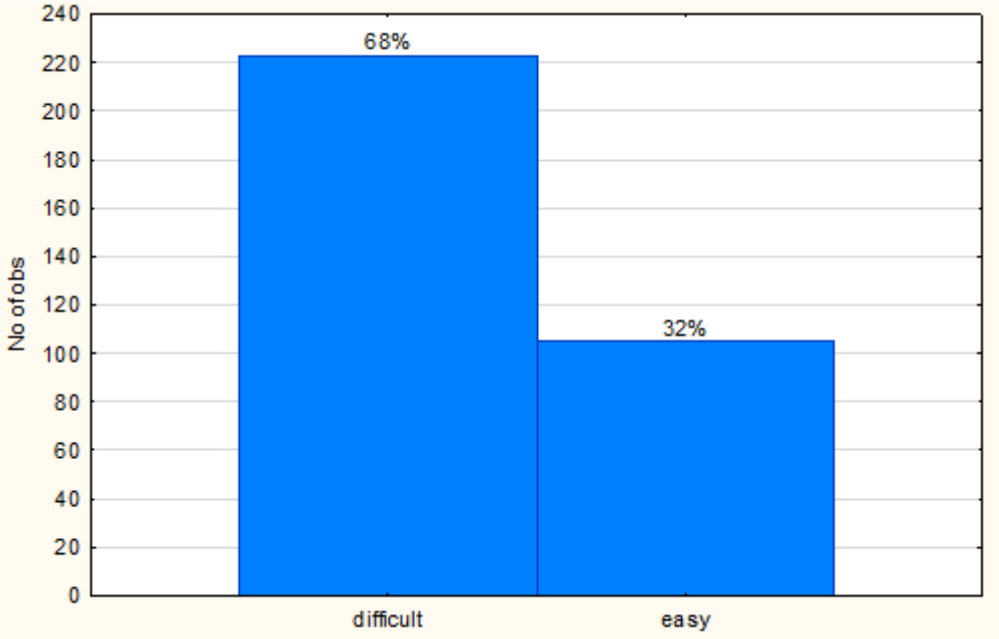


Figure 6.9: Licence accessibility for harvesting and trading in wild products

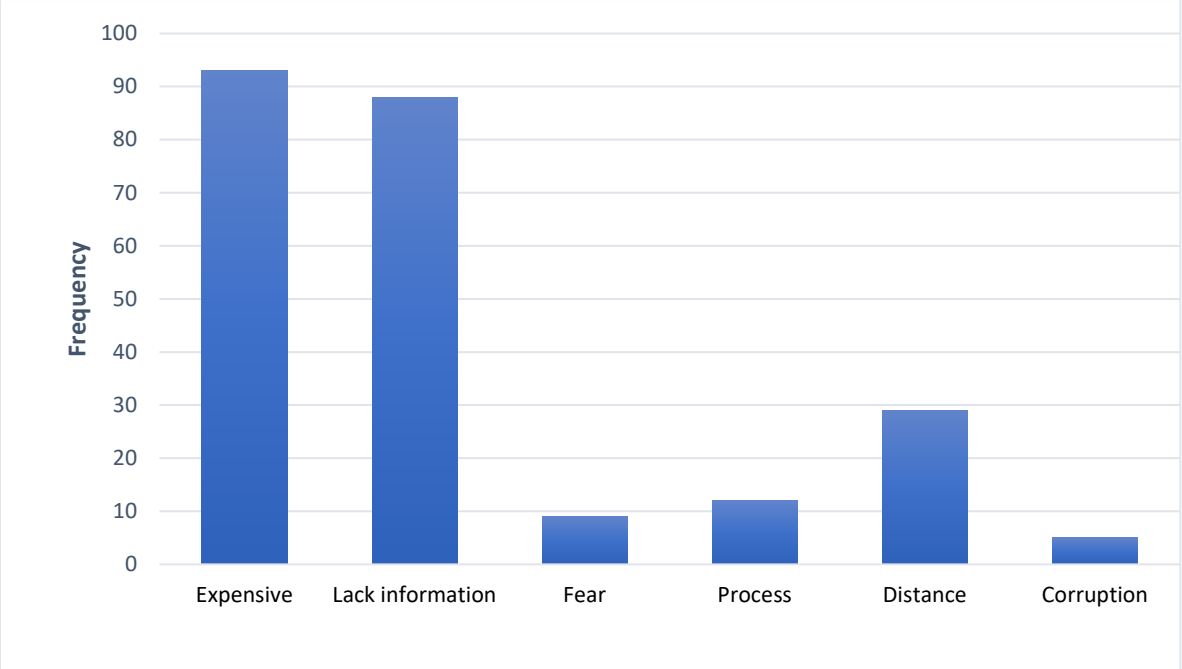


Figure 6.10: Barriers to accessing licences

Most of the households said that acquiring a licence was expensive which could be summed up in the process being very long, the distance that they have to travel to acquire the license and corruption where they end up paying more, thus making it more expensive than it is supposed to be. The other reason that households cited was a lack of information on the acquisition and availability of licences. According to the IUCN, in good governance principles all decision-making regarding PAs should include fair access to information. Measuring these factors (Figure 6.10) against the broad principles of good governance indicates that all the good governance principles listed in Table 6.4 are not met in the study area in terms of acquisition of licences. Involving the community in decision-making about PA management would bring to light such issues through dialogue which could be resolved thus improving governance and consequently livelihoods. The ranking of the good governance principles was done according to the responses given in (Figure 6.10).

Table 6.4: Measuring barriers to access against broad good governance principles

Good governance principles	Barrier to accessing licence
Respect for rights and the rule of law	Expensive****** and distance****
Promotion of constructive dialogue	Fear**
Fair access to information	Lack of information*****
Accountability in decision-making	Corruption*
Existence of institutions and procedures for fair dispute resolution	Process***

(*) Means the rank of the factor 5-1(5* is the highest rank and 1* is the lowest)

6.3.4.2 Reduced access to high-value natural resources

The higher the value of the resource, the higher the licence fee. Access to high-value resources is restricted, thus households lose out on opportunities to increase their environmental income base. Results show a positively high correlation between environmental income and licence fees (Figure 6.11 and Appendix 9). The correlation is significant at the 0.01 level (Appendix 9). The higher the environmental income from a product, the higher the fee for acquiring the licence to access the resource. In this case a licence becomes a constraint for households to improve income from high-value natural resources.

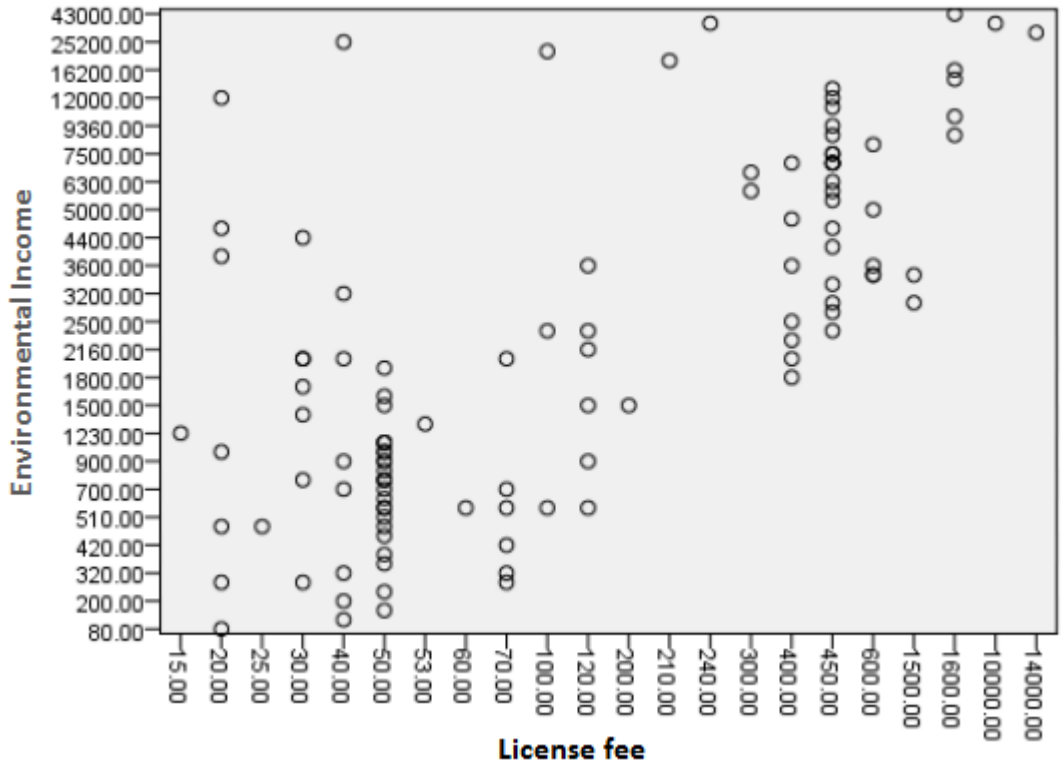


Figure 6.11: Correlation between environmental income and licence fees

When the analysis was done separately using Pearson's correlation for different wild products, the relationship is significant only for timber with a $p < 0.001$, charcoal with a $p < 0.001$ and grass with a p-value <0.02; the relationship was not significant for fish and caterpillars (Appendix 11). Timber, charcoal and grass have a higher market value than fish and caterpillars. A simple regression was also done to see the overall fit of the model (Table 6.5). For this model that was derived, R has a value of 0.601 and, because there is only one predictor, this value represents a simple correlation between licence fee and environmental income and the value of R^2 is 0.361 which tell us that licence fee can account for 36.1% variations in environmental income.

There might be many factors that can explain this variation, but this model, which includes only the licence fee, can explain approximately 36% of it. For the ANOVA (analysis of variance) F is 62.27%, which is significant at < 0.001. Therefore, it is asserted that our regression model results significantly predict environmental income well. Since access to high-value environmental products is dependent on weather, a household can afford a licence fee or not. From the model b_0 is 3560 which means that the model predicts that when no money is spent on fees, households can make K3560 (176.3 USD) from environmental income monthly; b_1 is 3.025 representing unit change in outcome associated with the unit change in the predictor. Therefore, the model predicts that if our predictor is increased by 1-unit, K3.025 (0.14 USD) more will be generated and since this is on monthly basis, households lose K90 (4.5 USD) of monthly environmental income. Since according to the t-test, the b-value is different from 0 and the significance is P< 0.001 it is asserted that licence fees make a significant contribution to predicting environmental income.

Table 6.5: Regression model on the correlation between licence fees and environmental income

Model	B	SE B	Beta	F
(Predictor), Licence fees	3560.261	648.681		62.277
Dependent Environmental Income	3.025	.383	.601	

Note R =.601 R^2 .361 P <0.001 * P < 0.05

6.3.4.3 Access to land and legal pluralism

In the study area, there are three main categories of land administered by different actors and institutions (Table 5.6 and Figure 6.12). The main category is customary land, in Litoya, Lalafuta and Kalale VAGs and the issue of land being under the Tobacco Board of Zambia (TBZ) has been raised (Figure 6.12). "*Our understanding of TBZ land is that previously the land was held under customary tenure. Therefore, at the time of creating the farms or schemes under TBZ, the government of the Republic of Zambia (GRZ) asked for land from the traditional authorities. The allocated farms varied in size from 7 ha to 15 ha. When TBZ was allocating this land, tenants were issued with letters and this land has its ownership changed with time. The District Council is in the process of carrying out a land audit. The District Council is an agent of the Ministry of Lands that administers state land. An adhoc committee has been constituted to carry out an inventory which will ascertain the position of the land under TBZ. Since initially it was under a lease hold agreement, some residents have pushed for titles, the Council is newly established and does not have records to that effect*" (Council Nkyeme 2018, personal communication, 15 July). People can acquire customary land and then bypass the traditional authority and get the title through the Ministry of Lands, turning the land into private land. This has tailing serious consequences on the governance of the GMA.

There is a transition that is happening in land administration which will have implications on the governance of the GMA. The shift from land being under customary tenure to other categories (Figure 6.12) may change the dynamics in terms of control and ownership. According to Zyambo (2018), community institutions have been weakened because individual or private land tenure instead of communal land tenure has increased and as a result, community institutions have virtually lost their traditional management systems that provide the local social controls to enforce access restrictions to natural resources.

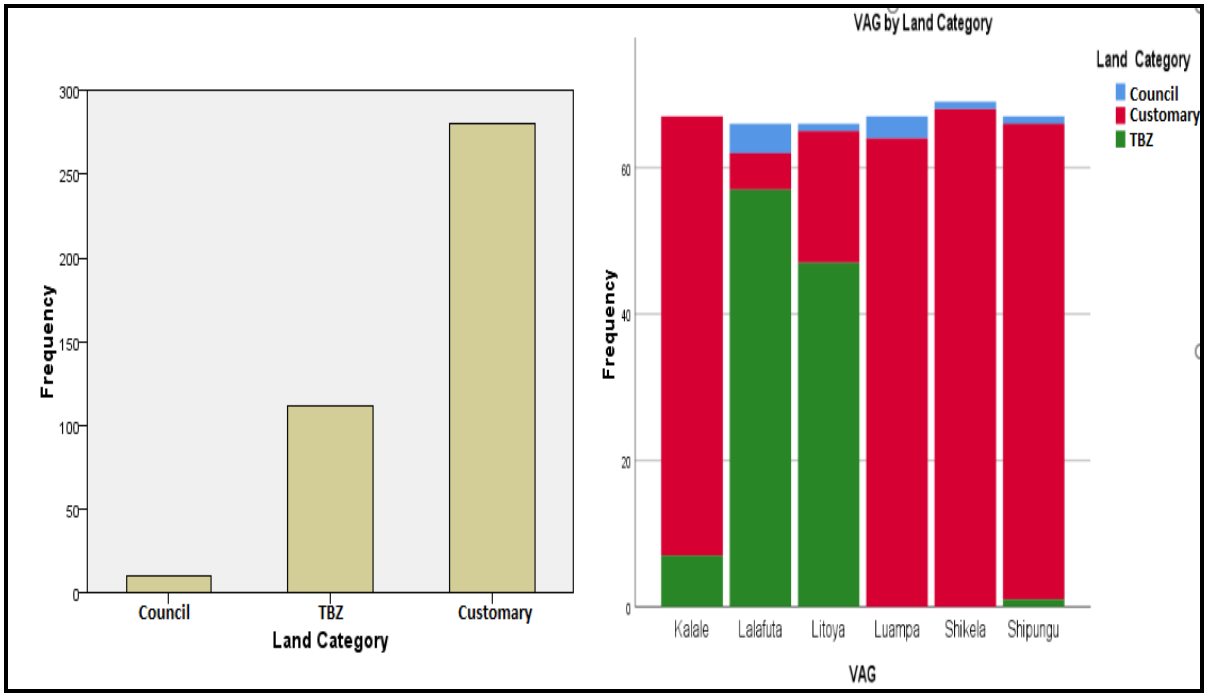


Figure 6.12: Land categories in the study area and patterns of categories in the sampled VAGs

Land acquisition depends on your status, thus different institutions apply, and different actors are relevant (Scoones, 2015). Also see data in Table 5.6. In the study area, for instance, natives acquire land through the traditional authority. This is done through customary law known as "kushowelela". In the past this was done by just giving a token to the Chief in any form as an expression of appreciation for the land. However, people in the study area say in the recent year's things have changed, because traditional leaders charge a lot of money for land. Furthermore, every time there is a new Chief, people need to pay for the land repeatedly through the same "kushowelela" law (Table 5.6).

A household laments that "land has become expensive and a source of conflict and we live in fear if you travel and leave your farm for a long time, the indunas may give our land to someone else; and if there is a new Chief in the area and one is not native, he or she has to "kushowelela" for the land already paid for" (Research participant 2018, personal communication, 10 July). Traditional laws and customs are very fluid and dynamic, and whatever is traditional can change suddenly. Poor people may get excluded from accessing land, since land access is transitioning into a market economy where money is the acceptable medium of exchange.

The patron of the CRB is Chief Kahare; from the data in Figure 6.13 there are more people who are non-native under him. This occurrence has implications for the governance of the GMA in terms of land allocation, especially now that the land ownership power is shifting in the VAGs that are under his jurisdiction. People that are not native to the area do acquire the land through the Council and obtain title to the land, which has reduced the control over the land by the patron. Furthermore, he has no control over land in the other areas where the other two Chiefs reside.

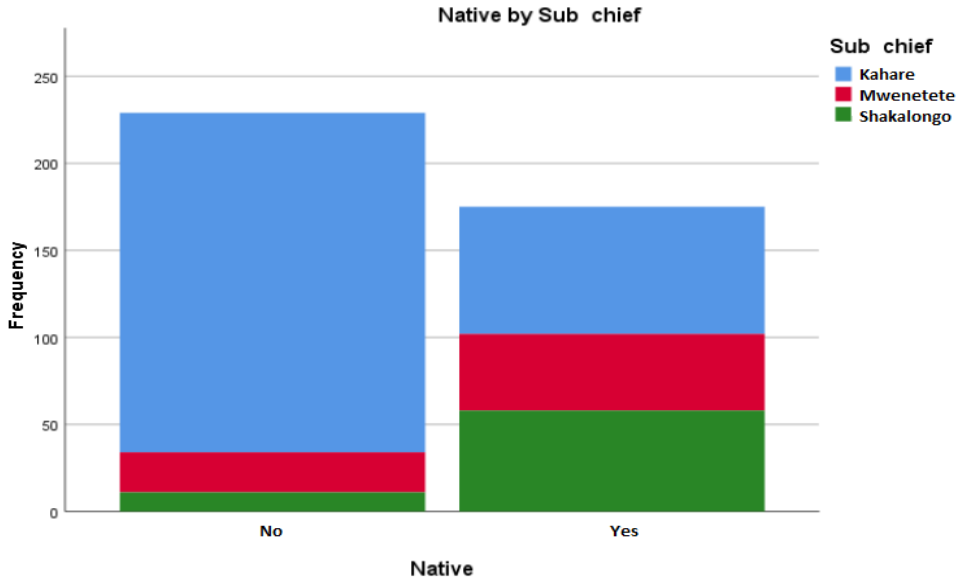


Figure 6.13: Native population by sub-chief

The processes to access resources have differential impacts influenced by power relations (Scoones, 2015). These may include gender, age, wealth, ethnicity, class, location and a whole range of factors that can influence access. Therefore, we ran a multiple regression (Table 6.6) to see the differential impact of some of these factors. The variables included in the regression are number of plots of land, wealth, education, age of household head and number of years lived in the GMA to determine access to land.

Table 6.6: Power relations and access to land

Model	B	SE B	Beta
Constant (Land size)	0.922	0.086	
Number of plots	0.165	0.033	0.27*
Wealth (Value of assets excluding land)	6.167	0.00	0.11*
Age of household head	0.004	0.001	0.17*
Education	0.011	0.006	0.09
Number of years lived in the GMA	-0.003	0.001	-0.13*

Note: R = 0.413 R^2 0.171 P <0.001 * P < 0.05

The regression explores the influence that the number of plots of land, wealth, education, age of household head and number of years lived in the GMA has on determining access to land by households. The regression is significant with a P value < 0.001. According to this result, the number of plots is the main predictor to the size of land a household has. From the Pearson correlation coefficient between every pair of variables from the data, number of plots had a high positive correlation with land size, r = 0.321 with a P value of p< 0.001; of all the predictors, the number of plots correlates best with the outcome variable (Land size). Therefore, it is possible that this variable will best predict land size. Furthermore, wealth, age and number of years lived in the GMA are also significant.

The wealthier a household is, the better the ability to access land. The number of years in the GMA influences land size of a household; however, this relationship is negative. The t-test with b-values is only significant (*) for number of plots, wealth and age of the household head and number of years lived in the GMA. Education, however, did not contribute significantly to the model. The multiple correlation coefficient R= 0.413, which represents a simple correlation and R^2 for the model is 0.171, which means the model accounts only for 17.1 % of the variation, which is very low. This indicates that there could be many other factors that can predict land acquisition such as ethnicity, gender, class and governance (section 6.2.4.4 and Figure 6.13) on the access to land.

6.3.4.4 Access affected due to exclusion regulation and legitimation

By creating a PA, such as a GMA, through policy and legal framework land use zones, such as protection and control are legitimised. Zoning the GMA into areas of resource collection and preservation created regulations for exclusion by prohibiting access to certain resources in areas preserved for biodiversity. This affected the bundle of rights and powers that the community has in relation to access to resources. The results indicate that accessing the areas that have been zoned has not changed much, although the collection of resources has decreased due to zoning. Furthermore, the creation of the GMA has affected access to various natural resources and the rights of the people living in the GMA as reflected in Figure 6.14. Also see interpretation of the bundle of rights in section 6.2.4.5 and Figure 6.17. When areas are placed under some form of protection such as a PA, they are generally not available for exploitation or conversion by local communities (Kamanga *et al.*, 2009).

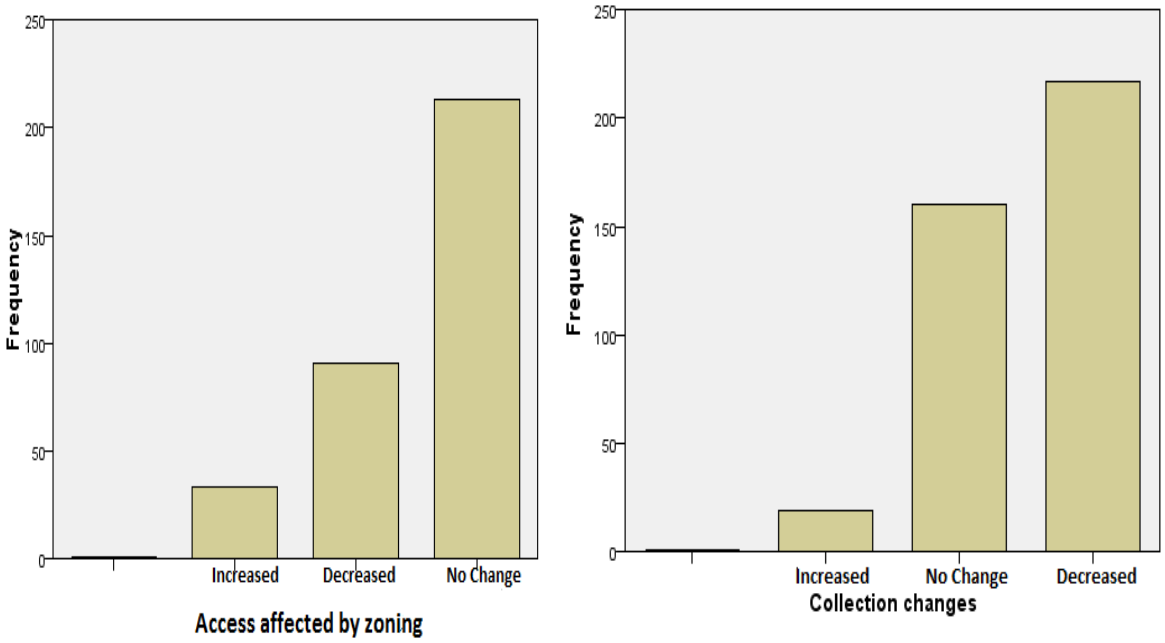


Figure 6.14: Access affected by creation of the PA (GMA) due to zoning

Among the resources that respondents indicated to have lost access to include non-timber forest products (NTFPs), wildlife, land, timber and fish from highest to lowest respectively (Figure 6.15). In the case of NTFPs, Neumann and Hirsch (2000, p.35) note the "overwhelming evidence that the poorest segments of the societies around the world are the populations principally engaged in NTFP extraction". Ranked highest is the right to hunt; people indicated that they have lost access to hunting privileges. Others included various costs of living in the

PA which included 85% alluding to the cost of harassment, 10% being arrested and 10% loss of life. These have come up mostly, as a consequence of the loss of rights to hunt. People are harassed, arrested or killed when they are found in areas where, they are suspected of poaching. When poachers run into the village while being pursued by the wildlife authority, all houses are searched and in the process, people are beaten based on mere suspicion. Arrests are made and in certain circumstances lives are lost (see narrative in section 3.4.1).

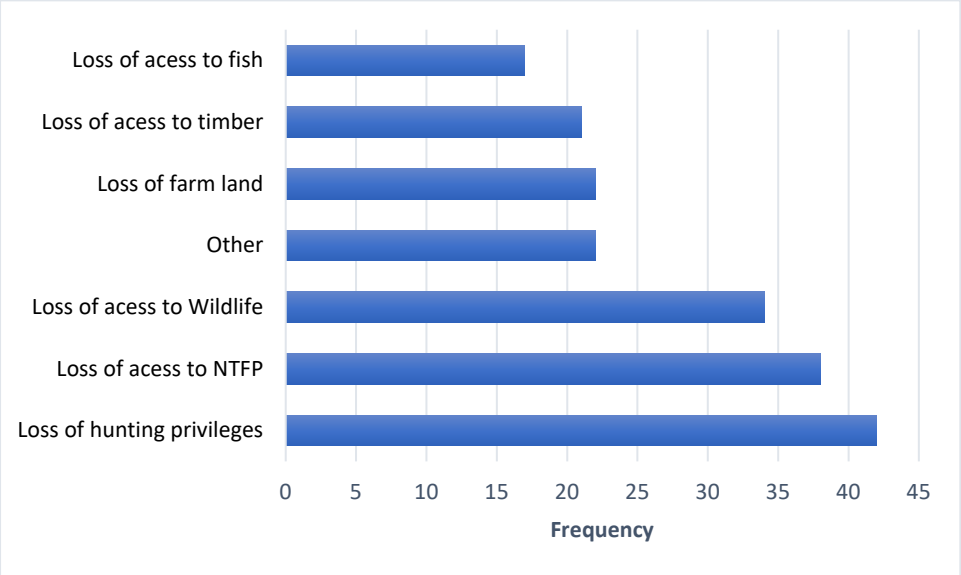


Figure 6.15: Loss of access due to the creation of the Mufunta GMA

6.3.4.5 Bundle of rights to resources and implications on livelihood

Property and user rights define the type benefits that can be accessed from a resource (Vatn, 2017). Households in the study area indicate that rights and access to a resource varies depending on the resource in question (Figures 6.16 and 6.17). This can be the right to access, withdrawal, management, exclusion and alienation (Figure 6.17). “The combination of rights as defined specifies the position of various actors in relation to the resource” (Vatn, 2017).

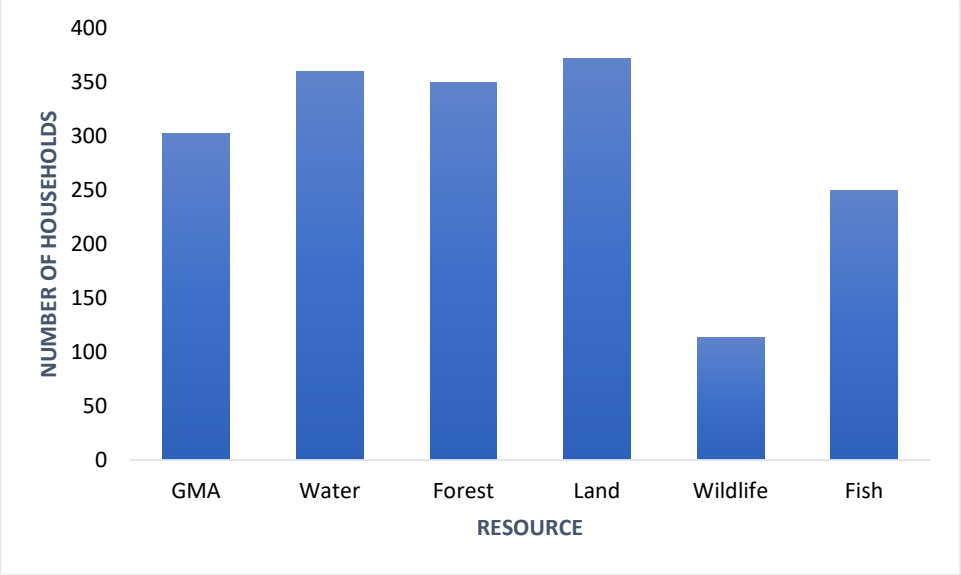


Figure 6.16: Resource rights to resources for households

Most of the households indicated that they have rights to access resources within the GMA. Over 300 households acknowledged having rights to water, forest and land resources. Since every household has a right to own the land that they use for farming, therefore granting them rights to use the other resources such as forest and water on that piece of land. However, wildlife is an exception to this rule, since even when animals stray into households' farmlands, they are not allowed to hunt them. Therefore, households that acknowledge having rights to fish and wildlife resources were low with rights to wildlife as the lowest.

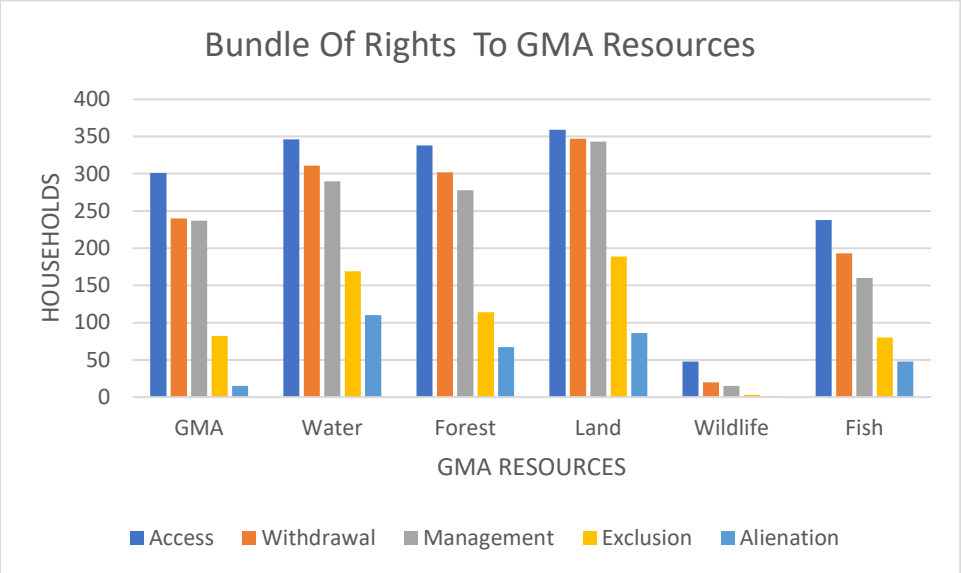
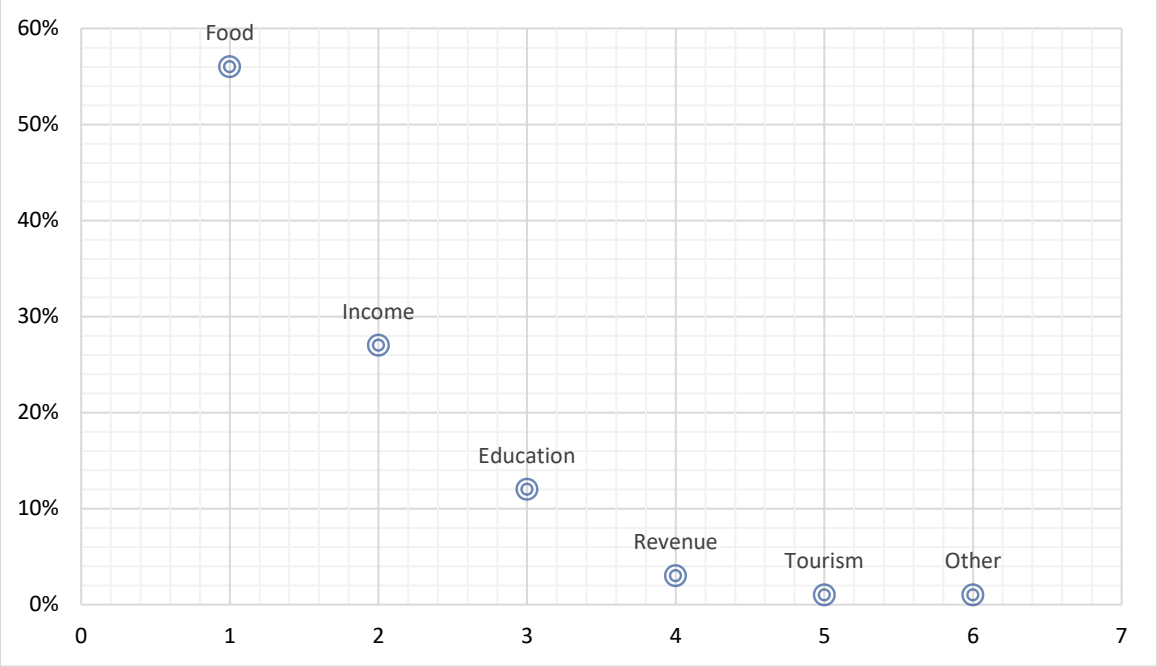


Figure 6.17: Interpretation of bundle of rights to GMA resources. Source: adopted from Schlager & Ostrom (1992).

The main resource of concern in the PA is wildlife, since these areas are set apart for the conservation of wild animals and their primary land use is wildlife management. However, the results indicate that wildlife is the resource people have the least rights over. Even the right to withdrawal of wildlife resources is weak, since the people in the study area have no rights to hunt wildlife or to conduct live animal sales. Schlager and Ostrom (1992) characterise an authorised user as one that has the right to access and withdrawal. When people do not have a right to withdrawal, they don't have the motivation to protect the resource as they don't have a sense of ownership. The people in the study area have a right mostly to access, withdrawal, manage, exclude and the weakest right is to alienate in descending order, respectively. An owner is suppose to have all five rights (Vatn, 2017).

6.3.5 Natural resources governance and household benefits and costs

The results indicate that food and income from wild resources are ranked as the first and second most important benefits for households in the study area (Figure 5.8). When asked to rank the benefits that motivate them to participate in CBNRM activities in order of importance, households ranked food, income, education, revenue and tourism from first to last respectively (Figure 6.18). This is an indication that households consider benefits that they accrue directly as more important than communal benefits (Figure 5.11). Research has shown that local attitudes towards PA conservation are mainly biased towards the capacity of the protected area to provide tangible benefits (Tumusiime & Sjaastad, 2013). Lack of benefits was at 33% as the main reason for households not participating in CBNRM activities (Figure 5.13). Although education, revenue and tourism ranked low, they merit some attention. Education represented conservation projects which resulted in construction of schools, while revenue generated was used for construction of schools, clinics and boreholes. According to Tumusiime and Sjaastad (2013), such initiatives should be given special attention as they represent one of the key dimensions in which local attitudes and development can be influenced. According to household survey data, access to knowledge was 33%, training 26%, income 11% information 11%, farming inputs 7%, money 4%, clothing 4%, licences 2% and employment 2% as household benefits (see Appendix 14).



Note: Ranking is (1-6) 1* is the highest ranked score and 6*is the lowest ranked score

Figure 6.18: Household ranking of wild resources benefits

Households who experienced costs due to human-wildlife conflict also agreed that they experienced these costs depending on the distance from the PA. The closer the household was to the national park, the more the costs the household experienced. A Mann-Whitney U Test was significant at $p< 0.05$ (see Appendix 12).

The closer the household is to the NP, the higher the costs due to wildlife conflict (χ^2 (4) = 624.2, $p< 0.001$) (see Appendix 11). Furthermore, the households are not compensated for losses caused by wildlife; the losses occur especially through crop damage. According to the results in Figure 6.20, only 1% agreed that they were compensated for losses incurred. This can be attributed to not having formal rules in place to ensure people are compensated. "When they are helped after suffering a loss, it is purely on humanitarian grounds" (Sub-chief and park range 2018, personal communication, 10 June). Compensation may reduce conflicts therefore, improving positive attitude towards conservation this will be beneficial for conservation (Tumusiime & Sjaastad, 2013).

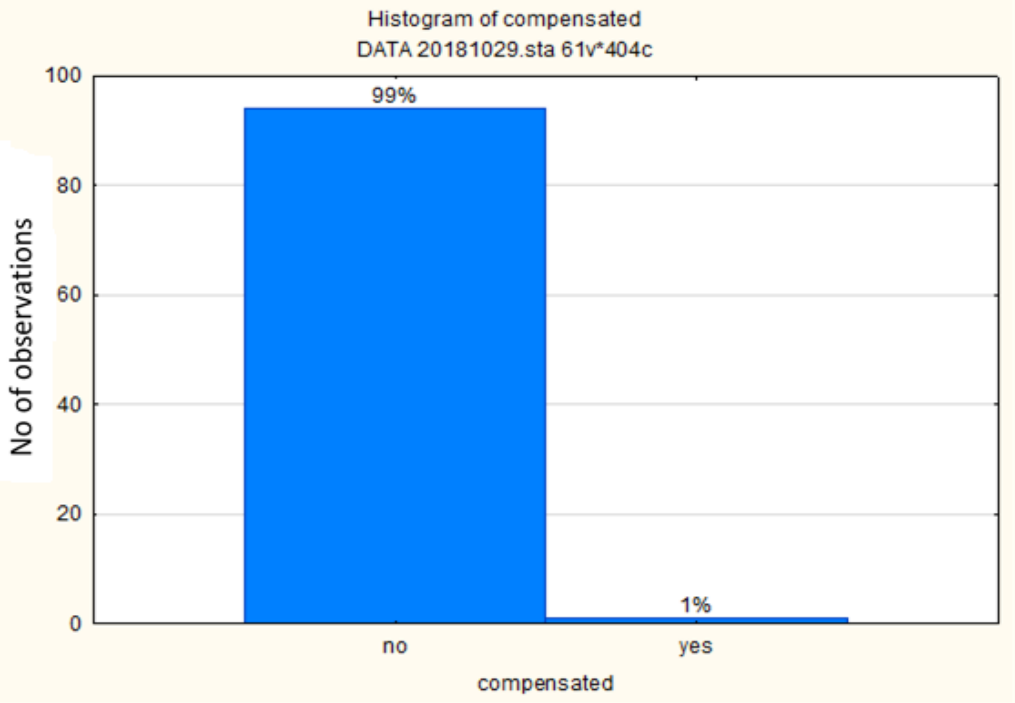
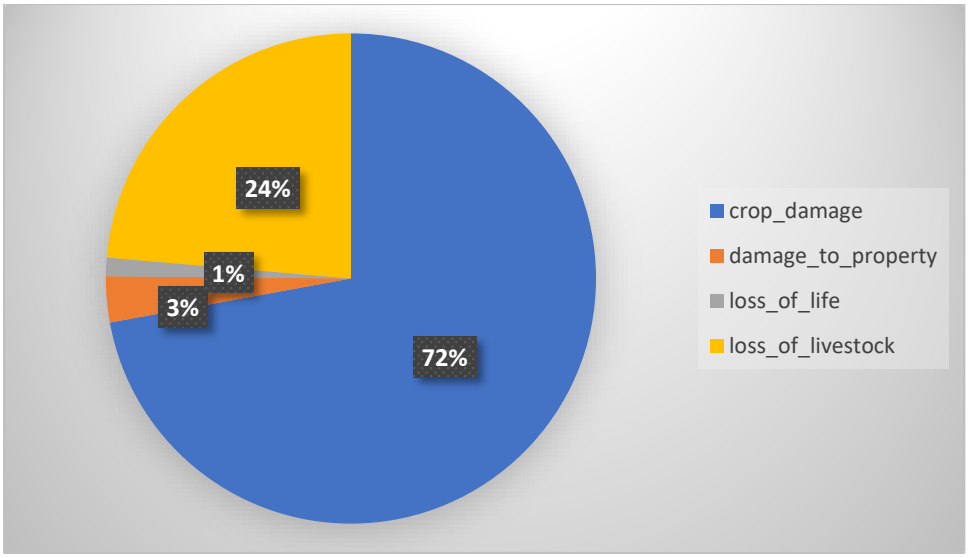


Figure 6.19: Compensation for losses resulting from human-wildlife conflicts

Most of the costs incurred due to human-wildlife conflict result in crop damage, which is at 72%, loss of livestock 24%, damage to property 3% and loss of life 1% (Figure 6.21). Tumusiime and Sjaastad (2013) cited a number of authors (MacKenzie & Ahabyona, 2012; Tweheyo, Tumusiime, Turyahabwe, Asiimwe, & Orikiriza, 2011) who indicated that loss of dwellings, farmlands, access to wild resources, damages to crops, livestock and people caused by wild animals are the most important costs associated with PAs (see Figure 6.16). Zyambo (2018) found that costs outweigh benefits in areas where households experience crop damage and livestock losses due to wildlife and through having grazing and cultivation opportunities denied. Crop damage is caused mostly by elephants, warthogs, wild pigs and birds, while livestock losses are caused by lions, leopards, wild cats and predatory birds. When animals stray into people's farms, they are driven away and when that is not possible, especially in the case of elephants, the matter is reported to DNPW for urgent intervention. The people have no right to kill the animals that cause damage to their crops, livestock or property by law.



Note: n = 170

Figure 6.20: Cost due to human wildlife conflict

Costs and benefits sharing increases inequalities in the study area; results reveal that PA-related benefits are not realised by the same households that incur costs (Table 6.7). About 42.5% of households indicate that they do not incur costs, but agree about receiving benefits, while 19.3% of the households indicate that they incur costs but disagree about having received benefits (Table 6.7).

Table 6.7: Costs and benefits sharing among households in PA

Cost of living in PA	Benefits of living in PA	f	%
no	no	11	15.5
no	yes	30	42.3
yes	no	14	19.7
yes	yes	16	22.5
Total		**71**	**100**

6.4 Discussion

6.4.1 The livelihood strategies of households and natural resources dependency

According to Scoones (2015) and Angelsen *et al.* (2011), understanding the differential access to the use of livelihood capitals needs information on the capitals. Capitals are used as constellations of means, relations and processes that enable households to derive benefits from resources (Ribot & Peluso, 2009). Households have access to all capitals in varying percentages, with the highest access percentages being for the natural capital and lowest for social and financial capital. Differential access to capitals has a strong bearing on long term adaptation patterns for households (Kamanga *et al.*, 2009). The ability of households to generate income from natural capital is low, since the percentage access to environmental income is low due to constraints, such as licences. Having secure rights to income-generating resources is necessary for sustaining livelihoods (Vatn, 2017). According to Vedeld *et al.* (2012, p.21), "local people perceive wildlife conservation as an imposition of legal constraints rather than offering economic opportunities". Therefore, some households do not benefit from environmental income, whether or not they have rights to them (Ribot & Peluso, 2009).

All households have access to land and as a minimum some primary education. Level of education influences participation in CBNRM decision-making. Households with low levels of education are excluded from decision-making, which is true for most households in the study area. Some people and institutions control the access to resources, while others must maintain their access through the powers that control these resources (Ribot & Peluso, 2009). Access to knowledge and participation in community programmes is very low, which may be the reason for ineffective CBNRM for Mufunta GMA due to low social capital such as networking. The low number of participants in VAGs may be because of the community not giving full support to CBNRM programmes. However, social capital plays a crucial role in attaining positive outcomes (Musavengane & Simatele, 2017). Grube (2010) cited building social capital and collaborative partnerships as an attribute of successful CBNRM initiatives. This can be improved through coordination of stakeholders to improve networking. Networks and partnerships are an integral part to building social capital and serve as a catalyst to finding innovative approaches and solutions for implementation (Gruber, 2010).

The households in the study area are mostly dependent on farming as the main livelihood strategy. Farming is dependent on the availability of land, emphasising the importance of

natural capital. Households having a low number of livelihood options means that their capability to adjust to shocks such as droughts is reduced, making them more vulnerable. Rain-fed farming is the main occupation in the study area. High dependency on environmental income may be as a result of a lack of livelihood options (Vedeld *et al.*, 2007). Diversification strategies can be seen as an adaptation process through which rural households construct diverse profiles of activities in order to survive and improve their standard of living (Kamang *et al.*, 2009).

Those who engage in businesses and crafts depend on the trade in timber and non-timber products. On the other hand, the contribution of PA employment to livelihoods is negligible. When households in the study area experience food shortages, they depend on the wild products as "safety net" or a "coping strategy". According to (Vedeld *et al.*, 2007; Angelsen *et al.*, 2014), forest products are important to support the current level of consumption and prevent the household from falling into deeper poverty. Therefore, despite the households having a diverse range of strategies to achieve sustainability, they are mostly dependent on the natural resource base.

The households are generally poor, defined as such because most of them live below 1USD a day. This is according to the world bank definition of poverty line as living below 1 dollar per day. It is estimated that more than 1 billion people, mostly poor, depend on forests in varying ways for their livelihoods (World Bank, 2004). Most of the households in the study area have low levels of income with the average monthly income of K1659 (130USD) and the main source of income from agriculture at 60%. Environmental income is ranked second, contributing 13% to total household income share, which is an indication of the economic dependence on the PA forest. Meta-studies indicate that as much as 20–25% of rural people's income may be derived from environmental resources in developing countries (Vedeld *et al.*, 2007; Kamang *et al.*, 2009). Environmental income has an equalising effect since the Gini coefficient increases when environmental income is subtracted by 0.05. Income source diversification is high, with the diversity of 0.8. However, the relationship between income and diversification is nonlinear. There was substantial variation in the level of annual environmental income.

The main physical asset is bicycles, which are mostly used for communication and transport. This asset cannot help the families in improving farm production, compared to tractors, which

can improve production and consequently livelihood sustainability. Mamo *et al.* (2007) found households with more assets are predisposed to exploit more forest resources. The gender of the household head influences the household's access to physical capital, as male-headed households are better positioned to access physical assets. The education levels are generally low, with most of the population having attained only a minimum of some primary education. Education influences the levels of participation in decision-making; thus, low education may increase the household's vulnerability and exclusion. On the other hand education places individuals in a advantaged position to tap into income flows from natural stocks (Mamo *et al.*, 2007).

6.4.2 The role of institutions in enabling households' access to natural resources

Accessing natural resources in PAs is based on a set of rules whether *de-jure or de-facto*. As observed by Borrini-Feyerabend and Hill (2015, p.176), "governance is as much about who holds authority *de-jure* and also about who makes decisions *de-factor* and how these decisions are made". In the study area licences are used as a way of controlling and monitoring the use of natural resources. Licences are obtained whenever the households want to engage in the trade of natural resources. The area has abundant natural resources and most livelihoods are dependent on the natural resource base, and there is an opportunity for households to improve livelihoods. However, institutional factors such as licences act as constraints to improving livelihoods. State actions such as imposition of new duties such as tax or maximum hunting quotas act as barriers to environmental income generation (Sjaastad *et al.*, 2005).

Child and Barnes (2010) identified removing all deferential taxes, charges and licence fees on wild resources as a key to making them economically competitive. Reduced access to forest resources affects the welfare of the rural population and increases the wealth gap among rural households (Mamo *et al.,* 2007). Households are unable to increase their environmental income share due to barriers hindering access; households indicated they had difficulties in getting trading and harvesting licences. The licence being expensive was ranked the highest challenge for acquiring one. Hence, it reduces access to high-value products. This was evident in that the higher the value of the product, the higher the licence fee for acquiring it. Adhering to the principles of good governance could help in overcoming this challenge of accessing licences. If information about licences was made available, then the process would be more transparent and accessible to most households.

As land is the main resource that local livelihoods is dependent on, good governance structures are necessary to manage this resource. "Land tenure and rights of access to resources are critical to rural livelihoods and community-based conservation" (Zyambo, 2018, p.3). However, in the study area multiple institutions and organisations, both formal and informal, govern access to land. The legal pluralistic nature in which land is governed in the study area may create uncertainties for households. Where there is administrative dualism of overlapping state and community systems of resource tenure, the vulnerability of previous community systems increases (Sarch, 2001). When rights and tenure to land and resources are predictable and secure it creates incentives and confidence for individuals to invest time and effort in conservation (Zyambo, 2018). Furthermore, when the GMA was created in 2006, the existing plurality were not taken into account. Thus, the existing use and access to natural resources and the rules underpinning access were not integrated. Knowledge about institutions and organisations, both formal and informal, is critical for the creation of new institutions, which would enable established institutions to translate into assured access on multiple fronts, for land, markets, off-farm employment and services contributing to livelihoods (Scoones, 2015).

Furthermore, there is reduced access to resources due to the zoning of the area when the GMA was created. This has resulted in reduced collection of resources in the preserved areas, hence reducing household's ability to maximise benefits from hunting, and collection of non-timber forest products, which are important sources of income. Reduced access to the forest may represent a net loss of wealth for the local community (Sjaastad *et al.*, 2005). Since it resulted in loss of income, households may not realise the full potential from wild resources, thus increasing their vulnerability. The rights of the households have been reduced to only the right to access, which is merely the right to enter in the study area, with the right to withdraw limited only to selective resources, with wildlife as an exception to this rule as withdraw is strictly by licence. According to Tumusiime and Sjaastad (2013), the creation of a PA will normally causes a sharp reduction in local people's access to wild resources and associated income. Exclusionary conservation policies limit natural resource access for the poor and could affect the livelihoods of the local people considerably (Angelsen *et al.*, 2014).

In most Southern African countries the government own land and natural resources, while individuals or communities may only have the access and usufruct rights (Zyambo, 2018). This is the case for the study area, albeit in this study the right to use a resource is defined as the

right to withdrawal. The bundle of rights has reduced the sense of ownership to an extent of reducing motivation among the local people to protect the resources. Communities are unwilling to invest their efforts and time to protecting a resource that is perceived as not theirs (Zyambo, 2018). The community has no rights to alienate resources use from outsiders, since they do not own the resource, and they have no power to decide who comes to exploit the resource in the area.

6.4.3 Cost and benefit sharing

Households in the study area experience costs due to human-wildlife conflicts, depending on the location of the households. The costs are mostly the result of crop damage and loss of livestock. However, households are not compensated for the losses that they incur due to lack of a deliberate policy on compensation. This implies that the households in the study area are incurring more resource management costs compared to benefits received from resource utilisation. Zyambo (2018) found that there are indications from Southern Africa that benefits derived from utilisation of natural resources for communities, and especially at household levels may not be adequate. Uneven distribution of benefits from natural resources has been tagged as one of the factors of CBNRM failures (Milupi, I.D., Somers, M.J. and Ferguson, W, 2017). The benefits that they get from natural resource harvesting is low due to constraints that have been placed on resource harvesting (Figure 6.12). Therefore, households have resorted to concentrating on non-environmental harvesting activities.

Very few people participate in CRB activities since this is associated with resources which households consider less beneficial to the household. Inadequate incentives are unable to influence local people to abandon illegal harvesting of resources if individual returns from illegal harvesting outweigh benefits accruing from legitimate resource uses. As a result, communities may not be willing to fully support CBNRM programs (Zyambo, 2018). Institutional economics tells us that people will choose among options, going for the least costly option. Economic benefits in the Southern African context have been identified as a major driver for sustainable utilisation of wild resources (Child, 2004). “When resource users can derive economic benefits from their resources, they tend to develop positive attitudes to natural resources and therefore use them sustainably” (Milupi, *et al.* 2017, p. 1132).

6.5 Conclusion

Access to capitals enables households to attain a sustainable livelihood outcome. The results illustrate that households have a maximum access to natural capital such as land. However, access to stocks, such as timber is very low. Thus, limiting the ability of households from generating the much-needed household income. Access to financial capital was also low, with most households unable to earn any savings or loans. Social capital was extremely low with far-reaching effects on participation in CBNRM programmes. Participation by the local community is a pillar to success of CBNRM and sustainable use of resources (Milupi, *et al.* 2017). Assets acquisition is further influenced by social and economic status of the household such as gender, wealth, education and number of people in the household. Differential access to livelihood assets can go a long way towards explaining variations in household livelihood strategies and outcomes (Scoones, 2015).

There is a high diversification in terms of income sources. With a diversification index of 0.8, however, the relationship between income and diversification is nonlinear and complex. The households are highly dependent on natural resources as is indicative in the role that wild resources play as a safety net in times of food shortages and contribution from environmental income. High dependency on natural resource extraction can also be associated with lack of assets and access to markets (Angelsen *et al.*, 2014). The collection of wild resources is done on daily basis; however, the main ones from which households derive income include charcoal, mushrooms, grass, timber and fish. It is a common practice in research to use environmental income share as a proxy for measuring dependency (Mamo *et al.*, 2007), and in this study food security was also used as a measure of dependency. During times of food insecurity households depend on wild food.

Most of the households are poor, living below the poverty line (< USD 1 per day) according to the world bank classification with the main source of income coming from agriculture. The total income share from agriculture was the highest at 60% followed by environmental income at 13%. Environmental income share is low because of constraints, such as licences that are barriers to increasing this income share (Tumusiime and Sjaastad, 2013). This was evident in the fact that high-value products had a positive relationship with licence fees. The higher the value of the harvested product the higher the license fee. Access to land is a problem due to the legal pluralistic nature with unclear land tenure system in which land has been handled,

rendering households insecure. The challenges associated with land acquisition and low rights have disincentivised local communities in their conservation role (Milupi, *et al.* 2017). Zoning the PA further reduced the access to the much needed NTFP that households require for sustenance as food and income.

Households consider the most important benefits as those that accrue directly to the households. Therefore, food was ranked the most important benefit, while tourism was ranked the least important. The people are not motivated to participate in conservation due to lack of incentives (Zyambo, 2018). People have lost access to hunting privileges, which is their heritage, creating a negative environment for conservation causing illegal harvesting. Costs of living in the PA are more than the benefits that households gain, leading to low motivation towards sustaining CBNRM programmes (Child, 2004). It is evident that livelihoods in the study area are highly dependent on the natural resource base. Therefore, their sustainability is dependent on getting the institutions that govern natural resources right.

6.6 Chapter summary

The livelihood profile of a household is determined by the resources that they can access. Contextual, social and economic factors influence the variations in livelihood strategies and outcomes. Livelihoods in the study area are highly dependent on the natural resources base. Environmental income contribution to total household income is an indicator of natural resources dependency. Furthermore, natural resources act as a safety net during months of food shortages. Governance structures, however, have put in place institutions that limit livelihood diversification. These institutions affect the ability of households to access natural resources. Rules in use, such as licences acquisition prior to accessing high-value natural resources is a constraint on increasing household income. The many actors and plurality of land access in the area increases the vulnerability of households due to uncertainties surrounding land tenure, since most of the livelihoods are dependent on access to land. Zoning further restricts and limits access to NTFP, which is needed as a source of food and income. The costs of living in the area mostly stem from human wildlife conflicts. The costs are mainly incurred through crop damage. The benefits range from food that benefits the households directly to revenue, which is a communal benefit. However, households tend to recognise benefits that accrue directly to households as of more importance. Livelihood strategies are constrained or enhanced by governance structures in place by influencing decisions that households make, thus having

implications for the conservation of the PA. The chapter that follows highlights the impact of livelihood strategies and governance structures on PA conservation.

CHAPTER SEVEN: THE IMPACT OF LIVELIHOOD STRATEGIES AND PROTECTED AREA GOVERNANCE ON WILDLIFE HABITAT CONSERVATION

7.1 Introduction

Social-economic factors such as agriculture expansion, population growth, daily livelihood needs, oil palm plantation establishment, policy shifts and regime change have been reported to influence Land Use and Land Cover (LULC) change (Handavu, Chirwa and Syampungani, 2019). This chapter presents the results on the impact of livelihood strategies and governance on buffer zone conservation. GMAs are designed to support community livelihoods and wildlife conservation (Milupi *et al.*, 2020). The decisions that households make determine choices that are made about livelihood strategies. However, these decisions are made in relation to the local institutions and norms.

Therefore, the study explores the interactions between livelihood strategies and governance to understand the drivers of forest loss and land use dynamics in Mufunta GMA. Identifying the factors that lead to Land Cover Change (LCC) may help to limit these processes and their negative consequences (Phiri, Morgenroth & Xu, 2019b). In Zambia, households in GMAs mostly engage in farming and forest product extraction as a livelihood strategy (Milupi *et al.*, 2020). In order to improve our understanding of LULC relationships, there is need to link them to human action (Handavu *et al.*, 2019).

The study illustrates the threats to habitat conservation due to livelihood strategy choices and decision-making at household level. People's perceptions about land cover change may influence cognitive change. The study measures agency through cognitive change by analysing the decisions that households make in relation to sustainable resource utilisation. Drivers of LCC are subject to the demands of household resource requirements. Thus, if drivers of LCC are not addressed, livelihoods will be greatly affected by resource base depletion. The consequence of converting forests to agriculture land is that poor people may be deprived of access to natural resources (Kamanga *et al.*, 2009).

The creation of PAs is an intervention for reducing biodiversity loss through forest conversion (Milupi *et al.*, 2020). Therefore, monitoring forest trends before and after the Community-Based Natural Resource Management (CBNRM) intervention, illustrates the link between Protected Area (PA) conservation and governance. The study area was gazetted as a PA in 2006. That year is selected as a baseline to monitor if CBNRM governance intervention has had an influence on forest conservation. Satellite images were collected in intervals in 2006, 2014 and 2018 to assess the trend of forest cover change. The chapter presents the results using a combination of remote sensing data, field observations, interviews and household survey data to analyse the patterns and dynamics of forest cover change for the 13 years from 2006 to 2018 in Mufunta GMA in Zambia.

7.2 Background

The UNEP (2009) Vital Forest Graphics Report estimated the world's terrestrial surface to be 70% land, 30% forests and 12% forests in PAs. The world's forests are under multiple threats, including from humans, which have consequences for wildlife habitat conservation. The main threat to habitat conservation is land conversion through the removal of forests for other land uses. "Deforestation and land degradation remain major global environmental challenges" (Kamanga et al., 2009, p.613). Deforestation is estimated at 13 million ha a year and most of the losses in forest cover are taking place in developing countries, in particular South America, Africa and Southeast Asia (UNEP, 2009). In Zambia the deforestation rate is estimated at 276,021 ha per annum, according to the Integrated Land Use Assessment Report (ILUA, 2017).

Agriculture is the biggest driver of land cover change through the conversion of forest areas into cropland. An estimated 4.7 million km^2 grassland areas and 6 million km^2 of forests, have been converted to farmlands worldwide since 1850 (Lambin *et al.*, 2001). Furthermore, an estimated 340 million ha of woody vegetation in dryland zones of Africa have become degraded due to agricultural expansion and deforestation (Kigomo, 2003). It is estimated that in Africa annual forest loss is about 0.62% (Kamanga *et al.*, 2009), of which 60% is due to direct conversion of forest area to small-scale permanent agriculture (UNEP, 2009). Rural livelihoods are highly dependent on agriculture and forests. "The World Bank has estimated that 1.6 billion people around the world depend to some extent on forests for their livelihoods" (UNEP, 2009, p.16).

According to Lambin *et al.* (2003), still unmeasured forms of rapid land-cover changes that are thought to be widespread are poorly documented at the global scale. Local and national scale studies demonstrate their importance and ecological significance; prominent among these are changes in the (sub) tropical dry forests such as the Miombo forests in Southern Africa (Lambin *et al.,* 2003). Zambia's vegetation where Mufunta GMA is located is predominately Miombo woodlands. In the period between 2000-2005 Zambia was ranked among the five countries with the largest annual net loss of forest area (UNEP, 2009). Deforestation and forest degradation are the major environmental challenge faced in Zambia (Handavu *et al.*, 2019). Through this study the understanding of land cover change in the Miombo woodlands in the GMA context will be enhanced. Thus, this study aims at contributing data to the unmeasured forms of rapid land use change.

There have been some studies of land cover changes at regional or local levels, but they often deal exclusively with quantifying land-use/cover changes using remote sensing tools for change detection or they focus on causes of land cover changes through socio-economic surveys (Tsegaye, Stein, Vedeld & Aynekulu, 2010). However, studies such as these which link land cover changes using remote sensing with PA governance interventions and perceptions of drivers are rare. Integrated, place-based research on land-cover change requires a combination of agent-based systems and narrative perspectives (Lambin *et al.*, 2003). Furthermore, Phiri *et al.* (2019) concluded in their study that PA status was important for forest recovery and reversion. Going beyond Phiri *et al.* (2019), the specific goal of this study is to illustrate the trends of land use land cover changes in relation to CBNRM governance intervention through the creation of a PA and linking them to the drivers of change and decision-making about livelihood strategies.

Using GIS and remote-sensing techniques, the study tracks the role of CBNRM from the establishment of the GMA in 2006 to 2018, monitoring forest cover trends during co-management implementation. One of the weaknesses in collaborative public management is that, whereas there is a need to understand how collaboration actually performs over time from inception to the present, research has mostly focused on cross-section analysis (O'Leary & Vij, 2012). Yet this should involve actually tracking collaboration in real time and more longitudinal studies (O'Leary & Vij, 2012). Therefore, GIS presents an opportunity for monitoring the influence of the governance structures on habitat conservation in real time.

"One of the root causes behind deforestation is the weak governance structure for forest conservation and sustainable management of forest resources" (UNEP, 2009, p.4).

7.3 Methodology

Data was collected through household surveys, interviews and remote sensing. For details on data and materials see Chapter 4. For household surveys see section 4.2.3.2, interviews section 4.2.3.1 and remote sensing see section 4.2.3.4. For the data-collection process details see section 4.3.3. and Figure 7.1 below on Land Use Land Cover Change (LULCC).

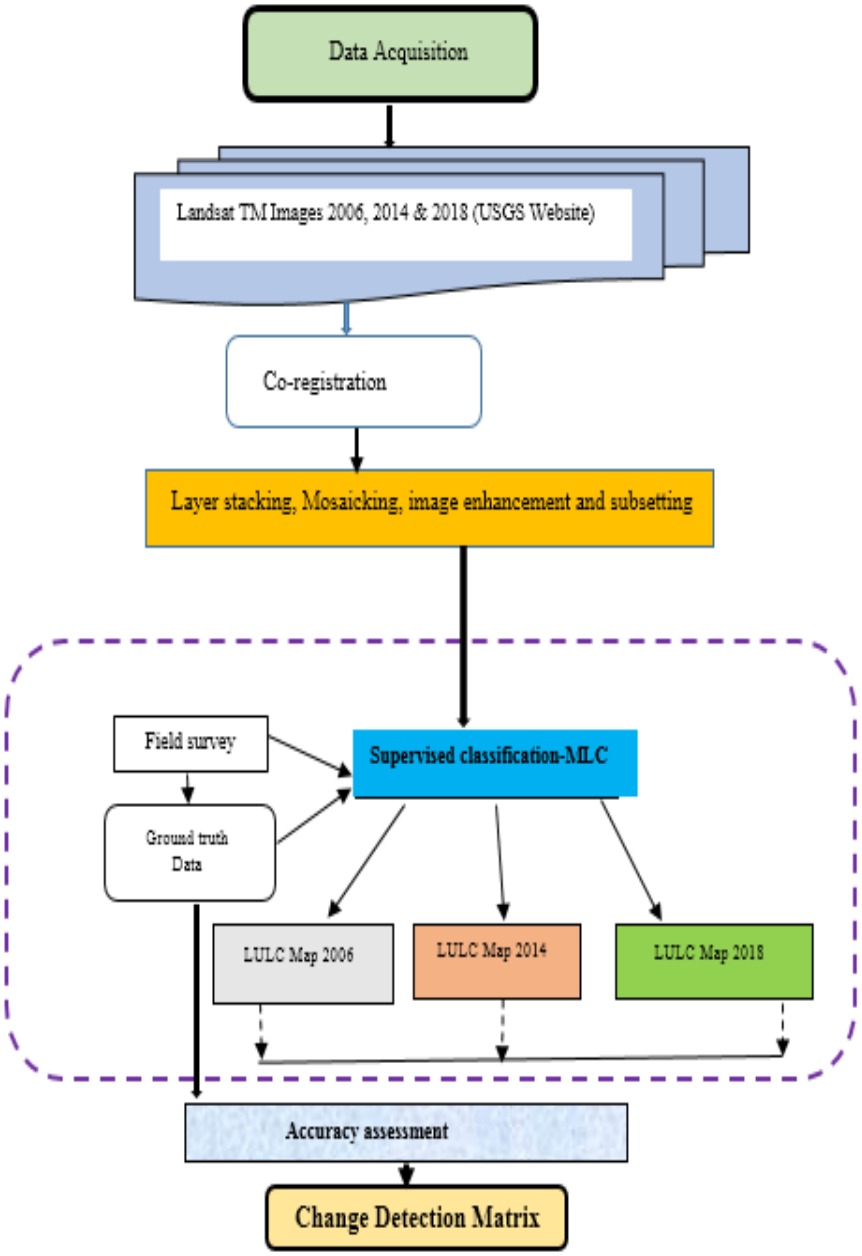


Figure 7.1: Methodology for Land Use and Land Cover Change

7.4 Results and analysis

7.4.1 The threats of agricultural expansion to habitat conservation

The threat of land conversion to habitat conservation is mainly through the expansion of agriculture. Over 90% of households depend on farming as an occupation (Figure 6.3) plus 53% depend on crop production as their main livelihood strategy (Figure 6.4). Agricultural expansion is a serious threat to habitat conservation in the study area. Some of the indicators of forest loss are land size under crop farming, the number of households engaging in shifting cultivation, years taken to shift, and the rate of expansion (Table 7.1).

Table 7.1: Indicators of forest loss in agriculture land use

Variables	Mean	SD	Coefficient of Variance	%households	Number of Observations
Plots of land (No.)	1.4	0.6	0.3	100	404
Land size (a)	32.9	38.37	1472.3	100	403
Shifting Cultivation				54.2	404
Years before shifting	2.7	1.49	2.244	54.2	404
Future expansion				62.4	404
Expansion per year	6.59	4.67	21.89	62.4	404

Note: % household contribution to variables of forest loss is an indicator of the threat of agriculture expansion on habitat conservation

On average every household has a plot of land equivalent to 32.9 acres where agriculture is carried out. Over 54.2% practice shifting cultivation and it takes 2-3 years for a household to shift to another piece of land. The fallow period used to be 5-15 years but keeps on reducing as pressure on land acquisition increases. Sixty-two-point four percent (62.4%) of the households indicated that they have plans for future expansion and they plan to expand at about 6.5 acres per year on average. In total the expansion for all households per year is estimated at 1,603 acres per year. Since 62.4% households out of the sampled households indicated plans for expansion and the study area has a total of 5,599 households, 3493 households on average

intend to expand their area for farming. This will result in 2,265 ha of forest loss per year on average from agricultural expansion (Figure 7.2). The Miombo woodlands covers about 497,600 ha of the GMA. Therefore, the study projects that in 10 years' time all factors held constant a total of approximately 22,650 ha of the buffer zone will have been cleared, equivalent to 4.5% of the buffer zone forest (Figures 7.2 and 7.3). Figure 7.2 is illustrating the cumulative forest area loss in 10yrs and 7.3 is illustrating non-cumulative forest area loss. The major vegetation type in the Mufunta GMA is the Miombo woodlands that provides a habitat for elephants, sable antelopes, roan antelopes, lions, leopards and warthogs (ZAWA, 2006).

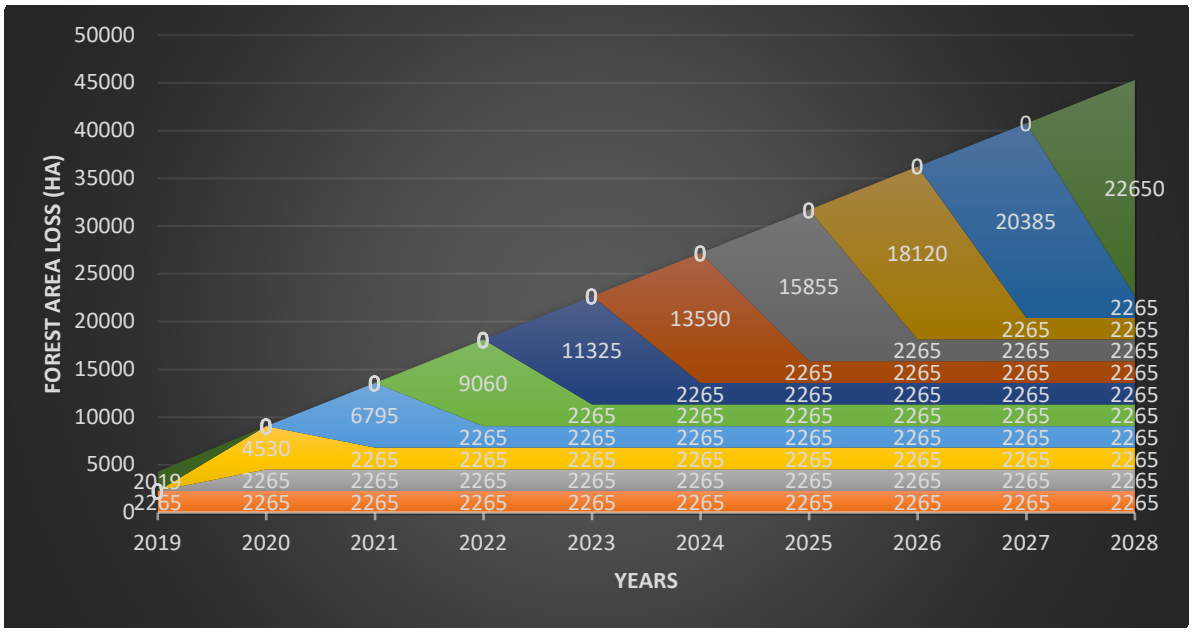


Figure 7.2: Projection of forest loss over time: cumulative change

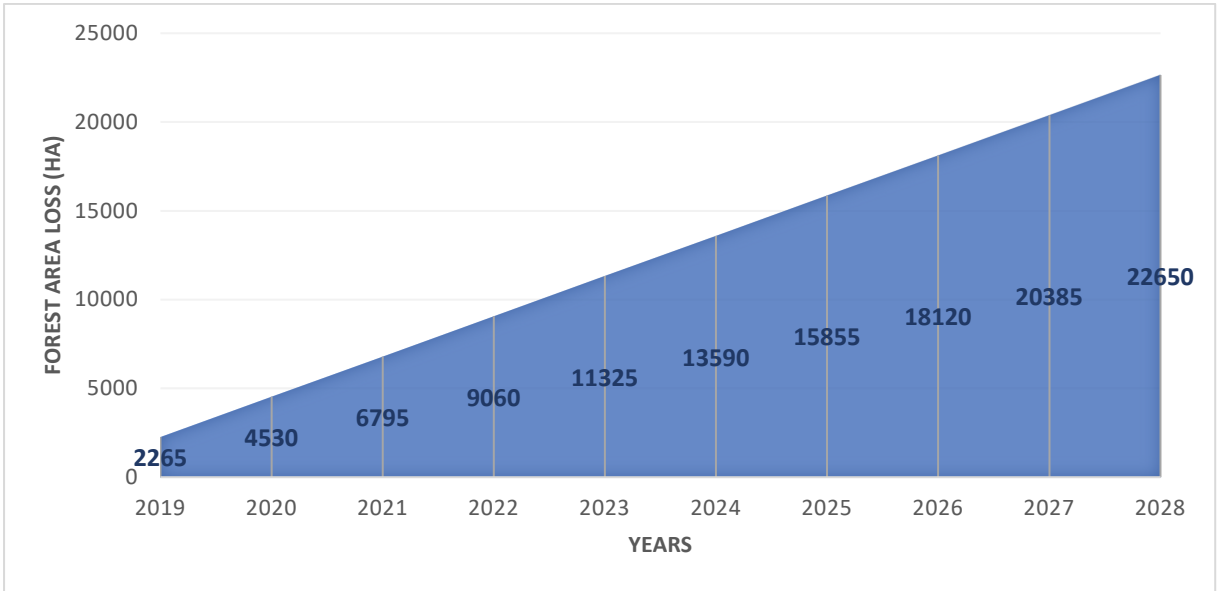


Figure 7.3: Projection of forest loss over time: constant change

7.4.2 Perceptions about land cover change and decision-making

About 79 % of the households in the study area share the perception that the forest area has decreased over time (Figure 7.4). However, their knowledge of the dwindling forest cover has not influenced all the households into action to reduce the loss of forest cover, as illustrated in Figure 7.5.

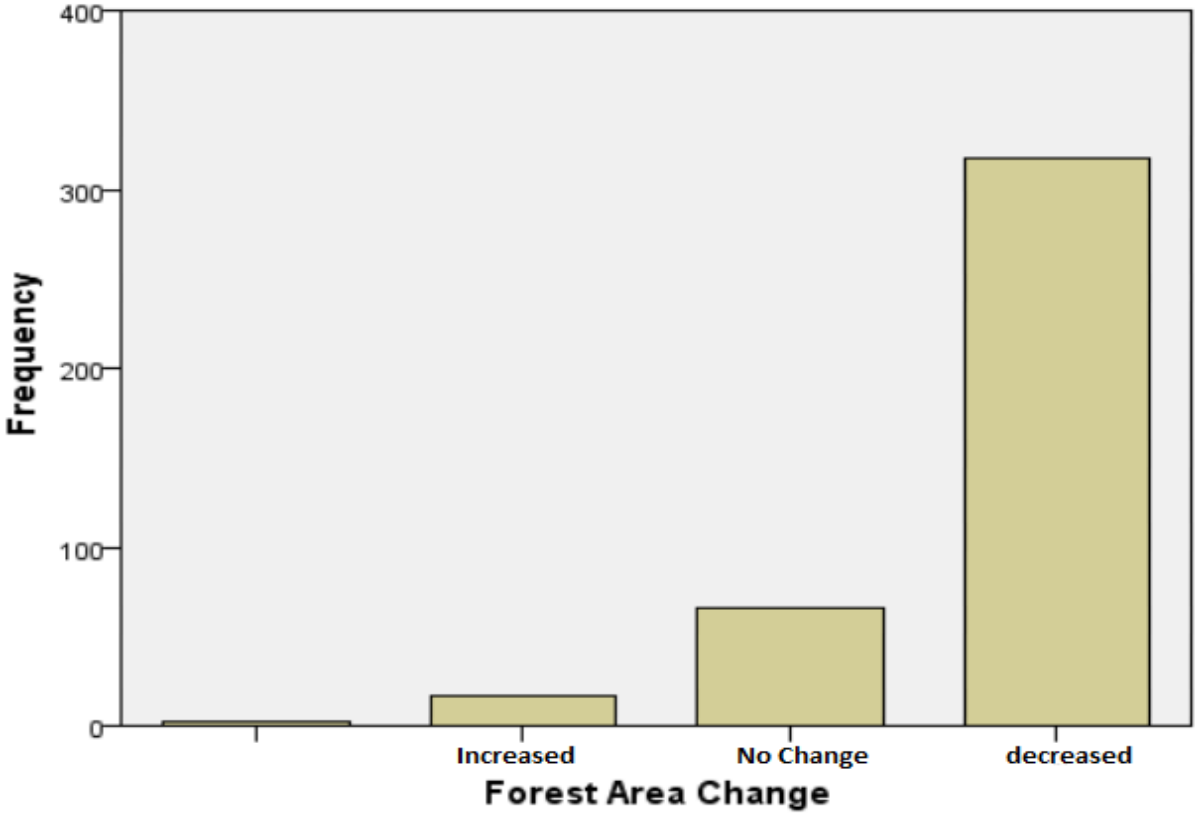


Figure 7.4: Perceptions about forest cover change

About 47% of the respondents indicated that they are doing something about the forest cover lost, while 53% said they were not doing anything about it (Figure 7.5), except continuing with business as usual. Those who were doing something about the loss of the forest engage in activities such as tree planting, educating others about the consequences of cutting down trees, practicing selective cutting of trees and abandoning tobacco farming. On the other hand, those who were not doing anything gave reasons, such as livelihoods being dependent on the forest and therefore they don't have alternatives, lack of tree seeds and seedlings for planting, lacking knowledge about what they can do about the situation, and having no rights to prevent outsiders from accessing forest resources. Sixty-four percent (64%) of the respondents were of the view that they do not have a right to make decisions about the forest, which does not belong to them,

other than that which is on their farmland. The GMA was created on the premise that the community will work together to protect the resources; however according to the data there is very little community cohesion and cooperation. Therefore, the people act more in terms of the "I" than the "We" factor as they believe they can do something about the forest on the land which they own, while that which is communal is the responsibility of community leaders and the government through the responsible department.

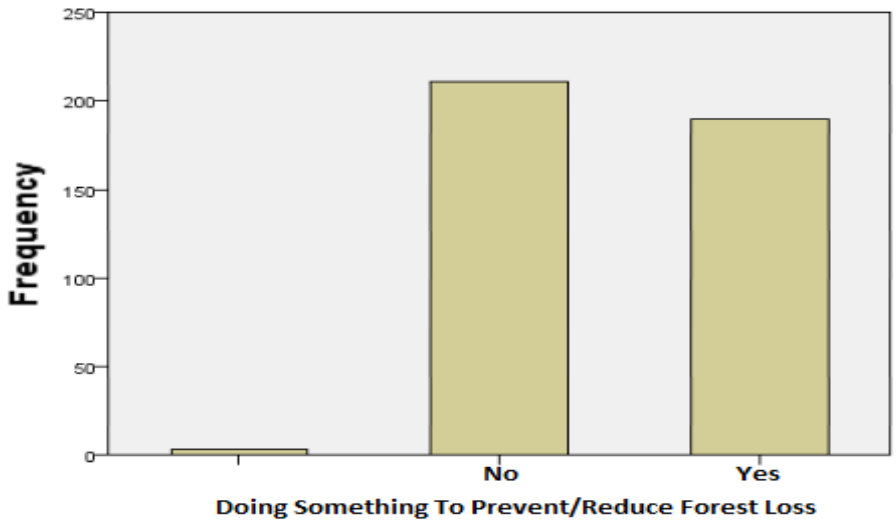


Figure 7.5: Decision about sustainable forest utilisation

Using a cross-tabulation, the relationship between knowledge of forest loss and the decision to do something about it was tested (Figure 7.6). The result indicates that there is no relationship between knowledge about forest loss and the decision to do something about it (χ^2 (6) = 192.1, P< 0.05). This may be attributed to the household's dependence on the natural resources, which results in households exploiting the resources despite being fully aware of the consequences (see Figures 6.5 and 6.6 on household dependency on wild resources). On the other hand, lack of knowledge about GMA and planned zones could be a driver of forest loss, since a larger percentage of the people are not aware of the planned zones and that they live in a PA. As a result, they don't know which areas to conserve and the ones from which to extract products (Table 5.2).

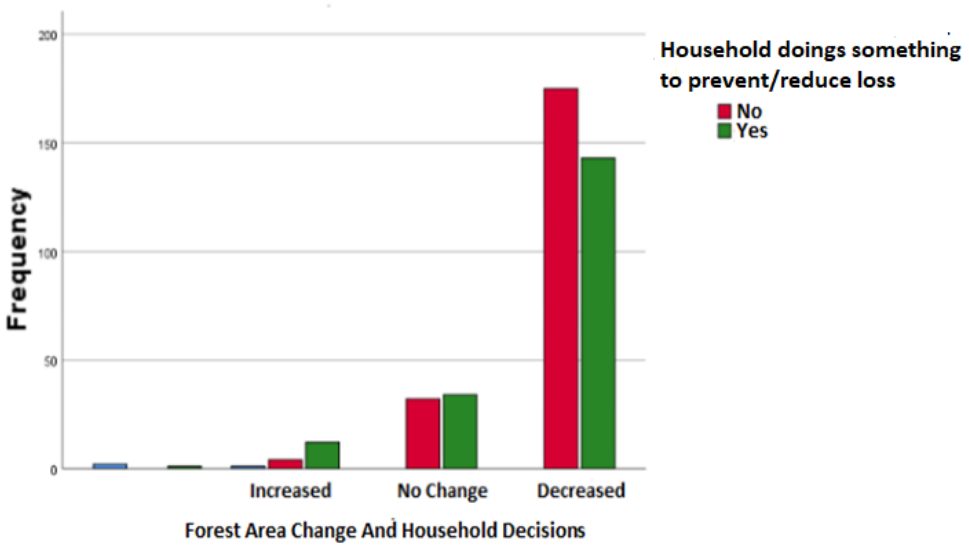


Figure 7.6: Perceptions about forest area change and household decisions on sustainable use

7.4.3 Drivers of forest loss in Mufunta GMA

The main driver of forest loss is tobacco farming at 44%; secondly as the study area has a lot of valuable timber such as Mukula (*Pterocarpus chrysotherix*), Mukwa (*Pterocarpus angolensis*) and Muzauli (*Guibourtia Coleosperma*), timber harvesting is ranked second at 19%, with charcoal manufacturing in the third place at 16% (Figure 7.7). Currently, there is a new threat to forest cover in the form of "caterpillar harvesting" ranked fourth at 10%; respondents indicated this as a new phenomenon which culturally they never used to engage in as a livelihood strategy. Households cut down trees when collecting caterpillars; from the data it seems to be contributing quite substantially to forest loss. This is an indicator that as livelihood strategies change, the dynamics of the threats to forest cover also change. Shifting cultivation, firewood and late bush fires are at 9%, 1%, and 1% respectively (Figure 7.7). The results on livelihood strategies indicate that the households are mostly dependent on cutting down trees in one way or another (Figure 6.4). Apart from PA employment all the livelihood strategies involve cutting down trees. Therefore, the decisions that households make bounder on survival "*You cut the tree, or you perish"* (Figures 6.6. and 6.7).

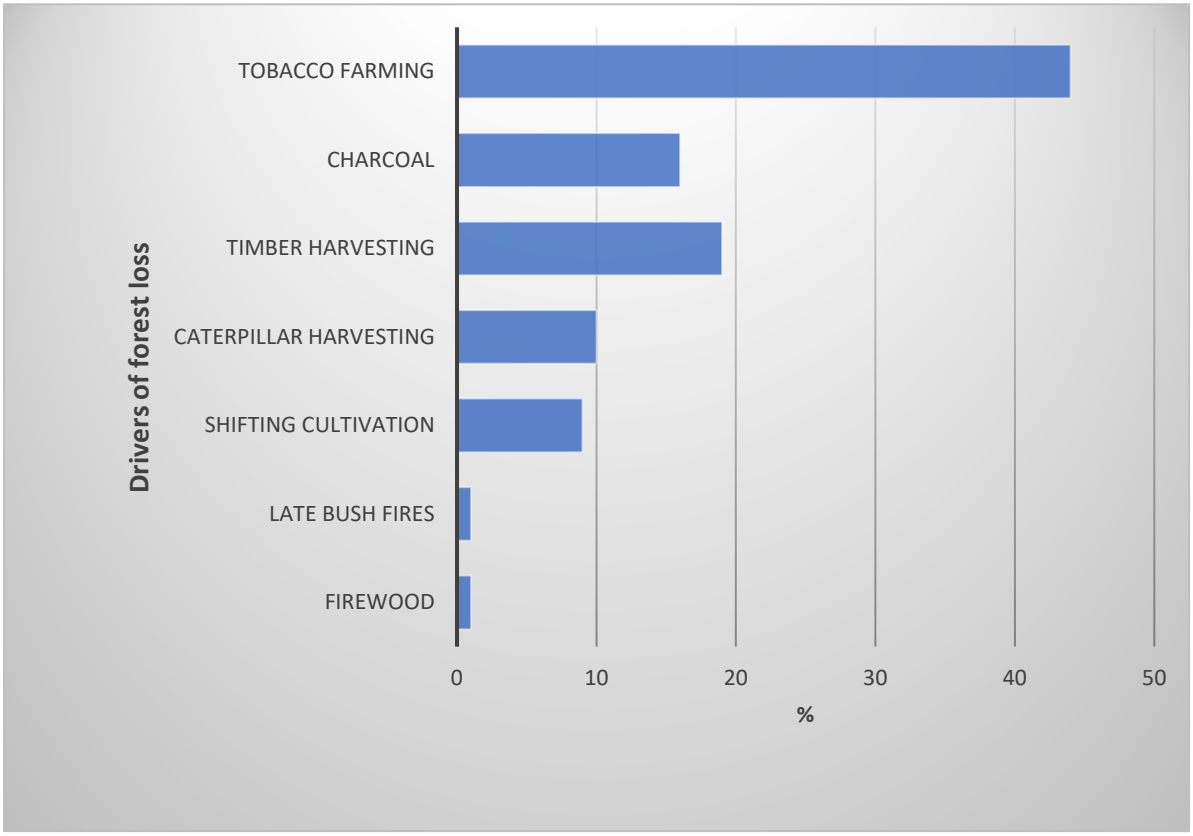


Figure 7.7: Drivers of forest loss in Mufunta GMA

7.4.4 The role of institutions in habitat conservation

Drivers of forest loss are clearly different between the two districts in the GMA, with tobacco farming being the major threat for Nkeyema district, while timber harvesting, charcoal manufacturing, shifting cultivation and caterpillar harvesting are mostly the drivers in Luampa district (Figure 7.8). Contextualising the drivers according to administrative boundaries provides valuable data for CBNRM stakeholders to develop strategies to conserve the buffer zone, since it enhances the understanding of the livelihood strategies within administrative boundaries. Thus, the strategy can be tailored to fit the social-economic context and district strategic plans. Drawing on the lessons from Nkeyema through CBNRM, the threat of tobacco farming on habitat conservation can be avoided by ensuring that it does not spread to Luampa district. The threat of tobacco farming combined with the other drivers the district is already facing could be disastrous for the PA. If the governance of the GMA is coordinated, CBNRM could be useful as a platform for exchange of information and prevention of the further forest loss.

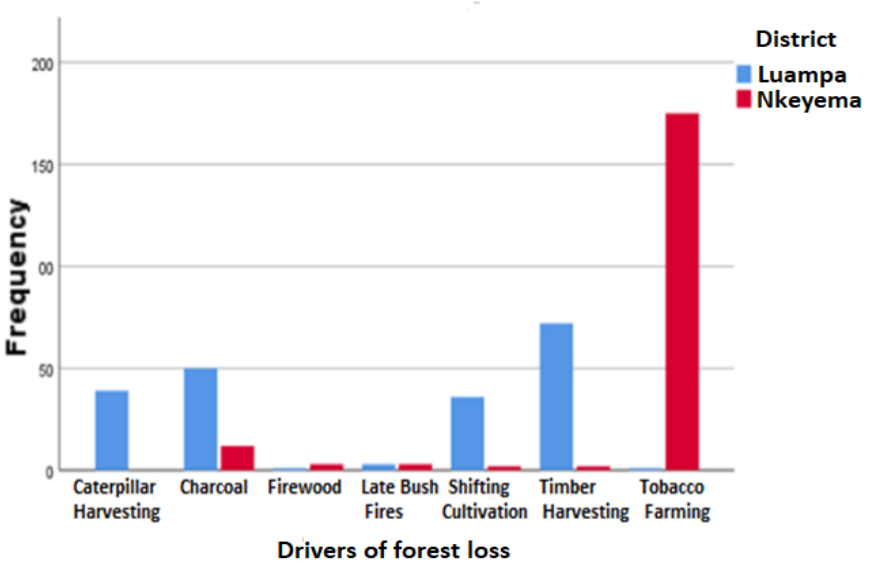


Figure 7.8: Drivers of forest loss by district

The drivers of forest cover loss that dominate each VAG are different (Figure 7.9). Therefore, the CBNRM structure through VAGs is key to developing a strategy to combating forest cover loss. For Kalale, Lalafuta and Litoya VAGs, the biggest threat is tobacco farming. Charcoal, timber harvesting and caterpillar harvesting are the biggest threats in Luampa, Shikela and Shipungu VAGs, respectively. Understanding livelihoods at VAG level, the CRB can focus on the threat each VAG is facing, by interrogating the livelihood challenges directly and developing alternatives and new strategies to reduce the pressure on the forest.

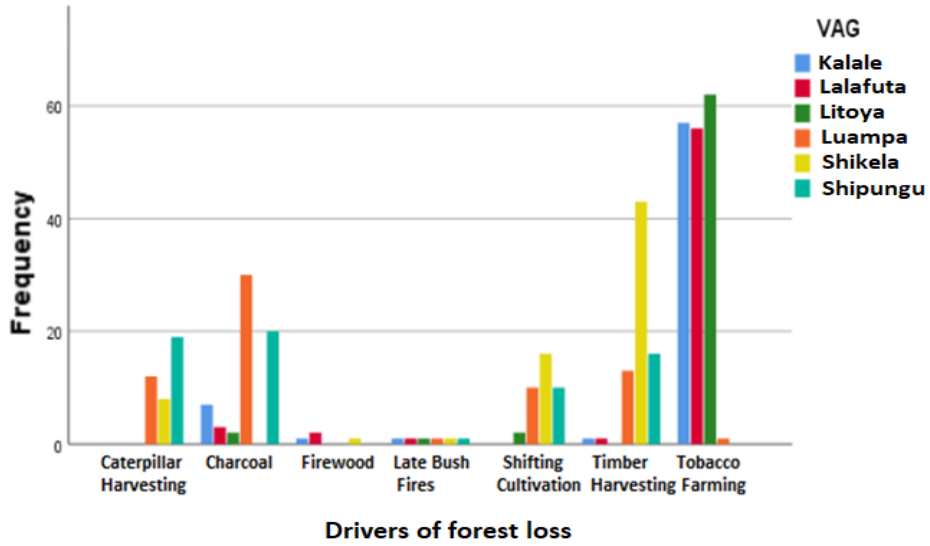


Figure 7.9: Drivers of forest loss by Village Action Group

7.4.5 Measuring typologies of causes of land-use change in the study area

Loss of forest occurs because of the interaction of different drivers, resulting in change. The causes of land use change in the study area are compared and measured against the five typologies of causes of land use change proposed by Lambin *et al.* (2003):

1. Resource scarcity causing pressure of production on resources;
2. Changing opportunities created by markets;
3. Outside policy intervention;
4. Loss of adaptive capacity and increased vulnerability;
5. Changes in social organisation, in resource access, and in attitudes.

The land use change factors illustrated in Table 7.2 for Mufunta GMA indicate the role of proximate drivers in forest loss.

Table 7.2: Typology of the causes of land-use change.

Source: adapted from Lambin, Geist and Lepers, (2003) Underlying drivers of LULCC

Land use change factor/Typology	**Lambin *et al.* (2003)**	**Study area (Mufunta GMA)**
Resource scarcity causing pressure of production on resources	Decrease in land availability due to encroachment by other land uses (e.g., natural reserves)	*Creation of the GMA and Zoning this has reduced access to land and other resources (figure 6.15 & 6.16) **(FC)**
Changing opportunities created by markets	Increase in commercialisation and agro-industrialisation	*Tobacco farming is main proximate driver caused by global tobacco markets (figure7.7) *Provision of farming inputs by the tobacco company.**(SC)**
Outside policy intervention	Poor governance, corruption and insecurity in land tenure	*Poor governance cited as a barrier to accessing natural resources (table 6.3) *Stakeholders ranked corruption as a main challenge for governance in the study area (figure 5.5) *Land insecurity due to legal pluralism and lack of land rights (table 5.6 & figure 6.13) **(SC)**
Loss of adaptive capacity and increased vulnerability	Impoverishment (e.g., creeping household debts, no access to credit, lack of alternative income sources, and weak buffering capacity)	*% access to loans and savings is very low in the study area (table 6.1) * Household income is mainly from agriculture with the other sources contributing negligible percentages thus reducing income alternatives reducing adaptive capacity (figure 6.8 & 6.9) **(SC)**
Changes in social organisation, in resource access, and in attitudes	Changes in institutions governing access to resources by different land managers (e.g., shift from communal to private, tenure, holdings, and titles) Lack of public education and poor information flow on the environment Loss of entitlements to environmental resources (e.g., forestry projects, wildlife conservation), which leads to an ecological marginalization of the poor	* There is a transition in land governance from customary to other land categories (figure 6.13) and tenure is not secure because most of the land is not on title (table 5.6) *Low awareness about CBNRM which may be a driver to forest loss (table 5.2). *Stakeholder ranked lack of information as the main challenge to CBNRM governance approach of the GMA (figure 5.12). **(SC)** * Households have very low access rights to resources thus are not motivated to protect resources (figure 6.17 & 6.18) **(FC)**

* Land use change factor/typology from the study area, (FC) Fast Change, (SC) Slow Change

7.4.6 Land use and land cover classification (LULCC) and change detection

7.4.6.1 Land use and land cover change in Mufunta GMA 2006 to 2018

Land use and land cover change can be monitored by focusing on land conversions and modifications. For this study, the focus is on land conversions since our interest is in forest loss through its replacement by other land uses. The monitoring of land conversion can simply be measured by comparing successive land cover maps (Lambin *et al.*, 2003). Forest trends are monitored from before and after the creation of the PA.

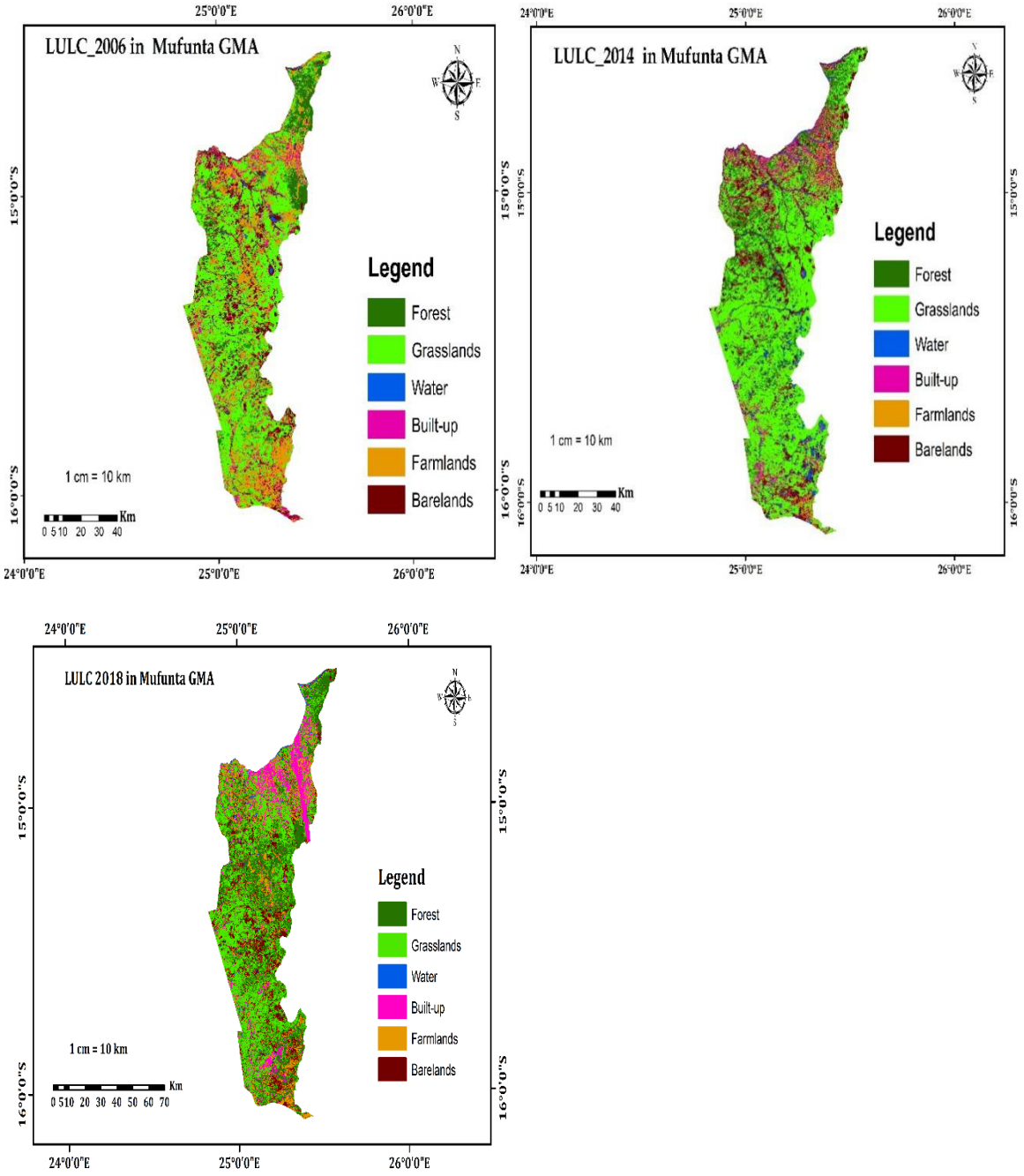


Figure 7.10: Land use and land cover change in Mufunta GMA for 2006, 2014 and 2016

The results showed an overall accuracy of 93.5%, 75%, and 70.2% for 2006, 2014 and 2018 respectively (Appendix 15). The user's accuracy ranges between 50% to 100% for 2006; 50% to 100% for 2014 and 60 to 85.7% for 2018. While for the producer's accuracy it ranges between 50 to 100% for 2006, 71.4% to 100% for 2014 and 50 to 85.7% for 2018 (Appendix 16). The map for 2006 had the highest overall accuracy compared to maps for 2014 and 2016. This can mainly be attributed to the high quality of the 2006 Landsat OLI image which was cloud free.

The Kappa statistics calculated from each confusion matrix were 64%, 65% and 69% for 2018, 2006 and 2014 respectively. Consequently, considering the classification scale of (Fleiss, Levin, & Paik, 2013), the classification lies in a very a good range (Appendix 16). According to Fleiss, Levin, & Paik (2013), a Kappa value ranging between 0.40 and 0.75 may be taken to represent fair to good agreement beyond chance.

7.4.6.2 Land use and land cover change in Mufunta GMA in 2006

The land use and land cover change classification of the area for 2006 from Landsat 7 ETM+ satellite image (Table 7. 3) showed that most of the study area was bare land (86802.12 ha) contributing 27.2% of the total area. The percentages of other LULCC as classified in the GMA were: water (3.1%), forest (17.7%), grasslands (23.9%), built-up (12.4%) and farmlands (15.7%).

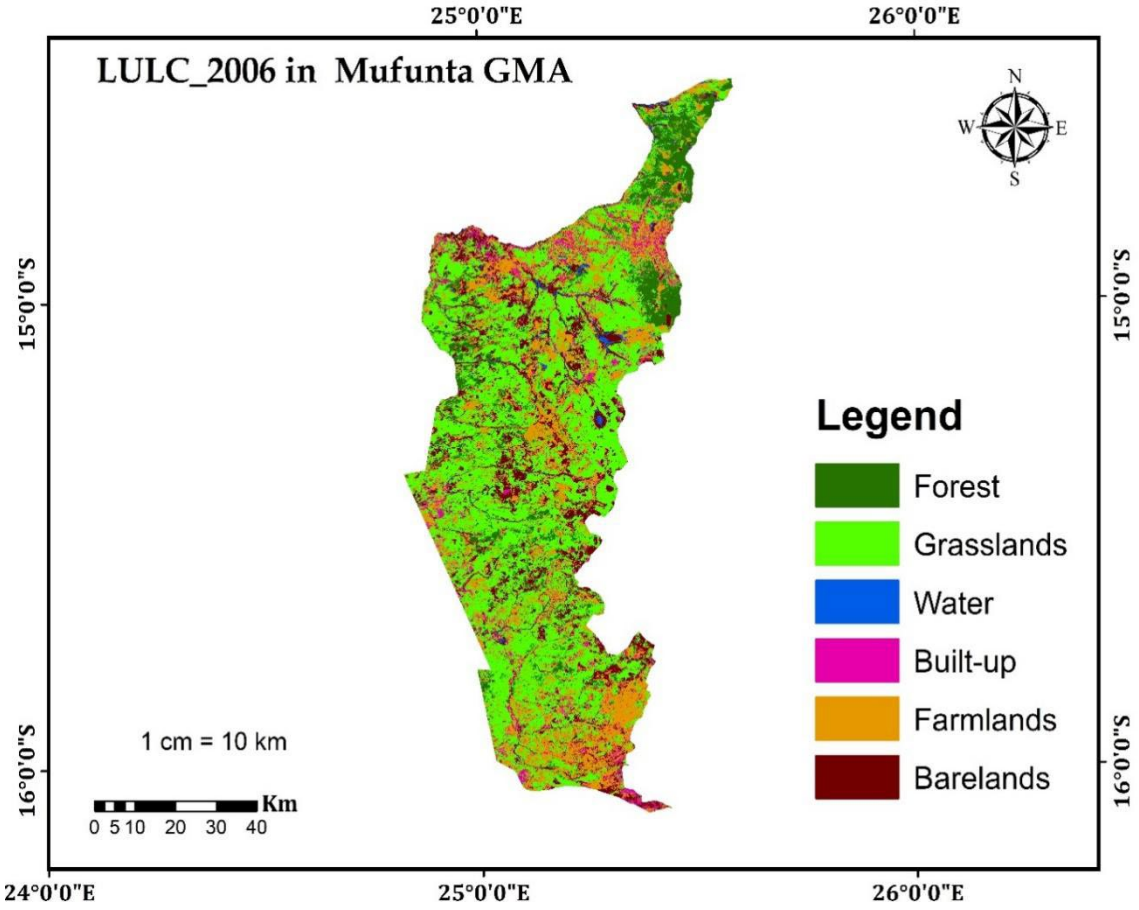


Figure 7.11: Land use and land cover change map in Mufunta GMA for 2006

7.4.6.3 Land use and land cover change in Mufunta GMA in 2014

The 2014 classification was as follows: grasslands (54.8%), forest (13.9%), water (4.4%), farmlands (5.4%), built-up (8.5%) and bare land was at (13.0). Grasslands were found to be the dominant type of land use classified in the year 2014 with an area of 349845.6 ha, covering 38.9% of the total study area. Forest areas covered an area of 88531.56 ha covering 30.7%, while the smallest land use was water bodies at about 27946.89 ha (4.4%) of the total land area. A drastic reduction was observed from the land use classified as farmlands dropping from 15.7% in 2006 to 5.4% in 2014, giving a reduction of -10.3% of the total land used for agricultural purposes. This reduction may be due to restrictions because of the creation of

GMA. Areas where farming could be carried out is restricted only to a specified zone in the PA known as the Development Zone.

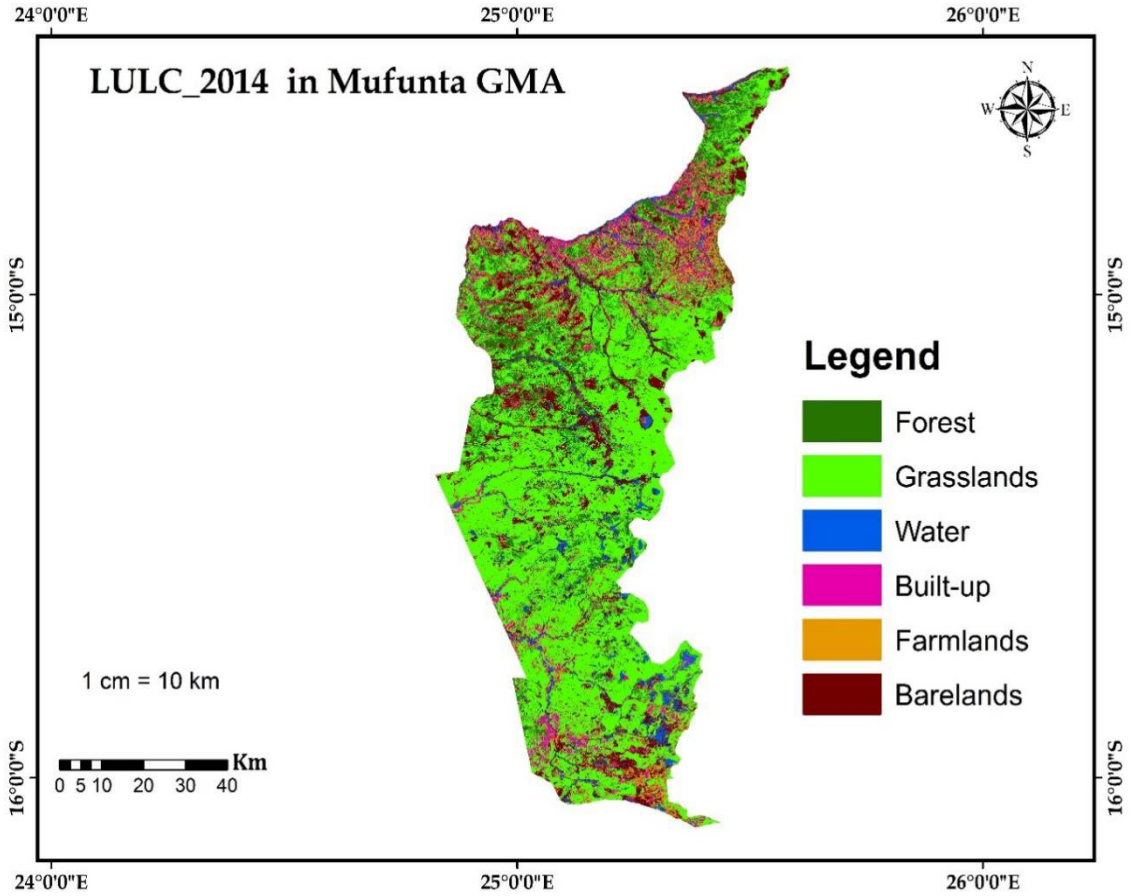


Figure 7.12: Land use and land cover change in Mufunta GMA for 2014

7.4.6.4 Overall change detection between 2006 and 2014

From the classification results, the overall changes detected between 2006 and 2014 showed that there was an increase of 3.8% in the forest, 30.9% in grasslands, 3.9% in built-up, 1.3% in water bodies and a decrease of -10.3% in farmlands and -14.2% in bare lands, respectively. The major decline was observed in bare lands (-14.2%) followed by farmlands (-8.1%) as shown in Table 7.4. According to household data, abandoning tobacco farming which involves clearing forests for cultivation and curing tobacco was among the ways in which households are contributing to forest conservation. The abandoned farms regenerate and the forest is given a chance to recover.

Table 7.3: Land Use Land Cover Change for 2006-2014

	2006	2014	LULCC 2006-2014
Class	**Area (Ha)**	**Area (Ha)**	**Change (%)**
Barelands	86802.12	82846.89	-14.2
Built-up	39440.07	54440.28	3.9
Farmlands	50217.84	34456.14	-10.3
Forest	56495	88531.56	3.8
Grasslands	76217	349845.6	30.9
Water	9831.78	27946.89	1.3

7.4.6.5 Land use and land cover change in Mufunta in 2018

The 2018 classification was as follows: forest (21%), grassland (33.7%), water (12.5%), farmlands (10.8%) and built-up (9.5 %) and bare lands was at 0.7%. Despite the slight decrease in the area cover by grassland it remains the dominant land use type (33.7%) with an area of 241703.5 ha. Although forests were not the dominant type of land use classified in the year 2018 with an area of 150452.2 ha, it covered 21% of the total study area. Land use classified as built-up was the smallest land use with an area 67848.2.

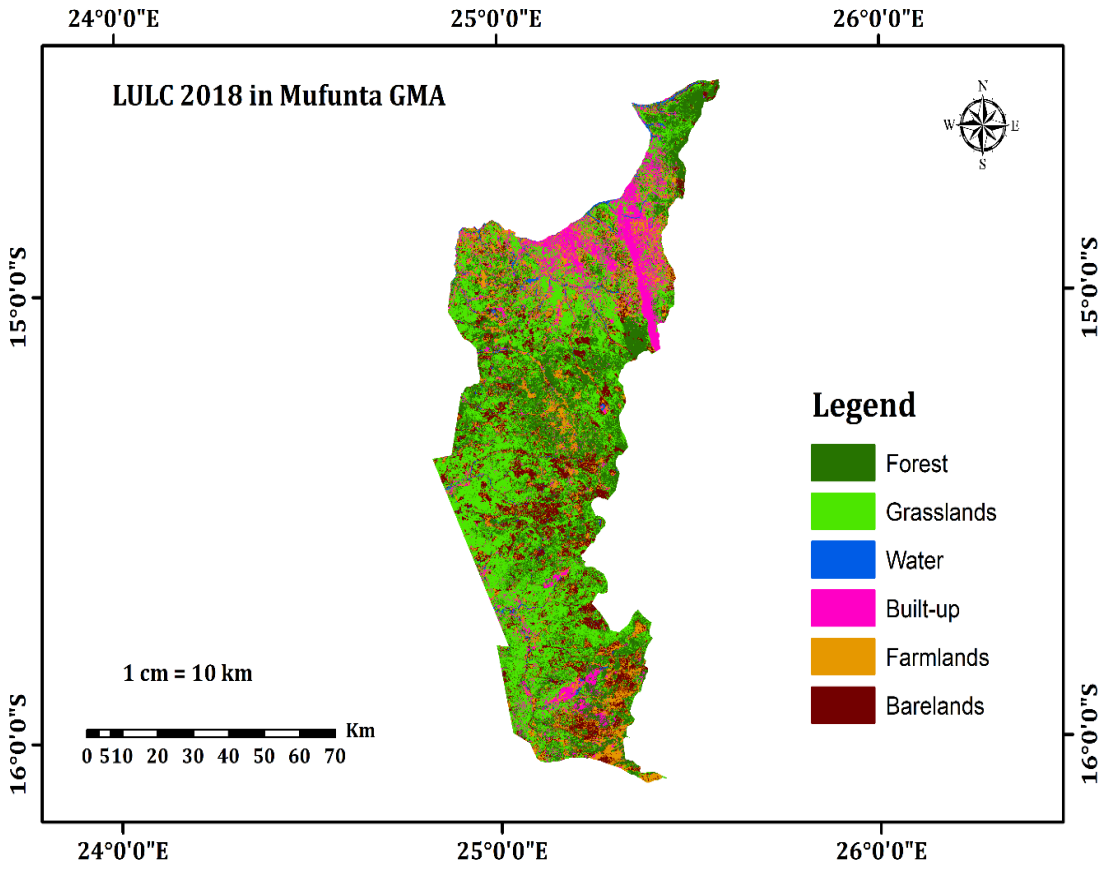


Figure 7.13: Land use and land cover change for Mufunta GMA 2018

7.4.6.6 Overall change detection between 2014 and 2018

Between 2014 and 2018 there was an increase of 7.1% for forest cover, 5.4% for farmlands and 0.9 increase in built-up. However, there was a decrease of -21.1% for the grassland, and -0.5% decrease in bare land and water bodies (Table 7.5). There was a decrease of about -0.5% in water bodies and about -0.5% in barelands. However, there were also significant conversions from one land cover category to another within the same period, as shown in the LULC maps in Figure 7.11, which shows the percentage cover of each LULC class. For instance, much of the grasslands were converted to forest and some grasslands were cleared to establish settlements. The reduction in water bodies might be explained by the clearance of vegetation along the major water bodies.

Table 7.4: Land Use Land Cover Change for 2014-2018

	2014	2018	LULC
Class	**Area (Ha)**	**Area (Ha)**	**Change (%)**
Barelands	82846.89	89699.04	-0.5
Built-up	54440.28	67848.2	0.9
Farmlands	34456.14	77733.8	5.4
Forest	88531.56	150452.2	7.1
Grasslands	349845.6	241703.5	-21.1
Water	27946.89	89699.04	-0.5

7.4.6.7 Overall change detection between 2006 and 2018

Between 2006 and 2018 there was a decrease in land uses classified as barelands of -14.7%, -4.9% in farmlands, -2.9% in built-up. However, between the same period an increase in forest, grassland and water bodies was observed at about 3.3%, 9.8% and 9.4% respectively (Table 7.6). The forest cover has increased by about 3.3%, which has had a positive impact on the water bodies, which has increased by about 9.4%.

Table 7.5: Land Use Land Cover Change for 2006-2018

	2006	2018	LULC
Class	**Area (Ha)**	**Area (Ha)**	**Change (%)**
Barelands	86802.12	89699.04	-14.7
Built-up	39440.07	67848.2	-2.9
Farmlands	50217.84	77733.8	-4.9
Forest	56495	150452.2	3.3
Grasslands	76217	241703.5	9.8
Water	9831.78	89699.04	9.4

7.5 Discussion

Mufunta GMA is mostly an agrarian community and the type of agriculture the households engage in influences the level of threat that this livelihood option poses to habitat conservation. Sustainable use theory suggests that the main threat to wild habitats and resources in Africa is conversion of land for agriculture (Child, 2004). Due to the involvement of most households in tobacco farming and shifting cultivation, the threat of habitat conversion is imminent. Like elsewhere in Africa, the agricultural production increases is as a result of conversion of forest to agriculture land by purposely removing the forest (Kamanga *et al.*, 2009).

The results illustrate the threats of habitat conversion using land use indicators such as land size cultivated, number of plots per household, type of farming practised and future expansion. According to Phiri *et al.* (2019), forest losses are influenced by a number of factors, including cultivated area. Using these indicators, the study projects that if all factors remain constant, 4.5% of the Miombo woodlands, which is the wildlife habitat, will be lost in the next 10 years. This signifies a significant loss of biodiversity and livelihood resource base.

Furthermore, households are highly dependent on timber and non-timber forest products extraction, increasing pressure on forest cover for generation of environmental income and domestic sustenance. Direct drivers of forest loss are indicators of the additional threat that forest dependent livelihood strategies impose on the buffer zone. Forests provide an important resource base for poor people, such as agricultural land, non-timber forest products (NTFPs) and timber (Vedeld *et al.*, 2007). The rate at which forests are being lost through livelihood strategies, such as tobacco farming, shifting cultivation, timber harvesting, charcoal production and caterpillar harvesting is threatening the ecological integrity of the buffer zone.

Agency is measured by analysing the decisions that households make in relation to sustainable resource utilisation. Despite households having knowledge of the declining status of the forest in the study area, they still engage in household activities that threaten to further reduce forest cover. This can be attributed to lack of alternatives for livelihood diversification away from forest exploitation (Angelsen, 2014). Furthermore, habitat loss is exacerbated by households being unaware of the planned zones in the protected area. Therefore, they are not equipped with the knowledge to enable them to preserve the areas set aside for conservation.

The drivers of forest cover loss are compared between the two districts in the PA and across VAGs, which are the smallest unit of micro-level governance. The drivers of LCC are clearly different between districts and across VAGs. Variations in the forest loss drivers can be used to guide the development of strategies to counter threats. The study demonstrates that contextual micro-level analysis of drivers using the CBNRM model can be useful to counter threats of forest cover loss by using grassroots structures, such as VAGs. Increased attention to demands of different groups for forest resources may promote effective and legitimate strategies for poverty reduction and consequently reduced forest loss (Kamanga *et al*, 2009).

Most of the drivers in the study area are proximate drivers and caused mostly by human or individual agency. However, these drivers interact in varying ways with underlying drivers to result in land cover change (Lambin *et al.* 2003). The typologies of causes of land use change that interact with the proximate drivers in the study area are measured in relation to the five typologies outlined by Lambin *et al.* (2003). Resource scarcity causing pressure of production on resources, the creation of the GMA and zoning have reduced access to land and other resources, putting more pressure on the available land and resources. As a result, there is an increasing threat of land use change. Changing opportunities created by markets include tobacco farming which is the main proximate driver in the study area. Greater access to markets may often accelerate forest extraction and clearing (Mamo *et al.*, 2007). Furthermore, the tobacco company JTI provides farming inputs, such as fertilisers and seeds for farmers engaging with the tobacco company, and hence providing an incentive for farmers to practice tobacco farming, which inevitably increases the threat on the wildlife habitat. According to Vinya, R., Syampungani, S., Kasumu, E.C., Monde, C. & Kasubika, R. (2011) tobacco curing is one of the main underlying drivers to forest cover loss.

Outside policy interventions, poor governance, corruption and insecurity in land tenure compound forest loss. Poor governance due to corruption is cited as a barrier in accessing natural resources and encourages illegal harvesting of resources, causing resource loss as monitoring becomes elusive. Poor governance has been reported as one of the main contributors to deforestation (UNEP, 2009). Stakeholders ranked corruption as a main challenge for governance in the study area, exacerbated by legal pluralism which causes uncertainties. In such conditions, the authority responsible for land allocation is unclear, resulting in land insecurity for households without titles and land rights. Households are more inclined to protect resources when they have secure rights or tenure (Zyambo, 2018).

Households' access to loans and savings in the study area is very low and this increases the vulnerability of the local people, compelling them into unsustainable use of natural resources. Household income is mainly from agriculture, with the other sources contributing negligible percentages, which reduces income alternatives and adaptive capacity. Lack of alternative livelihood assets results in households engaging in unsustainable natural resource utilisation (Angelsen, *et al.,* 2014). The high dependence on agriculture increases pressure on forests as households clear more land for farming. Agriculture expansion is the ultimate driver of forest cover loss in Zambia (Vinya, et al., 2011). Changes in institutions governing access to resources from communal to private, tenure, holdings and titles lead to uncertainty. There is a transition in land governance from customary to other land categories, and tenure is not secure because most of the land is not on title. Furthermore, traditional authorities are slowly losing control over access to land, making forests more vulnerable to over-exploitation.

Decision-making by households about conservation is affected by lack of public education and poor information flow about the PA. Low awareness about CBNRM may be a driver of forest loss. Since people are not aware of the different planned zones in the PA, they are inclined to cut trees in areas that should otherwise be conserved. Stakeholders ranked lack of information as the main challenge to the CBNRM governance approach of the GMA. Also, the loss of entitlements to environmental resources through the creation of the PA, leads to the ecological marginalisation of the poor. An underlying driver of forest loss could be the fact that households have very low access rights to resources, so that they are not motivated to protect natural resources. Vinya, et al., (2011) also reported insecure land tenure as an underlying driver to forest cover loss.

The overall land use land cover changes between 2006 and 2018 shows an increase in forest cover of about 3.3%, in contrast with the local communities' perception that forest cover has reduced. Furthermore, it also contradicts the 10-year forest loss indicator projection which predicts high rates of forest loss at 4.5% of the GMA. According to Phiri *et al.* (2019) in their land and forest connectivity study for Zambia, forests have been recovering at 0.03 to 1.3% per year; however, these rates are outpaced by deforestation rates at -0.54 to -3.05% per year. The results may be contradictory because of scale of judgement for a household forest loss is limited in area of coverage compared to the aggregated data of the whole area done through remote

sensing. Combining the two perspectives gives a more accurate picture of the status of habitat and the areas that require attention (Tsegaye *et al*.,2010).

The increase in forest cover may be an indicator that the declaration of Mufunta as a PA may have had a positive influence on the conservation of the forest, as it serves as a deterrent to people exploiting the forest without caution and within designated areas. Phiri *et al.*, (2019), concluded that PA status was the most important factor for forest reversion and recovery in Zambia. On the other hand, this increase could be due to households abandoning tobacco farming (i.e., by its nature tobacco farming is very destructive as it demands tree clearing of large parcels of land), which has given a chance for forest recovery over the years. Furthermore, some households practice selective cutting and planting of trees on their farms. However, given that a CBNRM structure is in place, the role that it has played through various community programmes to reduce forest, loss cannot be overruled as a positively contributing factor.

7.6 Conclusion

The chapter presented results on the contextual conditions and trends in the study area, and how they affect the sustainability of the buffer zone. This is done by focusing on individual household agency defining a range of flexible adaptive strategies and their outcomes. Furthermore, the wider structural political and economic forces focus on the role of NRG in influencing these outcomes. The argument of this chapter also connects livelihoods with natural resources and insists that means of sustenance should not undermine the natural resource base (Scoones, 2015).

Households are a platform for livelihood decision-making, which determine the strategies and outcomes. The strategies result in proximate drivers, which interact with underlying drivers such as resource scarcity, markets, outside policy intervention, loss of adaptive capacity and changes in resource access (Lambin, *et al.,* 2003). Attention should be given to both categories of drivers in order to arrive at a sustainable solution to forest cover loss. Governance is an underlying driver behind most of the decisions that households make, that result in forest loss. Understanding livelihoods is key to unpacking the drivers of forest loss and crafting possible interventions (UNEP,2009).

The interactions between governance and livelihoods result in positive or negative land use outcomes for the PA. Understanding drivers strengthens the knowledge of the link between governance and livelihoods. This can be used to develop pathways for reducing negative outcomes and improving on positive outcomes. Using the CBNRM governance structure and their attendant functional networks, drivers of forest loss can be contextualised using administrative boundaries and VAG structures for more targeted interventions for buffer zone conservation for specific groups.

Combining remote-sensing data, household data and field observation on land use enhances the view for monitoring PA conservation (Tsegaye *et al*.,2010). Remote sensing data provided an overview of the trend of forest cover from the establishment of the GMA, which is used as a measure for CBNRM performance in the study area. Household data provided the necessary data for explaining the reasons for the observed trends, in view of contrasting results, field observations were useful for clarifying and reconciling the differing perspectives. Furthermore, scale of observation had an influence on the results that were obtained.

7.7 Chapter summary

The main threat to habitat conservation in the study area is agriculture expansion. This is exacerbated by the high dependency of households on forest product extraction as a livelihood strategy. The decisions that households make about conservation are dependent more on survival than their perceptions that they have about forest loss. Despite households having the knowledge about forest loss, that does not influence their decision about conserving the forest; that decision is rather dependent ensuring the survival of the household. The direct drivers of forest loss include tobacco farming, timber harvesting, charcoal production, caterpillar harvesting, shifting cultivation, firewood collection and bush fires in the order of importance, respectively. Caterpillar harvesting is a new livelihood strategy and an indicator that as livelihoods change also the threats to habitat conservation change. The results demonstrate that the drivers of forest loss are different in the two districts of the study area. Therefore, administrative boundaries can be used to develop strategies tailored according to the context and fitting within the district management plan. Furthermore, VAGs also have different drivers of forest loss which means having this data is valuable for CBNRM stakeholders to develop strategies according to what each VAGs needs. The CBNRM model can be useful as a platform

for information exchange using experience-based knowledge to counter the threat which may have been experienced in other parts of the GMA. Poor governance, weak access rights, corruption, lack of information sharing, and land tenure insecurity are rampant as underlying causes of forest loss in the study area. The trend of vegetation change shows an increase in vegetation cover through remote sensing. However, people's perception and household survey data on land use indicate a high rate of forest loss. Therefore, there is need to pay attention to household's livelihood activities to avoid a downward trend in buffer zone forest cover. Remote sensing presents an opportunity for monitoring the performance of CBNRM in the study area in real time

CHAPTER EIGHT: CONCLUSION AND RECOMMENDATIONS

8.1 Introduction

This chapter summarizes the research findings of the study chapter by chapter, since each result chapter set out to achieve an objective. Furthermore, the study synthesises the findings, linking the three objectives since the study objective was to show the link between the three objectives. The chapter demonstrates these links and the valuable findings useful in the understanding of the interactions between livelihoods and governance to ensure sustainable outcomes for PA conservation. It contributes to the knowledge in understanding to what extent governance structures contribute to the achievement of positive outcomes for livelihoods and conservation. The study from the synthesis of results concludes that to attain a sustainable outcome for both livelihoods and conservation in PAs, the pivot of governance needs to be in the right place to balance the two (Figure 8.1). This can be achieved through holistic decision-making, improving access rights regimes, fair and equitable cost and benefit sharing and, most importantly, coordination among key stakeholders from conceptualisation to implementation. The study contributes knowledge on policy direction for improving PAG. Basically, it is about getting governance right by understanding the resource and the resource users through livelihoods. There are only three main things that are managed in life: nature, people and economies, but governance is at the centre of this process.

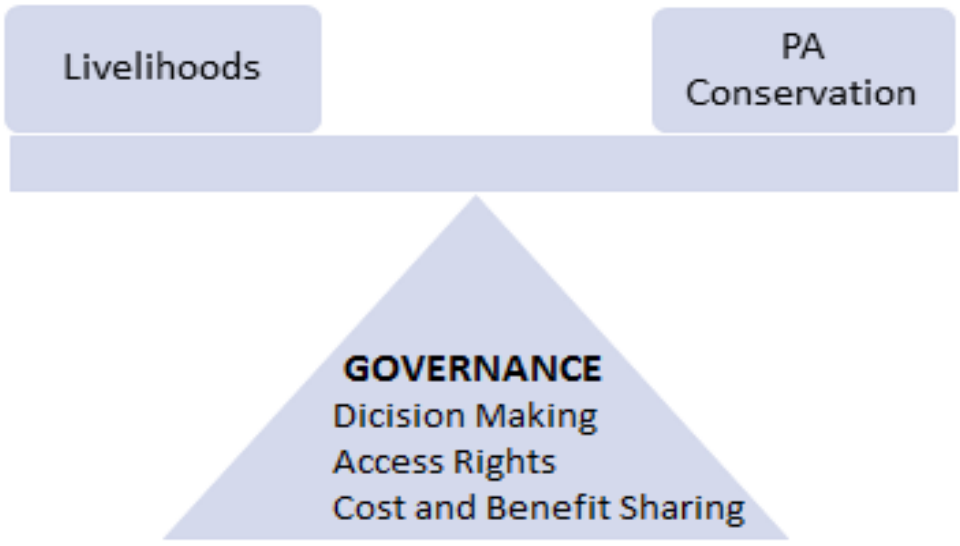


Figure 8.1 Balancing livelihoods and PA conservation through governance

The research has joined the academic debate in line with other findings and contributed to the following knowledge gaps.

1. Chapter 3;

The research analyses the history and evolution of policy and legal framework and how they have shaped PA governance in Zambia and revealed implications for existing structures and institutions. "Understanding how governance institutions emerge and evolve has not been an analytical concern in the ongoing debate about conservation policies and practices in Africa" (Petursson & Vedeld, 2015, p.251). However, such institutions constitute historical accounts of successive policies that shape the current governance structures and inevitably influence prospects for institutional change (Petursson & Vedeld, 2015). A number of policy recommendations were developed from this analysis (8.5).

2. Chapter 5; Objective 1

The assessment of CBNRM through the transdisciplinary approach offers an opportunity to understand the local community's perspective on the governance approach. Participatory evaluation of CBNRM by the communities have been clearly absent, such that their voices have not been articulated and heard (Blaikie, 2006). Through knowledge co-production, the community conceptualises the ideal co-ordination model for the study area. They identify the main actors that are key for the co-management arrangement to function and their roles and responsibilities in the governance structures. Most importantly, what links them together for the common purpose of CBNRM.

The involvement of many governmental and non-governmental actors operating at different spatial and jurisdictional scales makes coordination in natural resource governance problematic (Angst *et a.l,* 2018). Using the principle that a whole is greater than the sum of its parts, the governance structure was split into understandable parts of multiscale and cross-scaler governance linkages that fit together to make a functional whole. Child and Barnes (2010) contend that the initiation and endurance of local institutional complexity depends on critical cross-scale linkages which are only beginning to be understood. These are a network of actors which is important to understand which the research has demonstrated.

Chapter 6; Objective 2

The study presents the findings on the link between governance structures and livelihood strategies. According to Scoones (2015, p.46), a central but often missed feature of livelihood analysis is the role of institutions, organisations and policies in mediating access to livelihood resources and defining the opportunities and constraints of various livelihood strategies. Access is defined as the ability to derive benefits from resources, broadening from property's classical definition as the right to benefit from them (Ribot & Peluso, 2009). In using this approach, access is analysed as a "bundle of powers", of which rights are just one. The study contributes to the knowledge about the role of institutions in facilitating access to resources.

Chapter 7; objective 3

There have been some studies of land cover changes at regional or local levels, but they often deal exclusively with quantifying land-use/cover changes using remote sensing tools for change detection or they focus on causes of land cover changes through socio-economic surveys (Tsegaye, Stein, Vedeld & Aynekulu, 2010). However, studies such as these which link land cover changes using remote sensing with PA governance interventions and perceptions of drivers are rare. Integrated, place-based research on land-cover change requires a combination of agent-based systems and narrative perspectives (Lambin *et al.*, 2003). The study Combined remote-sensing data, household data and field observation on land use enhances the view for monitoring PA conservation. The study further used remoted sensing to demonstrated the role of PAG.

8.2 Synthesis

Using the livelihood approach, the study linked a micro understanding of who does what in CBNRM to meso and macro governance using a three-step transdisciplinary approach. Secondly, the standard fare analysis of livelihoods was done, linking them to governance in order to understand the role of governance on livelihood and conservation outcomes. Thirdly and most importantly, this was done with a wider appreciation of structural, contextual and historical drivers that shape conservation and define opportunities and constraints associated with livelihoods strategies. Local communities are not localised and there are multiple cross-scalar networks which need to be recognised as they have profound implications for CBNRM (Ojha *et al.*, 2016).

An assessment of the governance structure in place was done through knowledge co-production. The study concludes that most of the problems that CBNRM is facing are due to lack of contextual understanding and poor conceptualisation of the governance approach. Poor conceptual foundation has been cited as a factor for the failure of CBNRM in Southern Africa (Child & Barnes, 2010; Milupi *et al.,* 2017). Communities are on record as being side-lined during the introductory phases of the governance approach. This problem is compounded by poor information sharing and dissemination among stakeholders about CBNRM. According to Milupi *et al.* (2020), the future of CBNRM in GMAs is dependent largely on how different actors collaborate and share information. Using a transdisciplinary approach, the role of resource users is highlighted as a key to conceptualisation of a co-management arrangement such as CBNRM from the bottom-up. By using a transdisciplinary procedure, the researcher enables stakeholders to actively contribute their interest and knowledge, at least in some phases of the research (Scholz *et al.*, 2006).

CBNRM, as the name suggests, has mostly been focused on resource management rather than managing stakeholder relationships. CBNRM through co-management should be about natural resources conservation as much as it should be about managing relationships. Stoker (2006) highlights the building of a successful relationship as critical to networked governance, and the core objective needed to support it. This study has demonstrated that through effective stakeholder coordination, good governance can have a chance of being attained to achieve both conservation and livelihood sustainability. The study therefore contributes to the literature on developing a practical approach to co-management conceptualisation.

A conceptual framework within which CBNRM can be better understood and implemented was developed together with the research participants. Using a transdisciplinary approach, the study developed a community-driven model for improving co-ordination in Community Based Natural Resources Management using a 4-step approach: (1) conceptualisation by the local stakeholders; (2) understanding existing local structures; (3) linking traditional and state structures; and (4) overcoming fragmentation within the CBNRM working space. “The success of CBNRM initiatives could be enhanced by providing a conceptual framework within which it can be better understood and implemented” (Mukwada & Manatsa, 2012, p.70).

Additionally, the research proposes an analysis tool using a three-step approach for the coordination arrangement, which involved understanding of the context through knowledge

co-production, evaluating the coordination arrangement, and proposing changes which resulted in a theory of Bottom-Up-Top-Down arrangement of co-management. A Bottom-Up-Top-Down approach is critical to delocalise the community beyond the local scale using multiple cross-scalar networks, as these have profound implications for CBNRM (Ojha *et al.*, 2016). According to the principle of "a whole is greater than parts of the sum" the governance structure is broken into its constituent parts to understand how the parts fit into a functional whole in a fragmented governance landscape.

The coordination patterns of the governance structures were evaluated by looking at linkages that connect the structures through interactions between separate and overlapping sectors. A thoughtful evaluation of the effectiveness of a collaborative process is central to understanding expectations and the integration processes into existing institutions (Conley & Moote, 2003). There are missing cross-scalar roles and responsibilities in the governance structure linking micro, meso and macro governance. Child and Barnes (2010) contend that the foundation and sustainability of local institutional complexity depends on critical cross-scale linkages which are only beginning to be understood. The missing links are due to the current operating structure of the extension department in the DNPW. In addition, in the traditional governance structure indunas do not interact with the CRB and are not part of the governance structure; this is a serious governance flaw. There is no coordination among actors involved in land allocation, which has far-reaching consequences on PA habitat conservation. Lack of co-ordination among stakeholders involved in natural resources threatens biodiversity conservation in Zambia (Mwitwa *et al.*, 2018 and Vinya, *et al.,* 2011).

An intersection between state and traditional governance structures is the operating space for CBNRM currently in Mufunta GMA. This is where representatives of the state and groups of resource users have formed a joint management body through the CRBs for making joint decisions. This is the formalised arena for PA governance in Zambia. It is crucial therefore to reinforce CRBs as bringing or boundary organisation to ensure coordination of the governance structure for implementation. The central role of bridging actors in enhancing coordination for NRG is critical (Angst *et al.*, 2018). There is poor interaction between CRBs and their constituencies; the structure is good on paper but nonfunctional on the ground due to lack of financial and technical resources. The infusion of CBNRM into the existing traditional governance structures would enhance the CRBs presence and could be more cost effective. Using the research findings from the assessment of the governance structure, the study

proposes a combination of community and state-nested approaches to governance of PAs using the "Bottom-Up-Top-Down" approach in order to enhance CBNRM performance.

Coordination is key to improving the implementation of CBNRM, so the study has identified some challenges that can hinder coordination: jurisdictional fragmentation because of administrative boundaries and fragmentation due to traditional structures and power struggles divide the GMA. Coordination is critical to overcoming these challenges. Fragmentation and lack of coordination among relevant stakeholders represent a significant barrier to successful implementation of NRG (Muller, 2007; Angst *et al.*, 2018; Vinya,et al., 2011). Low community participation can be a barrier; this occurs because of community voice not being heard in decision-making, corruption, lack of accountability and transparency. Therefore, the community do not participate because they feel disfranchised (Milupi *et al.*, 2020). Communal benefits may not be enough to motivate households to participate in CBNRM programmes (Zyambo, 2018; Namukonde & Kachali, 2015). Household benefits, education levels, social status, ethnicity and lack of information are contributing factors to low levels of participation in Mufunta's CBNRM. Kazungu, *et al.,* (2021) propose paying attention to households with low levels of education in order to improve participation in conservation programs.

Differential access to livelihoods assets has implications for household livelihood status (Scoones, 2015). It can be improved when assets are made available for household use. Social capital is lowest in comparison to other capitals and has far-reaching consequences for the effective functioning of CBNRM. Social capital plays a crucial role in attaining positive outcomes for collaborative partnership in CBNRM (Gruber, 2010; Musavengane & Simatele, 2016). Therefore, this will affect the attainment of conservation goals for the GMA. This can be improved through coordinated collective action. Access can also be due to household factors, such as gender of the household head, wealth and education (Cleaver, 2001). The lower the livelihood options, the more vulnerable the household and the higher the dependency on environmental income (Angelsen, et al., 2014). The study shows that there is a very high dependence on natural resources in the study area.

Natural resource dependency is measured through the role of natural resources as a safety net during food shortage months and the contribution of environmental income to household income. Households in the study area depend on wild food collection during months of food shortages. Rural households are highly dependent on natural resources (Vedeld *et al*., 2007;

Kazungu *et al*., 2021). Environmental income has an equalising effect on household income as the Gini coefficient increases when environmental income is subtracted from total income for the study area. Environmental income is used as a measure of equality for income distribution for forest dependent households as previous research has demonstrated (Sjaastad *et al.*, 2005; Vedeld *et al.*, 2007). Diversity of sources of income is high in the study area, based on the Simpsons diversity index.

The high dependency of livelihoods on the natural resource base in the study area means that their sustainability hinges on getting the institutions that govern them right. These institutions affect the ability of households to access natural resources, hence their gatekeeper role. Institutions are critical in understanding how households gain access to livelihood resources (scoones, 2015). Rules in use, such as the need for licences act as constraints for improving environmental income for households living in PAs. There is a highly positive relationship between environmental income and licence fees, as high-value products attract a higher licence fee. Child &Barnes (2010) propose the elimination of deferential taxes, charges and licence fees on wild resources to enable them to compete economically. This will enable households to tap into the natural resource income source and increase their income base. In addition, good governance principles, such as accountability, transparency and fairness are not applied in the process of issuing licences. Thus making it difficult for household's access licences for harvesting resources which livelihoods depend on.

The many actors and plurality of land access in the area increases the vulnerability of households due to uncertainties surrounding land acquisition, since most of the livelihoods are dependent on access to land. Legal pluralism in the administration of land in the PA is a threat to sustainable management of PA habitat. According to Musgrave (2016), legal pluralism constitutes one of the fundamental problems of natural resources governance in Zambia, since land use is not harmonised through coordinated authority and decision-making. This has resulted in land set aside for conservation being encroached upon. Furthermore, power relations in aspects such gender, age, wealth, education and ethnicity also significantly influence access to land.

Zoning of the land into areas of protection and control created regulations for exclusion that restricted access to resources in areas preserved for maintaining biodiversity (Angelsen *et al.,* 2014). One of the principles of sustainable development is that tenure and rights of local people

should be clear and secure (Musgrave, 2016). The bundle of rights to resources, such as access, withdrawal, management, exclusion and alienation indicate households' rights are far below those of an owner. An owner has all five rights, but households do not. This is due to lack of participation in decision-making which disfranchises local communities (Milupi , *et al.*, 2020). The Bottom- Up-Top-Down model will ensure that the community is actively involved in decision-making about PA conservation, enabling them to manage, exclude and alienate resources for sustainable utilisation.

The costs of living in the area are mostly a consequence of human-wildlife conflicts, mainly through crop damage. Other costs include the harassments, arrests, loss of property and loss of lives during law enforcement operations by DNPW and village scouts. This happens because the human rights of the suspected residents are not respected during routine patrols and household searches for wildlife trophies. The benefits range from food, which benefit the households directly, to revenue, which is a communal benefit. However, households recognise benefits that accrue directly to households as of more importance. Household costs outweigh the benefits for living in the PA, especially as there is no compensation for losses suffered due to the lack of national policy on compensation.

Understanding household decision making is key to unpacking the drivers of forest loss and crafting possible interventions. Agriculture is the main livelihood, while agricultural expansion is the main threat to forest conservation in the study area. Globally, clearance of land for agriculture is one of the major drivers of deforestation in tropical forests (Musgrave, 2016; UNEP,2009). Forest loss indicators include land size used for farming, number of plots used for farming, percentage of households engaging in shifting cultivation, plans for future expansion for agriculture land and expansion per year. A land use projection using forest loss indicators predicts a loss of 4.5% of the buffer zone in the next 10 years, if all factors remain constant. "Regardless of the accuracy of estimates, Zambia has one of the highest rates of deforestation in the world" (Musgrave, 2016, p.6).

Knowledge and perceptions about LULCC do not influence decision-making that households make about habitat conservation. Decisions are based on household sustenance and needs. The main driver of forest cover loss in the study area is tobacco farming. Vinya *et al.* (2011) reported tobacco curing as one on the underlying drivers to forest cover loss in Zambia. Households engage in tobacco farming because a tobacco scheme in the area is provides farmer

support. Tobacco farming is a problem specific only to some VAGs, such as litoya, lalafuta and kalale. The diversity of interests and actors engaged in natural resources management can be an asset if experiences and insights can be shared (Keen & Mahanty, 2006). Learning from the experience of others could prevent negative environmental impacts from recurring. Governance structures using administrative boundaries and VAGs, are useful in mapping drivers of forest loss according to context and crafting solutions tailored towards the needs of the targeted groups. It is evident that drivers in the two districts in the GMA and the VAGs are different, therefore a blanket solution may not be effective to fit all.

Different drivers of forest loss interact as households engage in various activities to earn a living. The proximate drivers interact with underlying drivers, causing LLCC in PA areas (Lambin *et al.,* 2003). Understanding the interactions of these drivers will contribute to develop interventions for reducing forest loss. Governance is an underlying driver behind most of the decisions that households make that lead to forest loss. Understanding drivers, further strengthens the knowledge of the link between governance and livelihoods. The interactions between governance and livelihoods result in positive or negative land use outcomes for the PA (Scoones,2015).

The establishment of Mufunta GMA has had a positive influence on forest recovery, according to vegetation change detection. Forest cover has improved since the establishment of the GMA in 2006. PA status has a positive impact on vegetation recovery (Phiri *et al*.,2019). Combining remote-sensing data, household data and field observations on land use broadens the view for monitoring PA conservation (Tsegaye et al., 2010). Remote-sensing data provided an overview of the trend of forest cover from the establishment of the GMA at landscape level, while household data provided the necessary data for explaining the reasons for the occurring trends, taping in local cognitive capacities. The study provides evidence that the success of the implementation of the CBNRM or indeed any other governance model in PAs can easily be monitored using remote sensing through vegetation change detection.

8.3 The synergies between governance, livelihoods and PA conservation

Governance, livelihood and conservation are a three equal-sides of a triangle or pyramid, which need to be coordinated to achieve positive outcomes. Research emphasises the lack of attempts to combine policies on livelihoods and conservation and understanding the development-environment nexus (Kamanga *et al.,* 2009). GMAs in Zambia are intended to promote both community livelihoods and wildlife conservation through CBNRM (Milupi *et al*., 2020) .The study has demonstrated that governance structures in place are the key for achieving this. Governance through policies, legal frameworks, norms, rules, regulations and institutions influence rights, decision-making, benefits and costs for livelihood sustainability. The rights, costs and benefits that households have will determine the constraints and opportunities for sustaining livelihoods. Furthermore, these affect the motivation and decisions that households make about conservation of the PA area. Therefore, the three should be kept in a delicate balance to achieve positive outcomes for both livelihoods and PA conservation.

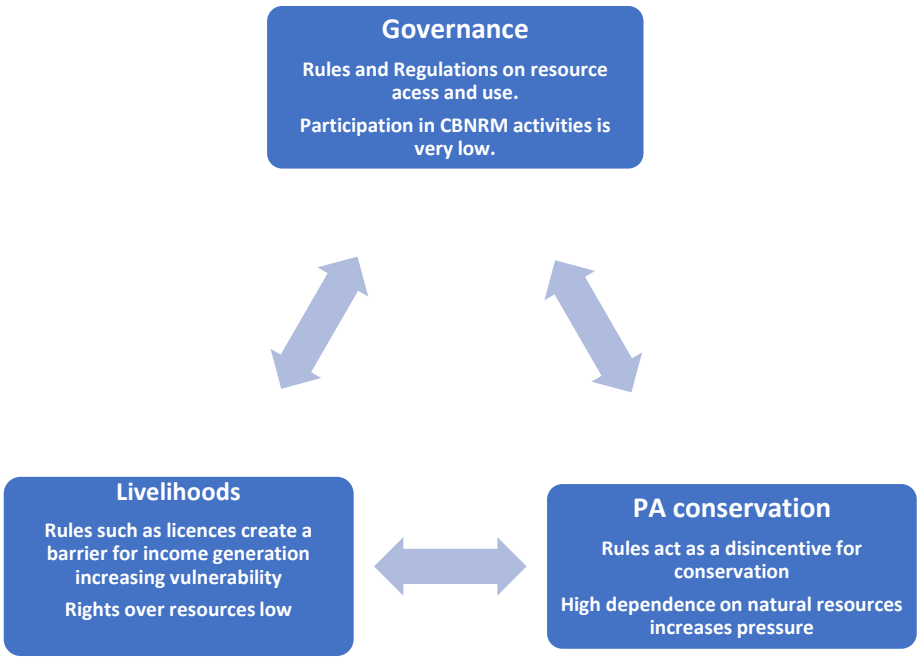


Figure 8.2: Synergies between governance, livelihoods and conservation in Mufunta GMA

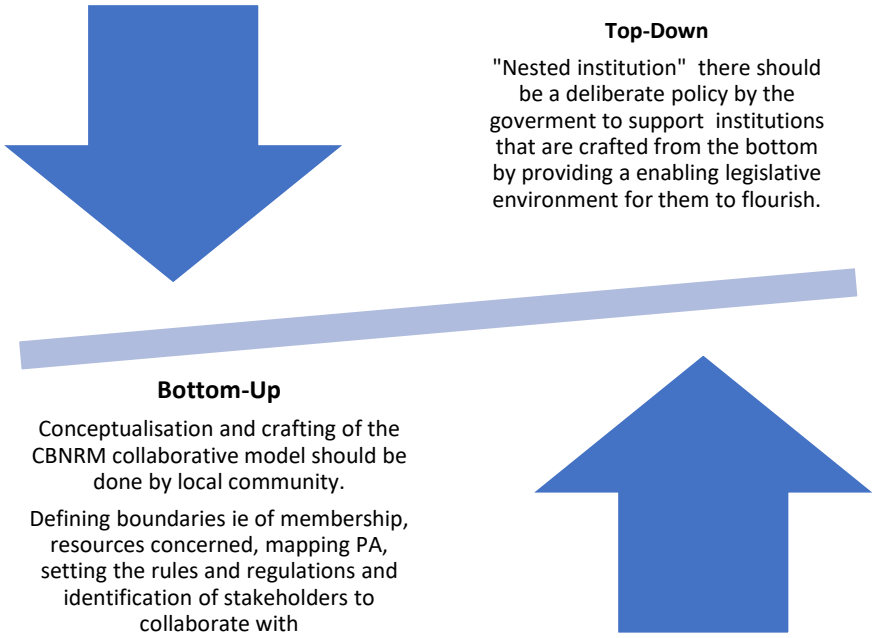
CBNRM as a governance model presents both opportunities and constraints for livelihood and PA sustainability. These come in the form of decision-making, rights, costs and benefits sharing. Low participation in CBNRM activities is a constraint on improving implementation

and giving the community a voice in decision-making. The low participation is linked to the rules such as licences that create a barrier for income generation, hence acting as a disincentive for participation in CBNRM and PA conservation. Besides rights over resources being low, costs outweigh benefits for households, thereby making PA conservation less attractive due to lack of motivation. Furthermore, rules and regulations regarding access to resources make households more vulnerable since they are denied their use. The high dependency on natural resource also acts as a constraint on PA conservation as this increases pressure on the resource base. On the other hand, high dependency on the natural resource base can be an opportunity for the community to conserve these resources, since they have an interest. The application of good governance principles is an opportunity to improve CBNRM and eliminate constraints for sustainable outcomes for livelihoods and PA conservation.

8.4 Proposing the equilibrium model for protected area governance in Mufunta Game Management Area (Bottom-Up –Top-Down)

After assessing the governance challenges experienced in Mufunta GMA, the research developed a Bottom-Up-Top-Down equilibrium model for improving coordination and collaboration of stakeholder for CBNRM in Mufunta GMA, which can also be applicable to CBNRM in other parts of Zambia and beyond. From the Bottom-Up model the community conceptualise the governance arrangement that is suitable for their context by considering membership, the resource of concern, rules and collaborating partners. Research has shown that "country-specific contextual realities play avital role in theorising governance, which has always been overlooked" (Asaduzzaman & Virtanen, 2016, p.2). The Bottom-Up arrangement should fit into the already established structure of governance, which should provide the necessary policy and legal framework for micro-institutions to function. Ostrom argued for 'nesting' local decision-making groups within state structures at a higher level, because they can provide guidance and other resources that enhance local decision-making (Mansbridge, 2014). The study results indicate that combining the two will enhance coordination in that the weakness inherent in one will be complimented by the strength of the other, thereby striking an equilibrium. Mukwada and Manatsa (2012) argue that the success of CBNRM requires a conceptual framework which has prompted academic initiatives such as concept of scaling, where the success could be achieved through the harmonization of the top-down and bottom-up approaches to resource governance.

8.4.1 Equilibrium model (Bottom-Up – Top-Down) for improving co-ordination (Margerum & Born, 2000; Ostrom, 1990)



(a) Bottom-Up process for crafting local PA institution (Margerum & Born, 2000; Ostrom, 1990)

Stakeholder collaboration (Authority, Information & Decision) Community should identify key stakeholders to coordinate with in the governance of the PA. Together with other stakeholders agree on the rules and regulations and the basis for collaboration rules and regulations for coordination, by identifying linkages and bridging institutions.
Rules and Regulations (Position) The community should define rules or regulations governing how, when, or in what quantity the resource can be used. These rules must be understood and agreed to by community members and recognised and respected beyond the community.
Resource Mapping (Scope)

The community should define natural resources boundaries (specify resources of concern within a PA for example water, forests, fisheries, rangeland, and wildlife). Mapping the exact physical boundaries of concern
Membership (Boundary) The community should be able to define itself (whether it be a whole village or a group of resource users) Its members should agree to cooperate to manage resources.
Boundary setting(scope)
Knowledge co-production with the community on what is currently pertaining on the ground, conceptualisation of the governance model.

(b) The Top-Down process nested institution (Ostrom, 1990)

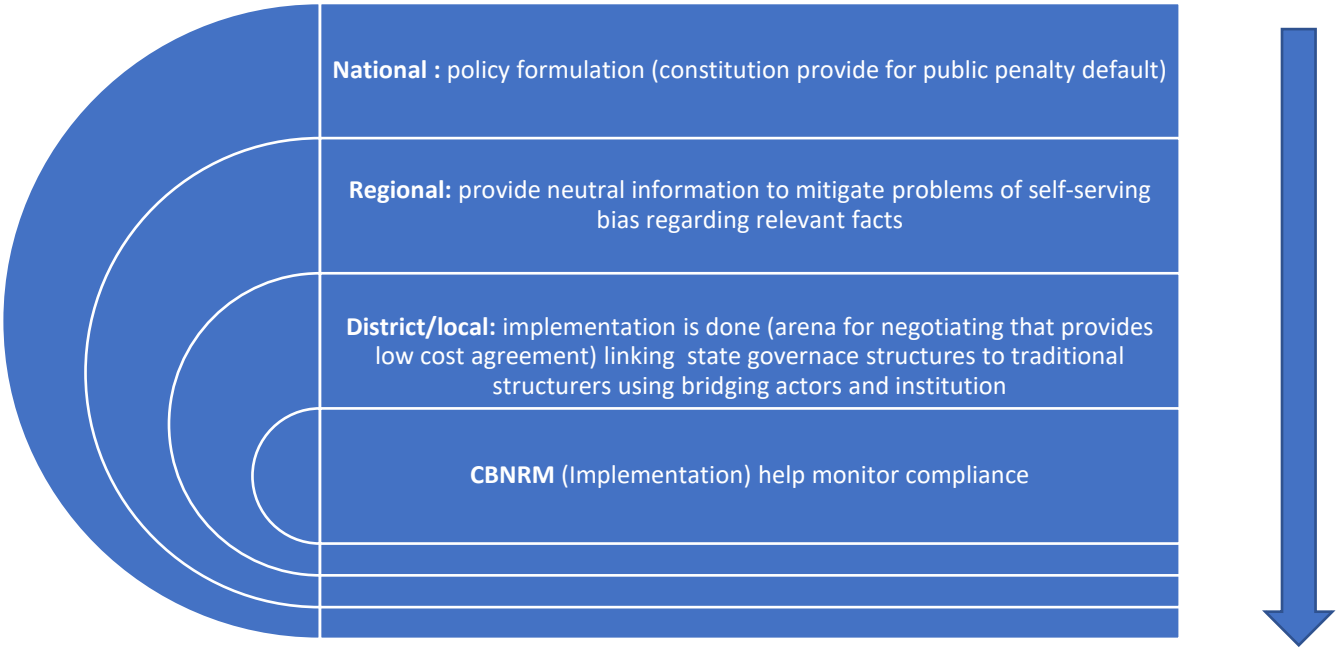


Figure 8.3: Equilibrium model (Bottom-Up – Top-Down) for improving co-ordination (Margerum & Born, 2000; Ostrom, 1990)

It is often said that the Bottom-Up approach is better than the Top-Down approach for the implementation of CBNRM or PA governance. CBNRM is an alternative model to centralised approaches of resource management that has resulted in poor outcomes after decades of

intrusive systems of sanctions and top-down rules (Gruber, 2010). However, this research advances an equilibrium model between a Bottom-Up approach and Top-Down approach. As much as the community can craft and develop the local institution from the bottom, it is necessary for the government from the top to provide the necessary legal framework for these institutions to thrive. Local users on their own are unable to manage most natural resources ; "at the same time there is overwhelming evidence that centralised management of local resources is problematic" (Carlsson & Berkes, 2005, p. 71).

A threshold between the two approaches must be reached to attain the balance required for success. It is on record that where top-down and bottom-up accountability are missing as in the case of CRBs in Zambia, resources are misappropriated with few benefits for livelihood improvement and conservation (Child & Barnes, 2010). Those who are not interested in participating in CRB activities cite lack of benefits, corruption and lack of accountability (Figure 5.13). The study has demonstrated that the use of the Bottom-Up and Top-Down approaches adds value to the PA co-management arrangement, such as CBNRM, because it eliminates the inherent weaknesses of the two approaches when applied separately. The study reveals that the success of using the combination of the two models depends on overcoming fragmentation through bridging actors and institutions to ensure a holistic approach to PA governance.

According to Ostrom (1990), current policy analysis is based on static models which assume that people are in a situation that they cannot change. However, the model presented is made dynamic by including the role of local communities in knowledge co-production for developing a governance model when they have the autonomy to craft their own institutions. The model is dynamic because it is context specific and can be tailored to fit the resource, such as the case in question. Therefore, it enables external validity and makes it a candidate as a policy instrument for CBNRM implementation.

8.5 Policy recommendations

Based on the review of the legal and policy framework for NRG in Chapter 3 and the overall results of the research; the study suggests the following policy recommendations and therefore contributes to knowledge on policy direction that can improve PAG.

(a) Policy and Legal

- Policy should strengthen existing local institutions for incorporation into CBNRM, capacity-building to enable the local community to manage natural resources sustainably, and trust building through reciprocity among CBNRM stakeholders.
- There should be a provision for land to be delimited and classified as a PA in the constitution. so that there is clarity over its management whether it is on customary land or state land so that specific guidelines are given for the governance of such land.
- There should be clarity in policy on resource rights, management and planning responsibilities between the community, local and central government. This can be done by ensuring that policy guidelines are clear on the rights to access, withdraw, manage, exclude and alienate as these have implications for benefit sharing and collective responsibility.
- A holistic definition in the wildlife policy for PAs encompassing wildlife and associated habitants is necessary to counter the challenge of managing the two in isolation, since the survival of wildlife is dependent on a suitable habitat.
- To ensure clarity in terms of authority over resources, policy should harmonies legislation enforced by government institutions in order to tackle the challenge of legal pluralism where resources are vested in the president, while in practice resource use is determined by traditional leaders, as it is with PA on customary land.
- Equitable access to associated resources should be clarified, especially for communities that live in and around PAs.
- Policy should take cognisance of the historical and cultural aspects of natural resource user communities when developing guidelines for implementation of laws for resource utilisation, so that the necessary provisions are included.
- Policy should be clear regarding cost and benefiting sharing, and the levels and type of participation by the local communities in CBNRM.
- The time taken between policy writing and enacting policy guidelines through passing legislation should be minimised to ensure alignment and implementation of policy goals.

When too much time is taken, there is a risk of losing pertinent components in the process.

- There should be an effort to combine policies of poverty alleviation, conservation and governance, if positive outcomes for PA are to be achieved.

(b) Organisational

- DNPW needs capacity-building and restructuring of the organisational structure of the extension department for them to be able to adapt to its changing role from purely law enforcement to community engagement.

(c) Operational

- Remote sensing can be used to monitor CBNRM performance in real time by monitoring vegetation trends through change detection.
- Develop standard operational procedures (SOPs) for CBNRM operations.
- It is key to understand-site level drivers of LULCC for this presents an opportunity for developing contextual strategies for countering the threats, as information exchange of experience based knowledge can be used to slow down the process which may not yet have affected some areas.
- The council in the study area through the District Commissioners (DC) office can play a critical role of coordinating the governance activities in the PA for the responsible departments in NRG. This is critical because the study area's boundaries cross two districts, namely Nkeyeme, and Luampa. Furthermore, all departments at district level report to the DC. Therefore, the DC's office can act as a coordinator for NRG in the GMA.
- NGOs play a critical role in CBNRM; however, their objectives and agenda should be harmonised with the GMP for the GMA and the CRB to ensure continuity.

8.6 Limitations of the research

- The conceptual framework for understanding CBNRM was developed by understanding the context, evaluating and testing. The study, however, could not test the response of the model due to time schedules on the PhD. Therefore, this presents an opportunity for future research after model has been applied and tested as testing was beyond the scope of this study.

- In addition, a pragmatic approach advanced by Dewey which involves recognising the problem, considering the nature of the problem, suggested a solution, considering the effects of solution and taking action is applied (Morgan, 2014). Considering the effects of the solution and acting, which are stages four and five respectively, was beyond the scope of this study.
- The study was carried out in an area where more than seven local dialects were spoken; to overcome the communication barrier, translators were used; however, certain aspects of the research suffered because of the language barrier especially through probing.
- Some VAGs were left out during data collection due to hostility and non-receptiveness of households in these areas. This was done to ensure the safety of the research team and so that the study could be conducted following ethical guidelines on the willingness of participants to take part.

8.7 Suggestions for future research

The study has achieved its objective and has also reviewed some gaps which can be explored further through future research;

1. CBNRM is transdisciplinary in nature and the study demonstrates the linkages between governance, livelihoods and conservation. Therefore, future research for CBNRM should engage teams with governance, social-economic and conservation experts in order to understand the implementation of CBNRM and its implication from a broader perspective.
2. The paradigm shifts from fortress to participatory approach needs careful examination to understand the gaps that the separation of people from nature created, to understand how the reverse process can be implemented. There are two main issues that arise from the fortress approach, namely;(1) lost and weakened local institutions of natural resources governance. Research into existing local institutions would enhance understanding of these institutions for incorporation into CBNRM, as this will review synergies. (2) loss of local knowledge about conservation of natural resources, and the loss of attachment between “nature” and “people”. The nature-people relationship was lost with it knowledge to manage natural resource. In this regard, the paradigm shifts highlighted capacity building to enable local community to manage natural resource sustainably. Therefore, there is a need for research into capacity building needs for local communities.

3. The study suggests that most of the problems that CBNRM is experiencing are due to poor understanding and coordination by stakeholders, which affects implementation. According to Carlsson and Berkes (2005) the tools for conceptualisation and analysis of co-management are strikingly blunt and more research needs to be done to refine these tools. In this study using a TD approach the role of resource users is highlighted as a key to conceptualisation of a co-management arrangement, such as CBNRM. The analysis tool developed can be tested on other GMAs with research participants to test if similar results can be obtained.
4. PAG in Mufunta GMA demands for government and non-government actors to come together to co-manage the PA. The application of the Bottom-Up-Top-Down model which was developed for CBNRM in Mufunta GMA by research participants presents an opportunity for future research through evaluating the performance of the approach as a pilot on the GMA.
5. Fragmentation in NRG is a hindrance to effective governance of resources (Muller, 2007). According to the results of the research there is organisational fragmentation, jurisdiction fragmentation and policy fragmentation therefore going forward furthers research should be carried out how these different types of fragmentation can be overcome to enhance coordination in CBNRM.
6. Musavengane and Simatele (2016) identified policy fragmentation as one of the factors that limit environmental governance. Governing fragmentation requires institutions that facilitate coordination, clear roles and responsibilities, agreement on the issue and its proposed resolution, and the scope of the issue. The role of CRBs an institution that could facilitate coordination should be probed.
7. Policies and legislation have evolved to adapt to the changes that have occurred in PAG. However, implementation has not kept pace in adapting to these changes. This may be in part due to the non-alignment of the wildlife policies with the wildlife Act. Based on transformative legal and policy reforms, the government needs to come up with a policy and legal framework which can enhance the scaling up and implementation of CBNRM. Such reforms require a thorough understanding of policy and legal evolution, and of the existing gaps in the policy and legal instruments. Institutional reforms that combine the devolution of power and delineation of property rights are among the many interventions that need to be tested (Child & Barnes, 2010).
8. The study contributing data to the unmeasured forms of rapid land use change. Whereas there is a need to understand how collaboration actually performs over time from

inception to the present, research has mostly focused on cross-section analysis (O'Leary & Vij, 2012). Yet this should involve actually tracking collaboration in real time and more longitudinal studies (O'Leary & Vij, 2012). Therefore, GIS presents an opportunity for monitoring the influence of the governance structures on habitat conservation in real time.

Data availability; Data will be made available on request to the author, email emeldahachoofwe@yahoo.com

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APPENDICES

APPENDIX 1: ETHICAL APPROVAL

UNIVERSITEIT STELLENBOSCH UNIVERSITY

NOTICE OF APPROVAL

REC Humanities New Application Form

8 November 2017

Project number: SPLPHD-2017-1615

Project Title: LINKING NATURAL RESOURCE GOVERNANCE TO RURAL LIVELIHOODS AND WILDLIFE CONSERVATION: A CASE STUDY OF MUFUNTA GAME MANAGEMENT AREA.

Dear Miss Emelda Hachoofwe

Your REC Humanities New Application Form submitted on **06 October 2017** was reviewed and approved by the REC: Humanities.

Please note the following about your approved submission:

Ethics approval period: 08 November 2017 - 07 November 2020

Please take note of the General Investigator Responsibilities attached to this letter. You may commence with your research after complying fully with these guidelines.

If the researcher deviates in any way from the proposal approved by the REC: Humanities, the researcher must notify the REC of these changes.

Please use your SU project number (SPLPHD-2017-1615) on any documents or correspondence with the REC concerning your project.

Please note that the REC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

FOR CONTINUATION OF PROJECTS AFTER REC APPROVAL PERIOD

Please note that a progress report should be submitted to the Research Ethics Committee: Humanities before the approval period has expired if a continuation of ethics approval is required. The Committee will then consider the continuation of the project for a further year (if necessary)

Included Documents:

Document Type	File Name	Date	Version
Research Protocol/Proposal	REVISED PROPOSAL	04/10/2017	1
Informed Consent Form	STATEMENT ABOUT INFORMED CONSENT	05/10/2017	1
Data collection tool	INTERVIEW GUIDE	05/10/2017	1
Data collection tool	MUFUNTA GMA LIVELIHOOD SURVEY 2	05/10/2017	
Data collection tool	FOCUSED GROUP DISCUSSION GUIDE final	05/10/2017	1
Proof of permission	Research Permit	05/10/2017	1

If you have any questions or need further help, please contact the REC office at cgraham@sun.ac.za.

Sincerely,

Clarissa Graham

REC Coordinator: Research Ethics Committee: Human Research (Humanities)

National Health Research Ethics Committee (NHREC) registration number: REC-050411-032.
The Research Ethics Committee: Humanities complies with the SA National Health Act No.61 2003 as it pertains to health research. In addition, this committee abides by the ethical norms and principles for research established by the Declaration of Helsinki (2013) and the Department of Health Guidelines for Ethical Research: Principles Structures and Processes (2nd Ed.) 2015. Annually a number of projects may be selected randomly for an external audit.

Page 1 of 2

Investigator Responsibilities

Protection of Human Research Participants

Some of the general responsibilities investigators have when conducting research involving human participants are listed below:

1.Conducting the Research. You are responsible for making sure that the research is conducted according to the REC approved research protocol. You are also
responsible for the actions of all your co-investigators and research staff involved with this research. You must also ensure that the research is conducted within the
standards of your field of research.
2.Participant Enrollment. You may not recruit or enroll participants prior to the REC approval date or after the expiration date of REC approval. All recruitment
materials for any form of media must be approved by the REC prior to their use.
3.Informed Consent. You are responsible for obtaining and documenting effective informed consent using **only** the REC-approved consent documents/process, and
for ensuring that no human participants are involved in research prior to obtaining their informed consent. Please give all participants copies of the signed informed
consent documents. Keep the originals in your secured research files for at least five (5) years.
4.Continuing Review. The REC must review and approve all REC-approved research proposals at intervals appropriate to the degree of risk but not less than once
per year. There is **no grace period.** Prior to the date on which the REC approval of the research expires, **it is your responsibility to submit the progress report in
a timely fashion to ensure a lapse in REC approval does not occur.** If REC approval of your research lapses, you must stop new participant enrollment, and
contact the REC office immediately.
5.Amendments and Changes. If you wish to amend or change any aspect of your research (such as research design, interventions or procedures, participant
population, informed consent document, instruments, surveys or recruiting material), you must submit the amendment to the REC for review using the current
Amendment Form. You **may not initiate** any amendments or changes to your research without first obtaining written REC review and approval. The **only exception** is
when it is necessary to eliminate apparent immediate hazards to participants and the REC should be immediately informed of this necessity.
6.Adverse or Unanticipated Events. Any serious adverse events, participant complaints, and all unanticipated problems that involve risks to participants or others, as
well as any research related injuries, occurring at this institution or at other performance sites must be reported to Malene Fouche within **five (5) days** of discovery of
the incident. You must also report any instances of serious or continuing problems, or non-compliance with the RECs requirements for protecting human research
participants. The only exception to this policy is that the death of a research participant must be reported in accordance with the Stellenbosch University Research Ethics
Committee Standard Operating Procedures. All reportable events should be submitted to the REC using the Serious Adverse Event Report Form.
7.Research Record Keeping. You must keep the following research related records, at a minimum, in a secure location for a minimum of five years: the REC
approved research proposal and all amendments; all informed consent documents; recruiting materials; continuing review reports; adverse or unanticipated events; and
all correspondence from the REC
8.Provision of Counselling or emergency support. When a dedicated counsellor or psychologist provides support to a participant without prior REC review and
approval, to the extent permitted by law, such activities will not be recognised as research nor the data used in support of research. Such cases should be indicated in
the progress report or final report.
9.Final reports. When you have completed (no further participant enrollment, interactions or interventions) or stopped work on your research, you must submit a Final
Report to the REC.
10.On-Site Evaluations, Inspections, or Audits. If you are notified that your research will be reviewed or audited by the sponsor or any other external agency or any
internal group, you must inform the REC immediately of the impending audit/evaluation.

APPENDIX 2: RESEARCH PERMIT

MINISTRY OF TOURISM & ARTS

Department of National Parks and Wildlife

Private Bag 1, Kafue Road, Chilanga, Zambia
Telephone: +260-211-279080 / 278366 / 278555 / 278365
Telefax: +260-211-278524 / 278244 / 278471
Email: info@zawa.org.zm

All correspondence should be addressed to the Director

DNPW/101/13/18

28th October 2016

Emelda Hachoofwe
PhD Candidate
School of Public Leadership
Stellenbosch University

RE: AUTHORITY TO UNDERTAKE RESEARCH IN AND AROUND KAFUE NATIONAL PARK

Reference is made to the application dated21st September 2016 concerning the above subject matter.

The Department of National Parks and Wildlife (DNPW) is pleased to inform you that youhave been granted authorityto conduct your research on ***"Bridging the gap between conservation of wildlife habitat and sustaining rural livelihoods: a case study of Mufunta GMA"*** beginning 1st November 2016 to 31st October 2017.

This permit is granted on the following conditions:

1. You shall conduct the research under the supervision of the Area Ecologist.
2. You shall adhere to all rules and regulations when in the National Parks and Game Management Areas.
3. You shall be accompanied by the Wildlife Police Officer (WPO) while in the park at all times.

At the end of your research, you will be required to submit to DNPW any technical reports, theses and scientific publications resulting from this research and DNPW's involvement and co-ownership of the information generated duly recognized. You will also be required to make an

Southern Region Office
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Mansa
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Western Region Office
P.O. Box 830124
Mumbwa
Tel: 01 800056

oral presentation to DNPW of your research findings and their conservation and management implications.

I thank you for your cooperation.

p.p Paul Zyambo
DIRECTOR-DEPARTMENT OF NATIONAL PARKS AND WILDLIFE
For/ PERMANENT SECRETARY-MINISTRY OF TOURIST AND ARTS
Cc: Permanent Secretary
Ass. Director- Research and Veterinary Services

APPENDIX 3: INTERVIEW GUIDE

STATEMENT ABOUT INFORMED CONSENT

Hello, I am conducting interviews on behalf of ***Copperbelt University (CBU) in collaboration with Stellenbosch University (SU), and Norwegian University of Life Sciences (NMBU)*** *on how natural resources governance structures are linked livelihoods and conservation of natural resources in the game management area* ***(GMA).*** *I would be very grateful if you would answer a few questions to help us understand this relationship.*

1. The information that you provide will be kept strictly confidential.

2. You do not have to answer questions you do not want to answer

3. You can stop the interview process at any time

4.You can ask for clarification on any questions at any time

5.There are no wrong or right answers, most candid and honest answers are most useful

6.There are no direct benefits, risks, or compensation to you for participating contact in the study

7.For more information about the research you can contact Stellenbosch University (Professor Muller@+27(0)806 3602 or Copperbelt University (Dr Nyirenda @+260 977352035).

The interview lasts about 1:30 minutes. Do you agree to be interviewed? If so, is this an appropriate time?

INTERVIEWEES NAME: …….. DATE: ……

ROLE/POSITION.....

Interviews will be carried out with key persons in the governance process such as the **Chief** since he is the patron for CRBs, the local government representative who is the **District commissioner (D.C)** following the decentralisation to local government in the new constitution and **Department of wildlife and national parks (DNWP)** since it is a department charged with the direct responsibility for PA management and **Tobacco board of Zambia (TBZ)** is also another important stakeholder as it has a number of households engaging in contract farming for tobacco. In order to capture views of people outside the governance process interviews will be carried out with males and females **(Community)** outside the formal governance structure.

Objective One

1. To assess the existing governance structures and evaluate the co-ordination effectiveness of the governance structures in Mufunta.

Research Questions

1. How do rights shape goals/Motivations, roles and responsibilities of actors in CBNRM?
    - How did you become a member of CBNRM?

- Which group of stakeholders do you represent in CBNRM?
- What are your roles/ responsibilities?
- Which resources are under your jurisdiction (Land, forest, wildlife, fisheries)

2. Do the institutions governing stakeholder interaction facilitate equal partnership for actors in the governance structure?

- How do you participate in the governance process as a key stakeholder?
- What is your opinion about the decision-making process in CBNRM?
- How can the process be improved?
- How do you engage other stakeholders in decision-making process?
- What kind of decisions are you able to influence in the decision-making process?

3. How effective is the coordination of CBNRM governance structure in enhancing input and output legitimacy?

- How do you account for your activities in the management of resources? Records, Reports budgets, elections .....
- How are benefits and costs shared among stakeholders or community members?
- What is your role in cost and benefit sharing?
- When their resources to be shared or decision to be made how you ensure all stakeholders are involved?
- How do you inform the people you represent about the decisions that have been made?
- How do stakeholders qualify to be members?
- What outcomes do the existing interactions have on livelihoods and PA conservation?
- How are different interests included in policy formulation and implementation?
- How are decision-makers accountable to the wider society in terms of the decisions that they make in relation to resource management, use and distribution of costs and benefits?
- Do the stakeholders have the capacity to ensure that defined goals are achieved?
- Can the set goals be achieved at the lowest cost possible?

c) What governance variables are key to improving the coordination arrangement for livelihoods and PA conservation?

- What is the scope in terms of resources of concern by CBNRM arrangement? E.g. Quota setting
- What rules specify positions and roles of those positions in the CBNRM?

- What rules specify how participants leave and enter positions?
- Which stakeholders have the power or authority to make decisions about the various aspects of the natural resources in the GMA?
- What is the source of their power/authority?
- How is information shared among stakeholders and what are the implications for livelihoods and resource conservation?
- How process of decision-making is coordinated among stakeholders and how do they affect outcomes?

Objective Two

2. To evaluate the link between governance structures and livelihood strategies of local communities living in GMAs.

Research Questions

- How do governance structures determine household access to livelihood assets?
- How does access to livelihood asset influence livelihood diversification opportunities for households?
- Does decision-making at community level influence the choice of livelihood strategies for households?
- How does cost and benefit sharing through CBNRM affect available resources for the households?

Objective Three

4. To assess how current livelihood strategies, impact on the conservation of the buffer zone.

Research Questions

a) How does choice of livelihood strategy affect wildlife habitat conservation?

- What drives the choice of land use by households?
- What are the drivers of forest loss in the buffer zone?

b) Can vegetation loss in the buffer zone be attributed to decision-making?

- What percentage of vegetation lost per ha per year can be attributed to decision-making at household level/community level?

c) How does loss of vegetation impact on wildlife dispersal areas?

- What impact does habitant loss have on wildlife conservation?

What is the state of vegetation cover in the buffer zone from 2006 to 2018?

APPENDIX 4: FOCUSED GROUP DISCUSSION GUIDE

Governance Structure

Governance structure consists of the following;

Actors

Institutions

The combination of user rights defines and specifies the position of various actors in relation to the resource. An Authorised user is one that has the right to access and withdraw and (Vtn, 2015) includes the right to manage as part of the definition. An owner holds all five rights (See list of rights below).

Actors; In total 5 focused group discussions will be carried out the first with CRB (Community resource board members), secondly with the VAGs (Village action groups) representatives 10 in total 1 representing each VAG, thirdly with the Government departments, local NGOs and interest groups, fourthly with randomly selected members of the community. Representatives will then be selected for the fifth and final focused group discussion.

1. Do you participate in CBNRM programs?
2. What are your goals?
3. What are your responsibilities/roles in the governance process?
4. Do you have enough resources to achieve the set goals?
5. What motivates you to participate in CBNRM programs?
6. What rights do you have in the decision-making process?
7. What decisions about the resource do you think can be made locally and those that can be made by higher government levels.
8. What rights do you have as stakeholders in CBNRM?

N: B The combination of resource rights as defined below specifies the position of various actors in relation to the resources in the GMA.

Property and user rights (Ostrom and Schlager, 1992) bundle of rights

(i) Access: Do you have the right to enter the GMA (Physical property)

(ii) Withdrawal: Do you have a right to obtain products of a resource (wildlife, forest products, land, Fish)

(iii) Management: Do you have a right to regulate internal use patterns and transform the resource by making improvements

(iv) Exclusion: Do you have the right to determine who will have access right and how access right can be transformed.

(v) Alienation: Do you have the right to sell or lease either or both of the above rights.

Research focus on the role of actors and how the influence access and decision-making

Actors and institutions

Categories of Actors

Those owning/using productive resources (economic actors)

Those having the power to define property/use rights and interaction rules (political actors)

Those ensuring legitimacy of political action (civil society)

Objective One

1. To assess the existing governance structures and evaluate the co-ordination effectiveness of the governance structures in Mufunta.

How to address this objective the theoretical framework by Arild Vtn (2015) and a Co-ordination Diagnostic for Improving Integrated Environmental Management by Richard D. Margerum & Stephen M. Born (2000). Are going to be applied to address objective number one.

Research Questions

1. How do rights shape goals/Motivations, roles and responsibilities of actors in CBNRM?
2. Do the institutions governing stakeholder interaction facilitate equal partnership for actors in the governance structure?
3. How effective is the coordination of CBNRM governance structure in enhancing input and output legitimacy?

Outline of what data and information will be collected to answer objective one.

1. How do rights shape goals/Motivations, roles and responsibilities of actors in CBNRM?

- Who are the actors in CBNRM in Mufunta?
- What are their goals/motivations in relation to improving livelihoods and conservation?
- Do CBNRM actors have enough resources to achieve the set goals?
- What are the responsibilities of the various actors in CBNRM?
- What rights do the actors have in the decision-making process?

N: B The combination of resource rights as defined below specifies the position of various actors in relation to the resources in the GMA.

Property and user rights (Ostrom and Schlager,1992) bundle of rights

(vi) Access: Do you have the right to enter the GMA (Physical property)

(vii) Withdrawal: Do you have a right to obtain products of a resource (wildlife, forest products, land, Fish)

(viii) Management: Do you have a right to regulate internal use patterns and transform the resource by making improvements

(ix) Exclusion: Do you have the right to determine who will have access right and how access right can be transformed.

(x) Alienation: Do you have the right to sell or lease either or both of the above rights.

2. Do the institutions governing stakeholder interaction facilitate equal partnership for actors in the governance structure?

a) What rules are in place concerning access rights to resources?

b) What rules govern the interaction among the stakeholders in CBNRM governance (Trade, command, community rules no rules defined).

- The following are the stakeholders in the CBNRM arrangement how often do you get to meet them?
- Do you meet all stakeholders in one place or its one stakeholder at a time?
- How are the meetings done and where do they take place?
- How do you feel about how other stakeholders treat you?
- What kind of relationship do you have with other stakeholders?
- How are decisions made concerning resources in the GMA?

c) What rules govern the political process (Constitution and collective-choice rules) Theory

Do you have a constitution pertaining the management the GMA if yes (Ask for copies Get copies of CRB Constitution, act and policy documents pertaining protected areas) FD, Fisheries, wildlife Act all recognise the CRBs.

- Constitutional rules define the bodies of decision-making and who are eligible to participate in the decision-making process.
- What are the collective-choice rules on the ground (norms and conventions of how to manage GMA resources (Specific procedure of collective decision-making)?
- How are collective decisions made?
- How do stakeholders participate at different levels? (Participation ladder)

d) What checks and balances do of civil society provide to enhance equal partnership in the CBNRM

3. How effective is the coordination of CBNRM governance structure in enhancing input and output legitimacy?

N: B Actors should first develop and articulate what they see as their real interests and ensure that these are accepted as legitimate issues for political decision-making. Therefore, for focused group discussion/analysis. Stakeholders will model what is obtaining on the ground currently in CBNRM in

the GMA. Then the stakeholder will go through the process of modelling what they think is the ideal structure that can function better in their context and make it acceptable for decision-making. For the analysis, what comes out of this process will be compared with the theoretical structure of CBNRM (Normative standards of what is a good process and outcome). Capture the concept of polycentric governance which is the relationship between various actors (Social capital).

Resource use and impact (Ranking Exercise)

Ranking exercise for which of the resource is most accessed, most important to households,

Which of the following natural resources do you have access to	Codes	Membership	Access control	Seasonal/all year round
land	01			
Forests *(Forest products)	02			
Wildlife *(Game, hunting)	03			
Fish	04			
Streams and Rivers	05			
Plantation Forests	06			
Wetlands	07			

Trend lines in resource use

APPENDIX 5: MUFUNTA GMA LIVELIHOOD SURVEY, 2017

STATEMENT ABOUT INFORMED CONSENT

Hello, I am doing a survey on behalf of ***Copperbelt University (CBU) in collaboration with Stellenbosch University (SU), and Norwegian University of Life Sciences (NMBU)*** *on how natural resources governance structures are linked to your household livelihoods and conservation of natural resources in the game management area* ***(GMA).*** *I would be very grateful if you would answer a few questions to help us understand this relationship.*

1.The information that you provide will be kept strictly confidential.

2.You do not have to answer questions you do not want to answer

3. You can stop the interview process at any time

4.You can ask for clarification on any questions at any time

5.There are no wrong or right answers, most candid and honest answers are most useful

6.There are no direct benefits, risks, or compensation to you for participating contact in the study

Questionaire No.		Village Name	
Household Number		Village action group (VAG)	
Chief		Farming block	
Tribe		GPS Cordinate	

GPS Cordinate (Distance from the road/park/ if settled in buffer Zone)
1= Nkoya, 2 = Lozi, 3 = Luvale, 4 = Mbunda, 5 = Tonga, 6 = Kaonde, 7 = Ila, 8= Other

1. 0 Basic Household Information:

1.1. Household members
Note: ***List only household members who live more than six months per year with the household***

HH members	Sex (m/f)	Relationship to HHH[1]	Age	Education	Main occupation[2]	Secondary occupation	Other occupation
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

[1]*Relationship: 1=HHH, 2=wife, 3=child, 4=dependant, 5=laborer, 6=others, specify*
[2]*Occupation: 1=prod./sale of crop 2=prod./sale of livestock 3=beer brewing 4=agricultural input trading 5=carpentry/lumbering 6=crafts/art 7=trading agricultural output 8=shop keeper 9=brick making 10=service provider 11=charcoal burning 12=KNP Employee 13=NGO employee 14=selling bush meat 15=casual laborer 16=Honey production 17=tourist guide 18=school 19=other, specify*
[3]Education 1=none,2=Some primary,3=completed primary,4=Some secondary,5=Completed secondary,6=College,7=University

1.2 How long have you lived in this area?

a) Less than five years, b) Less than ten years (5-10 years), c) More than ten years, d) Native to the area, e) Other (specify) ……

b) If moved in from other place where is your place of origin? …….

Why did you come to this place?……..

(1=availability of land, 2=employment, 3=family, 4=marriage, 5=Tobacco scheme 6=National park, 7=others, specify)

2.0 Household Assets:

2.1 What is the number of buildings you own?

Type	Number	Value (Est)
Building or structure locally		
Building or structures elsewhere		

2.2 Which materials is the locally owned house made of?
(1=Iron sheets, 2=grass, 3=bricks, 4=mud & wattle, 5=cement, 6=others, specify)

a) Roof_____
b) Walls _____
c) Floor _____

2.3 How many plots of land does your household have?
2.4 What are the characteristics and size of the household land in hectares?

Code	Description	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Total (ha)
01	Size of plot in hectares						
02	Land quality(1,2,3)						
03	Location (GMA Zones)						
04	Land use (*Crop grown,)						
05	Tenure of Land						

**Land quality: 1=Fertile 2=midum 3=poor*
GMA Zones; 1= Development *zone 2= Natural preservation zone 3= wilderness zone 4= buffer Zone*
Tenure: 1=own land, 2=rented land, 3=borrowed land, 4=communal land, 5=other, specify
Land use:1=dwelling 2=crop land 3=fallow land 4=0ther, specify

2.5 How did you aquire the land? Through; 1= The chief 2=Goverment 3=CRB 4=inheritace 5=Other specify .....CRB(Community resource board)

**Do not read the options just ask the question and tick the appropriate option*

2.6 Did the size of your land change over the past 12 months? If yes, why? _____
2.7 Any plans for future expansion? If yes how many hectares do you expand per year 1=1 to 5, 2= 6 to 10, 3= more than 10?
2.8 Who makes the decision about the type of land use or expansion you undertake as a household?

a) Household b) Community c) Chief d) CRB e) Government b) Other specify

2.9 What are the main problems, if any, with your land? _____

2.10 How much (Zambian Kwacha) would you (a) pay for a hectare of land: _____
(b) demand for one-hectare land: _____
(c) spend on renting a hectare land: _____
(d) let out (monthly) a hectare of land_____

2.11 Do you own machinery or other major assets, such as cars, motorcycles, bicycles, TVs or radios? If yes, fill out:

Type of asset	Amount (Quantity)	Total value

2.12 Do you possess any financial assets or savings?? If yes, how much? _____
2.13 Do you have access to loans? If yes, what kind of loans? _____

2.14 Do you have a loan which you are still servicing? If yes, how much do you owe?

2.15 Trees and Plantation

Type	Number/Size of land covered	Value (or value of harvest last 12 months)
Mango trees		
Orange trees		
Lemon trees		
Size of banana plantation*		
Size of sugar cane plantation*		
Plantations (planted trees)		

** Size of plantation in number column*

3.0 Income and Costs

3.1 Does your household own any livestock? 1. Yes 2. No

Animal type	Total value	Sold	Died	Slaughtered	Given out	Bought	Received	# now	Total value now
Cattle									
Goats									
Pigs									
Chicken									
Duck									
Others									

* Livestock last 12 months

3.2 What were the inputs associated with livestock ownership during the past 12 months?

Type of input	Total cost of input
Medicine/veterinary service	
Dipping	
Herding	
Motorised transportation	
Licks	
Fodder (incl. husks)	
Renting of land (incl. stubble)	
Other (incl. fines)	

3.3 Income from livestock

3.3.1 Meat production from cattle last 12 months:

Season	Period	# of cattle slaughtered	% of meat sold	Income from one animal	Total income from meat sales

1					
2					
3					
4					

3.3.2 Meat production from goats last 12 months:

Season	Period	# of goats slaughtered	% of meat sold	Income from one animal	Total income from meat sales
1					
2					
3					
4					

3.3.3 Milk production from cows last 12 months:

Season	Period	# of milk cows	Production litres/day	% of milk sold	Price (mean) in ZMK/litre
1					
2					
3					
4					

3.3.4 Milk production from goats last 12 months:

Season	Period	# of goats	Production litres/day	% of meat sold	Price (mean) in ZMK/litre
1					
2					
3					
4					

3.3.5 Other livestock income last 12 months:

Type	Total # produced	Total # sold	Total cash income
Butter			
Eggs			
Hides			
Other			

3.4 Income from crop production

3.4.1 Crops and vegetables cultivated the last 12 months:

Crop	Unit produced	# produced	Unit sold	# sold	Price	Income (ZMK)	Area cultivated (Ha)

Maize							
Sorghum							
Millet							
Tobacco							
Cotton							
Paprika							
Beans							
Groundnuts							
Cassava							
Sweet Potatoes							
Vegetables							
Others (specify)							

3.4.2 Expenditure on farm inputs last 12 months:

Input (for seed, specify crop)	Total cost
Seed,	
Seed,	
Seed,	
Seed,	
Seed,	
Seed,	
Fertilizer	
Pesticides	
Other inputs	

3.4.3 Hiring of labour for cultivation last 12 months:

Activity	How many?	Total man-days	Total payment

(*Activity: 1=ploughing, 2=planting, 3=weeding, 4=harvesting, 5=cutting firewood, 6=other, specify)*

3.4.4 Hiring of equipment (machines, oxen) last 12 months:

Type of equipment	Activity	How many?	Total payment

(*Activity: 1=ploughing, 2=planting, 3=weeding, 4=harvesting, 5=cutting firewood, 6=other, specify)*

3.4.5 Is the produce from your own farm enough for year round home consumption? 1=Yes2= No

3.4.6 If no for how many months you usually face food shortage in the household (between sowing and harvest/Months)?……

3.4.7 How do you usually fill the consumption gap……..

.....

3.4.8 Have you ever faced critical food shortage over the last 20 years? 1=Yes2= No

3.4.9 If yes, what had caused the food insecurity situation……and when…….

3.4.10 How did you cope with food shortage during these periods?

Coping strategy order of priority(scale of 1-10)

a) Sale of firewood
b) Sale of livestock
c) Sale of timber
d) Labour employment on-farm
e) Labour employment off-farm (Specify)
f) Employment in the national park
g) Sale of bushmeat
h) Hunting and gathering for household consumption
i) Others …….

3.5 Environmental Income

3.5.1 On a scale from 1 to 5, *with 1=twice or more a week, 2=once a week, 3=2-3 time a month, 4=seldom and 5=never,* how often do you collect resources from a) forest within GMA _____ and b) outside GMA? _____* (Game management area)

3.5.2 What is the main purpose of collecting from outside the GMA (*subsistence, shortfall or cash income*)?
3.5.3 Income from wildlife last 12 months: (We define wildlife as all wild resources)

Resource	Unit	Weekly collected	...outside GMA	...inside the GMA	Time hours/ week	Consumed/week	Sold /week	Bought/ week	Price/ unit	Total Income
Charcoal										
Firewood										
Timber										
Poles										
Bamboo										
Ropes										
Fodder										
Mushrooms										
Vegetables										
Honey										
Medicine										

Grass										
Fruits										
Fish										
Bush meat										
Other										

3.5.4 What is the main benefit of wildlife to your household? a) Food ☐ b) Income ☐ c) Tourism ☐ d) Education e) Revenue for community f) Other (specify) ☐

3.5.5 If you were to rank on a scale of 1-5 how would you rank the above motioned contribution to your household? .....

3.5.6 Which of the above-named resources are typically collected by a) women: _____
b) men: _____
c) kids: _____

3.6 Other income sources

3.6.1 What type of wage labour did members of the household engage in during the last 12 months?

Who in the HH?	Type of work	Employer	Period	Wage	Total income

3.6.2 Did the household have income from other businesses during the past 12 months?

Who in the HH?	Type of business	Total net income

3.6.3 Were there other income sources available during the past 12 months?

Source	Where/to whom?	Total net income
Gov. support		
Remittances		
Sale of beer		
Hiring out equipment		
Beneficiary from scheme		
Conservation related initiative		
Other		

4.0 Governance

4.1 Knowledge about governance and resource use

4.1.1 Are you aware that you live in a GMA? 1=Yes 2= No

4.1.2 Do you know exactly when this GMA was created? 1=Yes 2= No

4.1.3 Do you like the idea that this area was turned in to the GMA? 1=Yes2= No

If yes why?.....

If No why?.....

4.1.4 Does your household participate in any community programmes/ initiatives/ organisations? 1=Yes 2= No

4.1.5 If Yes to above list the programmes you are involved in...(need to go on the ground to collect information on programs/intiatives in the area and incoperate).

4.1.6 What are these organisations for? a)Religious b) Education c) Enterpreneural d)Conservation e)Agriculture

4.1.7 Are you aware of the existence of an active collaborative resource management agreement in your Village? If yes, what kind of collection does it allow? _____

4.1.8 Has your collection of resources from the GMA increased, decreased or not changed at all since 2016/creation CBNRM? 1=increased, 2=decreased, 3= not changed

4.1.9 Would you say that the communities' resource harvesting is sustainable, or did you experience significant differences in the accessibility of certain resources? Explain .....(Indicators)

Resource	Disappearance (15 yrs)	Species Name	Reason for disappearance
Trees			
Wildlife			
Fish			

4.1.10 How was the access to wildlife resources affected after/due to introduction of Community-based natural resource management (CBNRM)?

a) improved
b) deteriorate
c) no change
d) others

4.1.11 Do you think you are benefiting from the Community-based natural resource management (CBNRM) effort ? 1=Yes2= No

If yes how?

……

4.1.12 Do you feel that you are negatively affected due to introduction Community-based natural resource management? 1=Yes2= No

If yes how?……

4.2 Costs and Benefit sharing

4.2.1 Are you a member of the Village Action group (VAG)? 1=Yes2= No

If yes to 4.2.1 , for how long …….

4.2.2 What is your position in the group?……

4.2.3 Do you get any benefit as a household by being a member of the VAG? 1=Yes2= No

4.2.4 If yes to 5.3 what type of benefits list them…….

4.2.5 If No to 4.2.1 why are you not a member?

a) I am not interested
b) Exclusion by group
c) I was evicted from group
d) Other reasons……..

4.2.6 On a scale from 1 to 7, *with 1=excellent, 2=very good, 3=good, 4=indifferent, 5=bad, 6=very bad, 7=severe conflicts*, how would you describe the relationship with CRB/DWNP (Dept. of wildlife)

_____

4.2.7 If yes to 4.2.1 how do you participate in the village action group activities?

a) Meetings b) Patrols c) Awareness campaigns d) Planning e) Election f) decision-making

Note* The respondent can pick what applies to him and add what is not on the list

4.2.8 How are you informed about upcoming events or meetings held for village action group?

4.2.9 Do you participate in CRB decision-making about natural resources in the GMA?Yes/No (Participartion

ladder)

4.2.10 Have you faced any problem over last 15 years due to creation of the game management area? 1=Yes2= No

42.11 If yes what problem?

a) Lose of farm land
b) Lose of access to TFP forest products
c) Lose of access to NTFP forest products
d) Lose of access to wild meat
e) Loss of access to fish
f) Loss of hunting privelleges
g) Others

4.2.11 Has your household experienced any form of human animal conflict? 1=Yes2= No

4.2.12 If yes what type of conflict? .....

4.2.13 Have you incurred any cost due to your households location/distance from the park over last five-year (2013-2017)? If yes, what are the estimated cost incurred.

Cost	Frequency	Cost per year
Damage to property		
Crop loss		
Loss of livestock		
Loss of life		
Loss of farm land		
Fine		
Conflict with poachers		
Other		

4.2.14When this happens who do you report to? a) Chief b) Headman c) CRB(Community resource board d) DWNP (Department of wildlife and national parks e) Goverment f) Other.....

4.2.15 How do they help? Explain.....

4.2.16 Where you compensated for the loss? 1=Yes2= No

4.2.17 If Yes who compensated you? a) Chief b) Headman c) CRB d) DWNP e) Goverment f) Other.....

7.9 In what form was the compensation? a)Monitory b)In kind c)Other specify

4.3 Decision-making and rights

4.3.1 Are you aware of the different planned Zones in the GMA? 1=Yes2= No

4.3.2 Yes to 4.3.1 Which Zone do you collect your products and carry out livelihood activities? ?a)development Zone b)Buffer Zone c)Conservation Zone

4.3.3 Which Zone is supposed to be protected from human settlement or activities? a)development Zone b)Buffer Zone c)Conservation Zone

4.3.4 Do you have a right to regulate internal use patterns and transform the resource by making improvements? 1=Yes2= No

9.7 Do you have the right to determine or influence over who will have access right and how access right can be transformed? 1=Yes2= No

9.5 Do you have the right to sell or lease either or both of the above rights? 1=Yes2= No

5.0 Drivers of forest loss

5.1 Who controls access to forest use? a) Government departments (specify)…. ☐ b) Chief ☐ c) CRB ☐ d) Others☐ (specify)……

5.2 What is the main purpose for cutting down trees? a) Agricultural expansion ☐ b) Timber ☐ c) Charcoal ☐

d) Firewood e) Other (specify) ☐

5.3 If you were to rank on a scale of 1-5 how would rank the above motioned reasons for tree loss? .....

5.4 How has the forest area changed during the last 15 years? a) Increased ☐ b) No change ☐ c) Reduced ☐

5.5 If there is an increase, why do you think this is so? a) Restriction of use by Government☐ b) Restriction of use by CRB ☐ c) forest important to household ☐ d) Replanting of trees☐ e) Others☐ (specify)

5.6 Of the above reasons, which of them do you consider most important for forest conservation? a) Restriction of use by Government☐ b) Restriction of use by CRB ☐ c) forest important to household☐ d) Replanting of trees☐ e) Others☐ (specify)

5.7 If there is a reduction, why do you think this is so? a) Small scale agriculture☐ b) Commercial agriculture☐ c) Timber ☐ d) Charcoal ☐ e) Firewood ☐ f) Others (specify) ☐…….

5.8 Of the above reasons, which of them do you consider most important? a) Small scale agriculture☐ b) Commercial agriculture ☐ c) Timber ☐ d) Charcoal ☐ e) Firewood ☐ f) Others (specify) ☐…….

5.9 Have you noticed disappearance of some tree species during the last 15 years? a) Yes☐ b) No☐ c) Not sure☐

5.10 If your answer is Yes, specify which ones and give reasons for disappearance……
……

5.11 Have you noticed an increase of some tree species during the last 15 years? a) Yes ☐b) No ☐ c) Not sure☐

5.12 If your answer to 3.17 is yes, specify which ones……

5.13 Who makes the decision about the type forest products you can access as a household?

a) Household b) Community c) Chief d) CRB e) Government b) Other

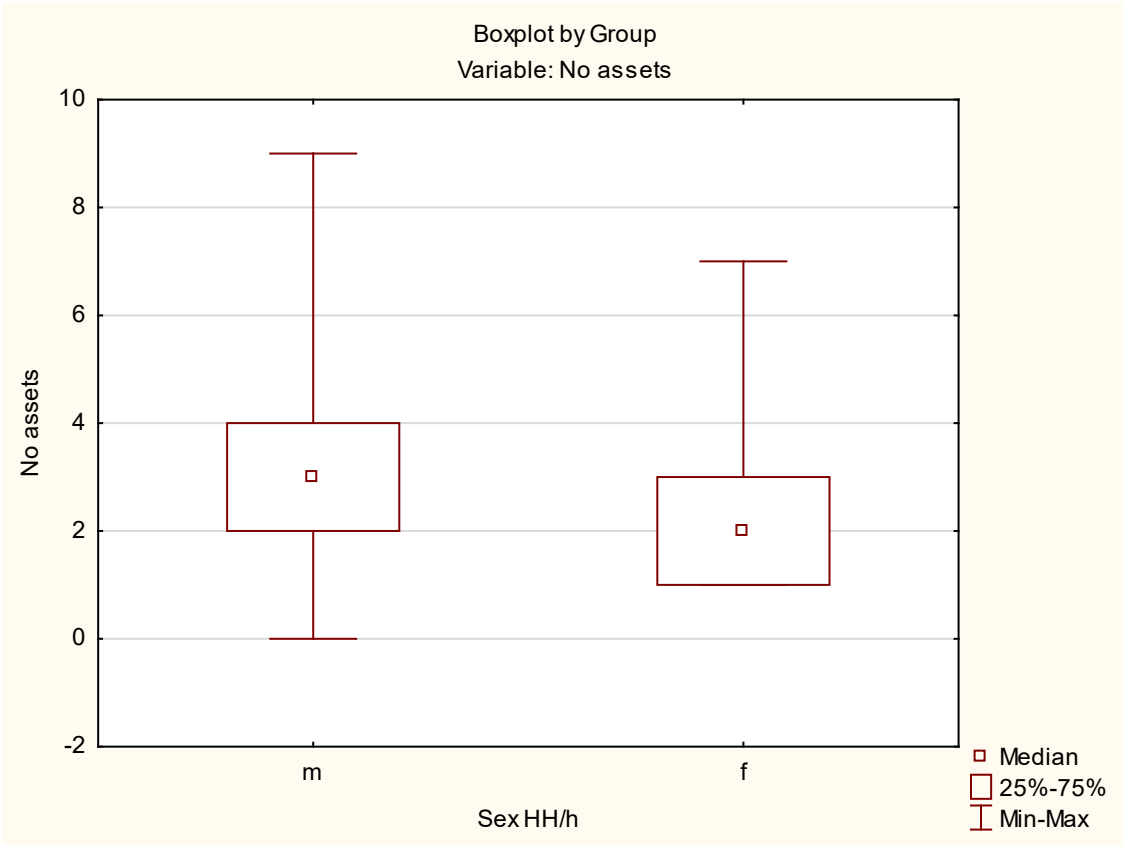
APPENDIX 6: CORRELATION BETWEEN GENDER AND NUMBER OF ASSETS

Nonparametric comparisons of two groups dialog

Mann-Whitney U Test (w/ continuity correction) (Correlation gender and asset in DATAX obj 2 20191107)

variable	Mann-Whitney U Test (w/ continuity correction) (Correlation gender and asset in DATAX obj 2 20191107) By variable Sex HH/h Marked tests are significant at p <.05000 Rank Sum m	Rank Sum f	U	Z	p-value	Z adjusted	p-value	Valid N m	Valid N f
No assets	46634.00	9982.000	7426.000	2.725261	0.006425	2.792802	0.005226	265	71

Boxplot by Group



APPENDIX 7: INCOME DIVERSITY CALCULATION USING SIMPSONS DIVERSITY INDEX

$$D = 1- \left(\frac{\sum n(n-1)}{N(N-1)}\right)$$

n = the total number of households per income source category
N = the total number of all household's income sources.

The value of D ranges between 0-1 with this index,1 represents infinity diversity,0 means no diversity.

Income Source	**No. Of Households**	**n(n-1)**
Wage	133	17556
Business	153	23256
Employment	12	132
Remittances	73	5256
Government Support/Social warfare	48	2256
Environmental	241	57840
Agriculture	370	136530
Total	**1030**	**242826**
D= 0.8		

$$D = 1- \left(\frac{\sum n(n-1)}{N(N-1)}\right)$$

$$D = 1- \left(\frac{242826}{1059870}\right)$$

D = 1-0.23479860

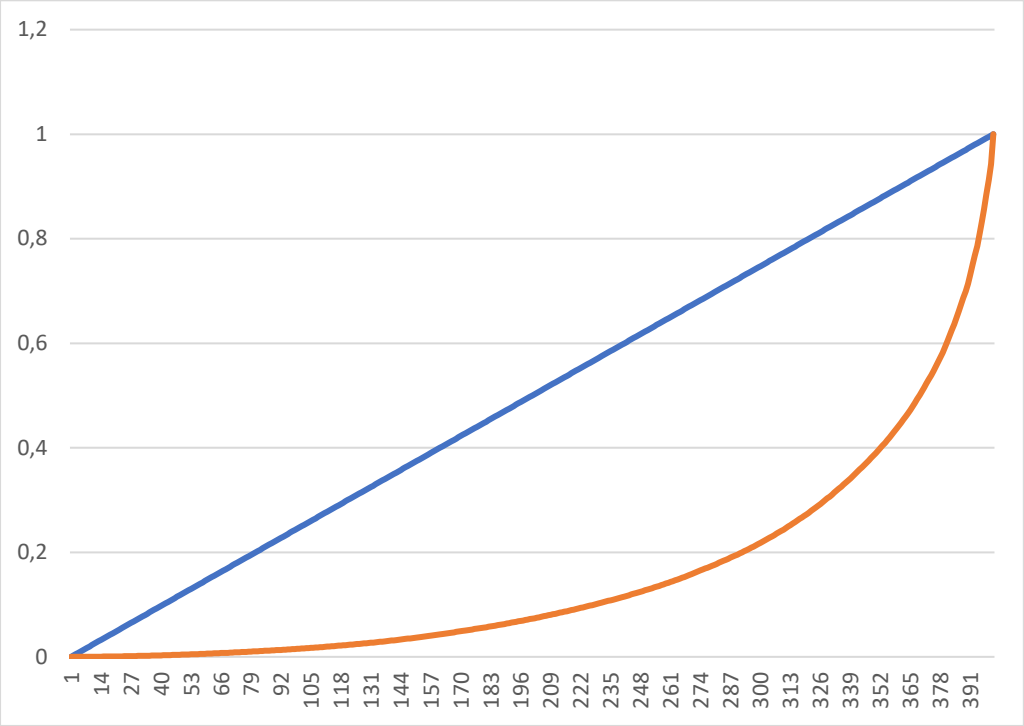
D = 0.8

Therefore, the index indicates high diversity in terms of income sources.

APPENDIX 8: GINI COEFFICIENT CALCULATION WITH AND WITHOUT ENVIROMENTAL INCOME

(i) Gini coefficient with environmental income

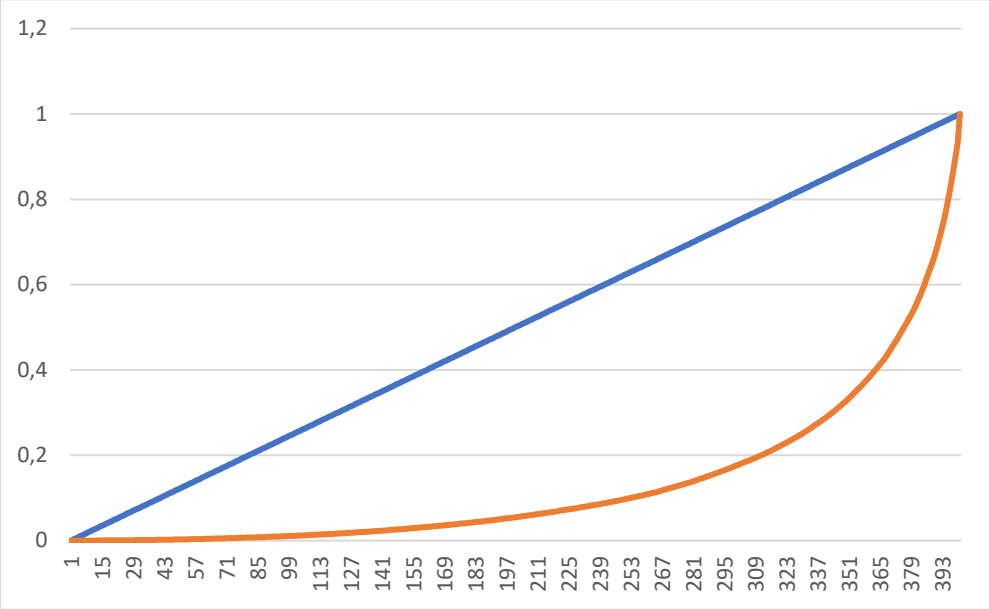
Area B	Area A	**Gini Coefficient**
0.0025	0.343826	0.687652543



Population	Total income	%PP	%Inc	%Incumulative	Area Under the Lorenzo (Area B)
0	0	0	0	0	
1	40	0.0025	4.97E-06	4.97261E-06	6.21576E-09
2	100	0.005	1.24E-05	1.74041E-05	2.79709E-08
3	140	0.0075	1.74E-05	3.48083E-05	6.52655E-08
4	190	0.01	2.36E-05	5.84282E-05	1.16546E-07
5	210	0.0125	2.61E-05	8.45344E-05	1.78703E-07

(ii) Gini coefficient without environmental income

Area B	Area A	**Gini Coefficient**
0.0025	0.367374	0.734748787



Population	Total income	%PP	%Inc	%Incumulative	Area Under the Lorenzo (Area B)
0	0	0	0	0	
1	0	0.0025	0	0	0
2	0	0.005	0	0	0
3	70	0.0075	1E-05	1.00269E-05	1.25336E-08
4	100	0.01	1.43E-05	2.4351E-05	4.29723E-08
5	100	0.0125	1.43E-05	3.86751E-05	7.87825E-08
6	120	0.015	1.72E-05	5.5864E-05	1.18174E-07

APPENDIX 9: CORRELATION BETWEEN LICENCE FEE AND ENVIRONMENTAL INCOME

Correlations			
		licence fee	environmental_ income
licence fee	Pearson Correlation	1	.601**
	Sig. (2-tailed)		.000
	N	112	112
environmental income	Pearson Correlation	.601**	1
	Sig. (2-tailed)	.000	
	N	112	112
**. Correlation is significant at the 0.01 level (2-tailed).			

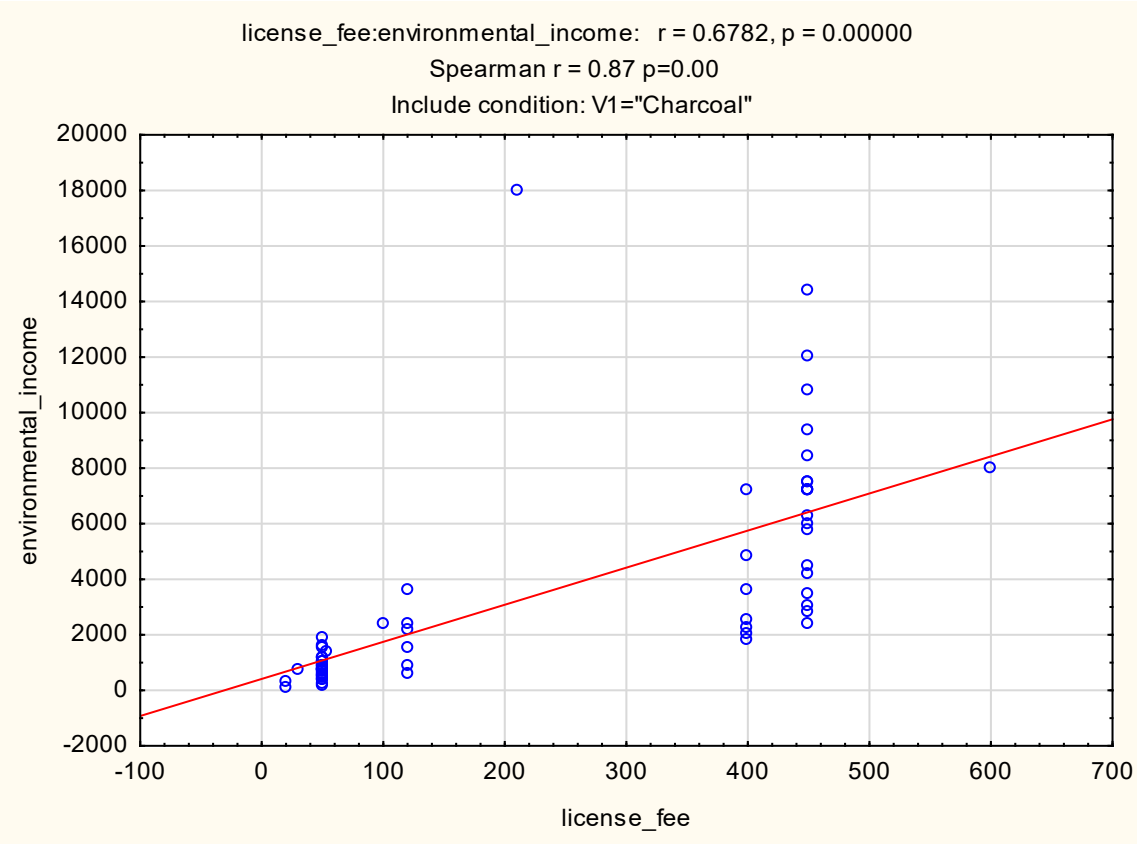
APPENDIX 10: COSTS DUE TO DISTANCE FROM THE PA (NATIONAL PARK)

Human animal conflict * cost due to distance Cross tabulation					
		Cost due to distance			Total
			No	Yes	
Human animal conflict		1	0	0	1
	No	0	261	5	266
	Yes	0	43	95	138
Total		1	304	100	405

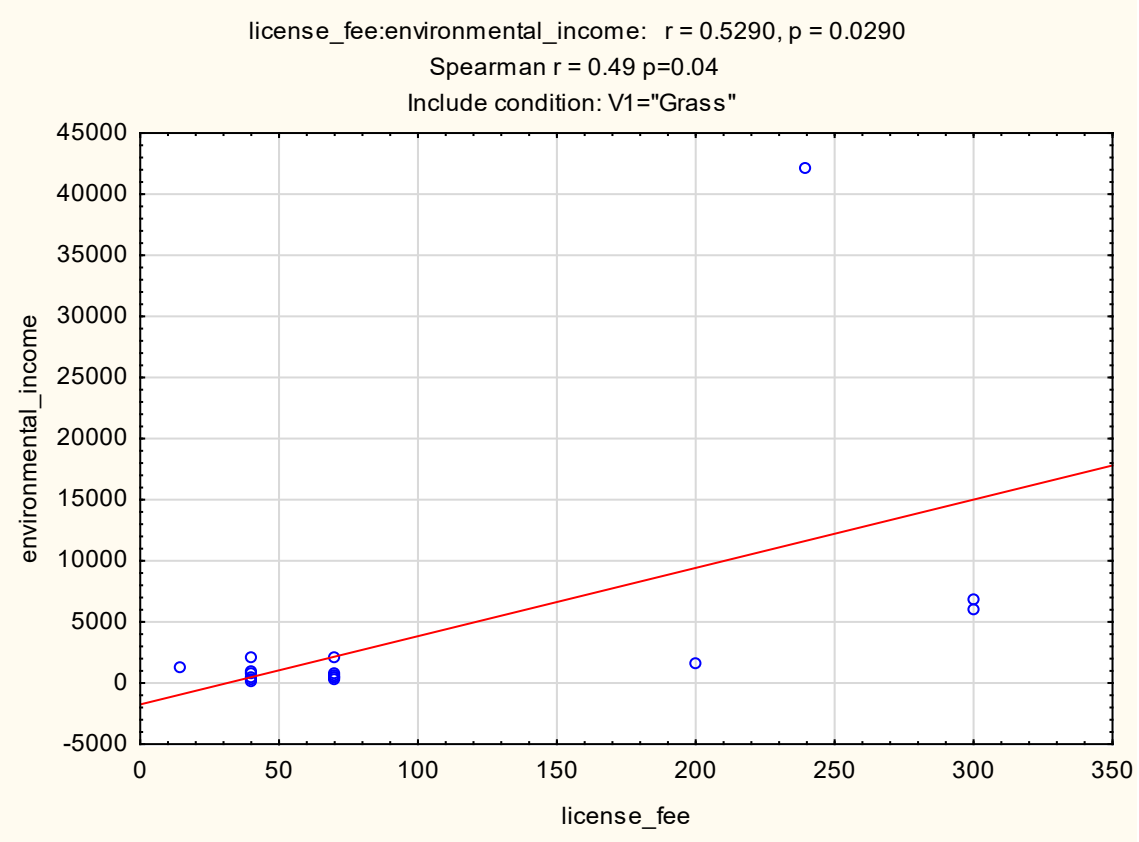
Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	624.273[a]	4	.000
Likelihood Ratio	245.293	4	.000
N of Valid Cases	405		
a. 5 cells (55.6%) have expected count less than 5. The minimum expected count is.00.			

APPENDIX 11: CORRELATION BETWEEN LICENCE FEE AND ENVIRONMENTAL INCOME PER NTFP

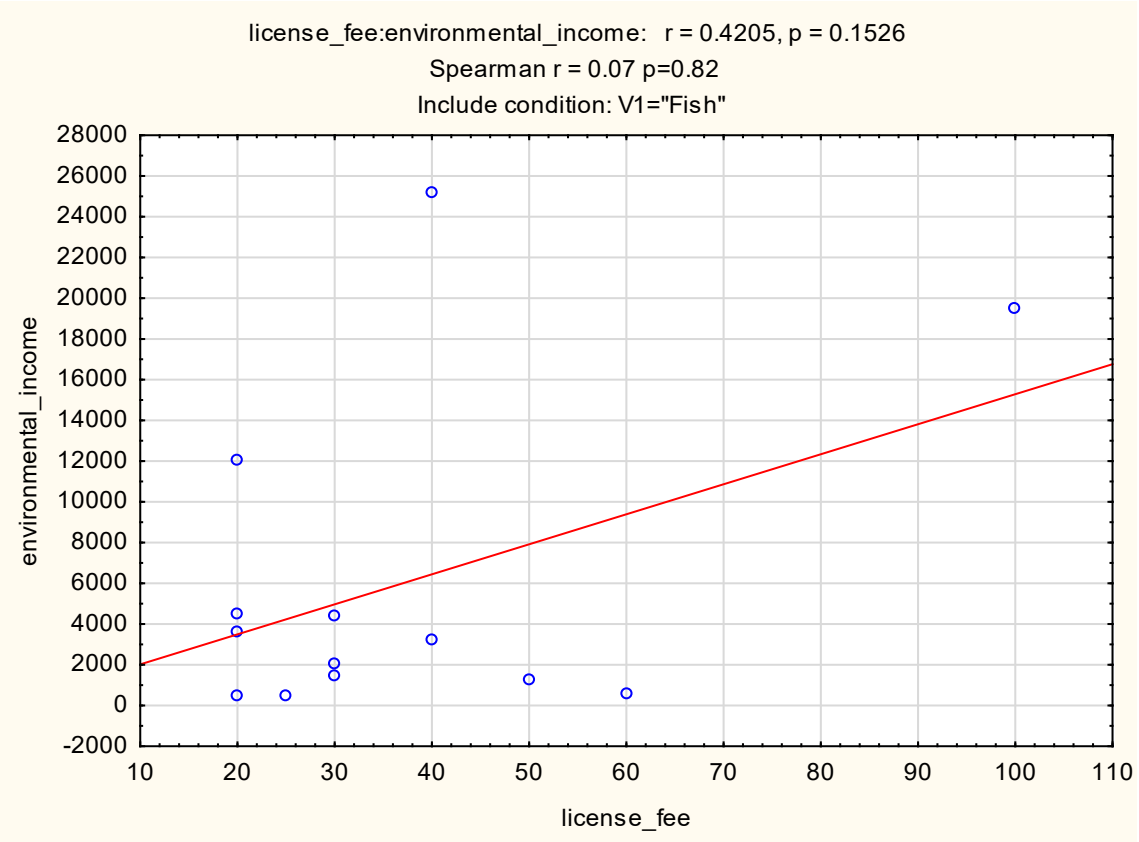
Resource=Charcoal



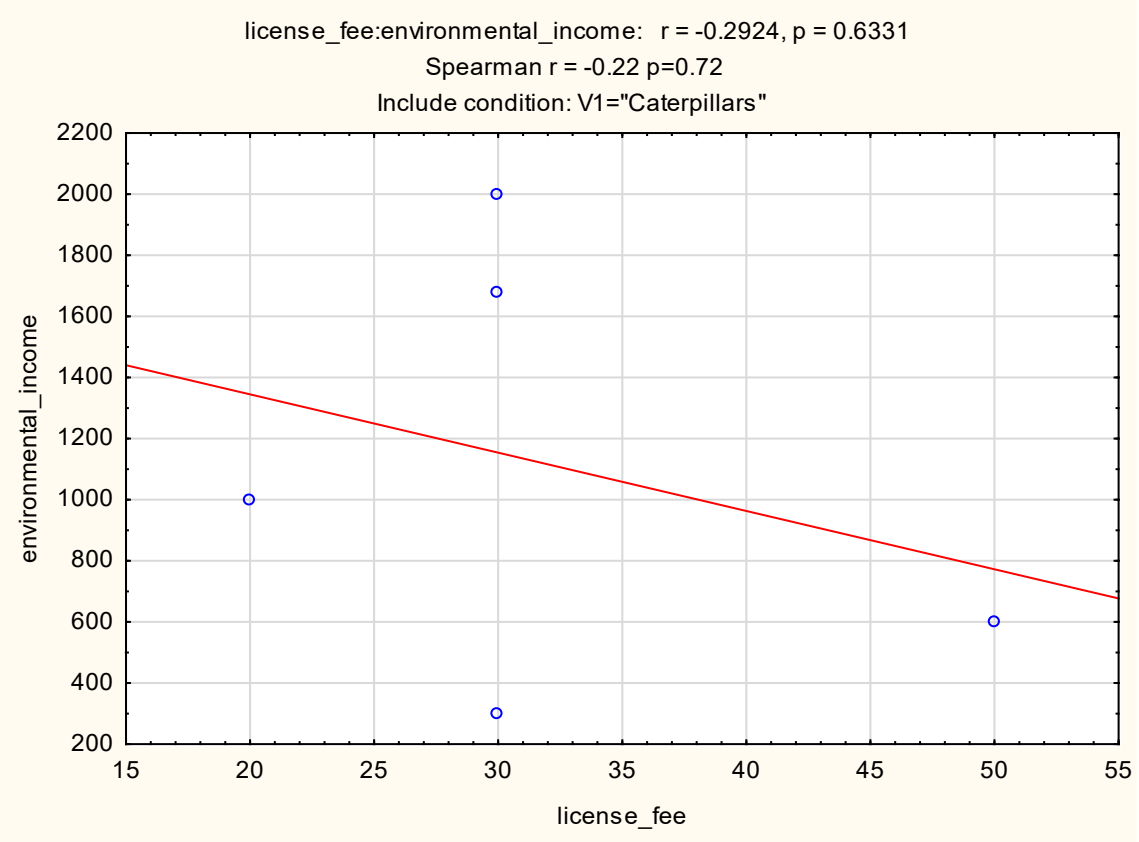
Resource=Grass



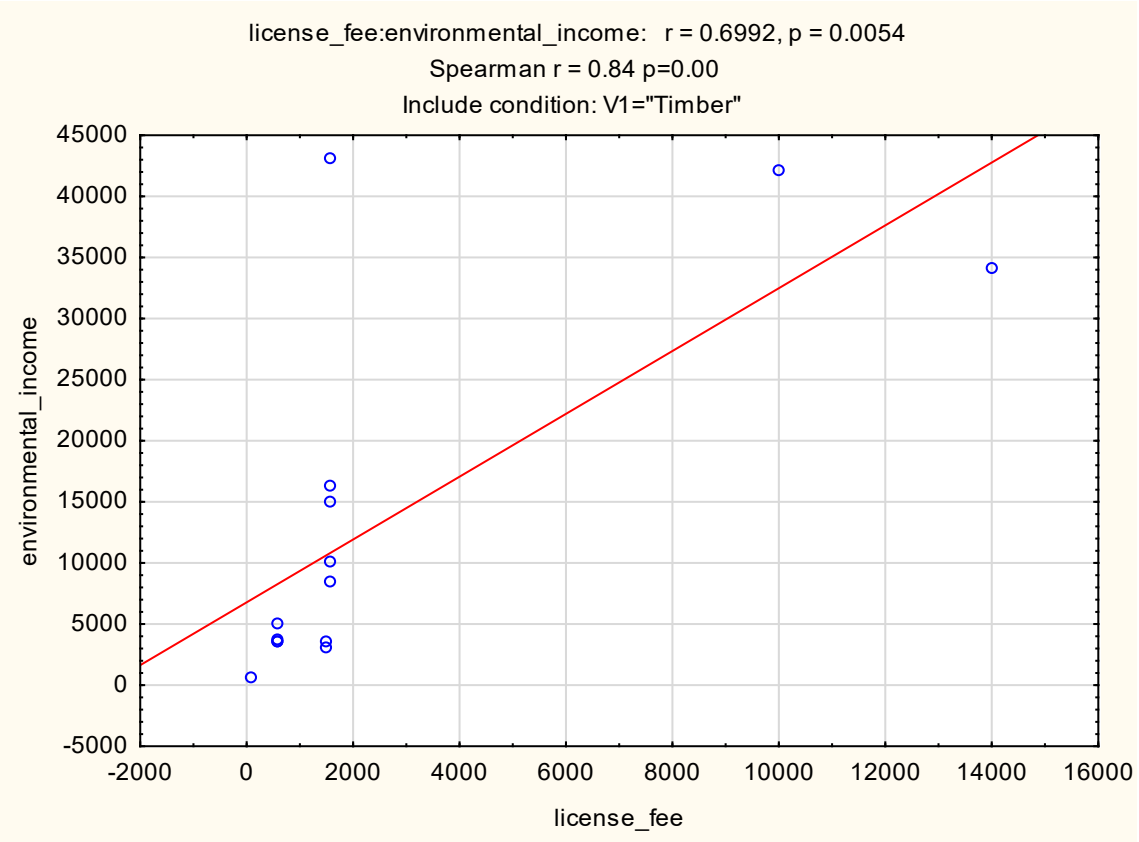
Resource=Fish



Resource=Caterpillars



Resource=Timber



APPENDIX 12: CORRELATION BETWEEN DISTANCE FROM THE NP AND COST DUE TO HUMAN ANIMAL CONFLICT

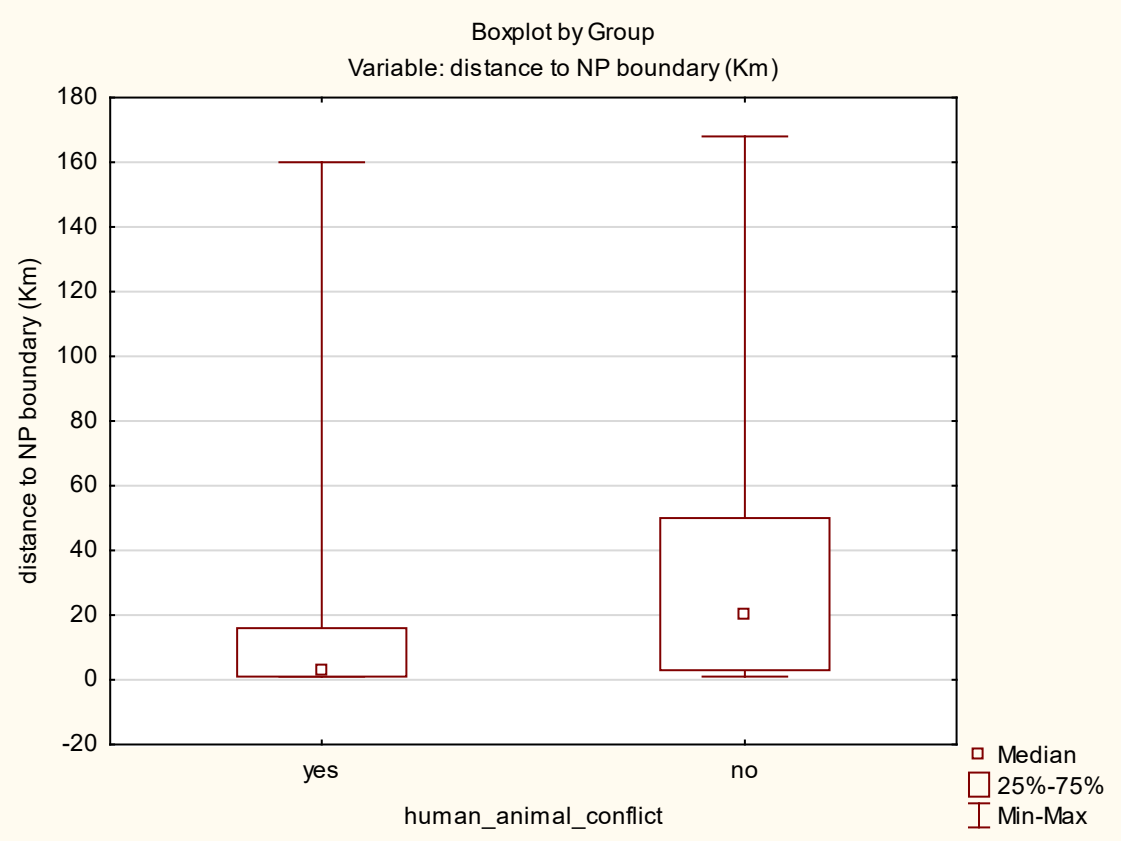
Nonparametric comparisons of two groups dialog

Mann-Whitney U Test (w/ continuity correction) (Cost and distance in DATAX obj 2 20191107)

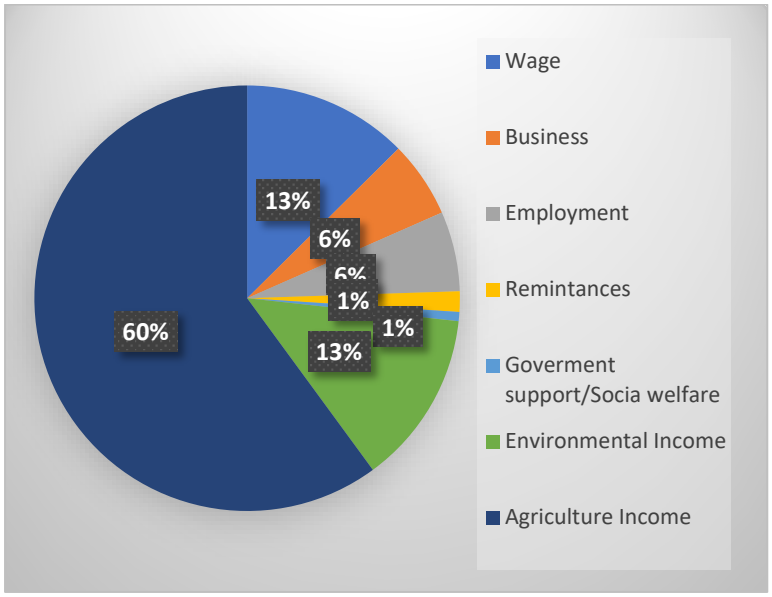
Mann-Whitney U Test (w/ continuity correction) (Cost and distance in DATAX obj 2 20191107)
By variable human_animal_conflict
Marked tests are significant at p <.05000

variable	Rank Sum yes	Rank Sum no	U	Z	p-value	Z adjusted	p-value	Valid N yes	Valid N no
distance to NP boundary (Km)	20226.00	61584.00	10635.00	-6.93451	0.000000	-6.97813	0.000000	138	266

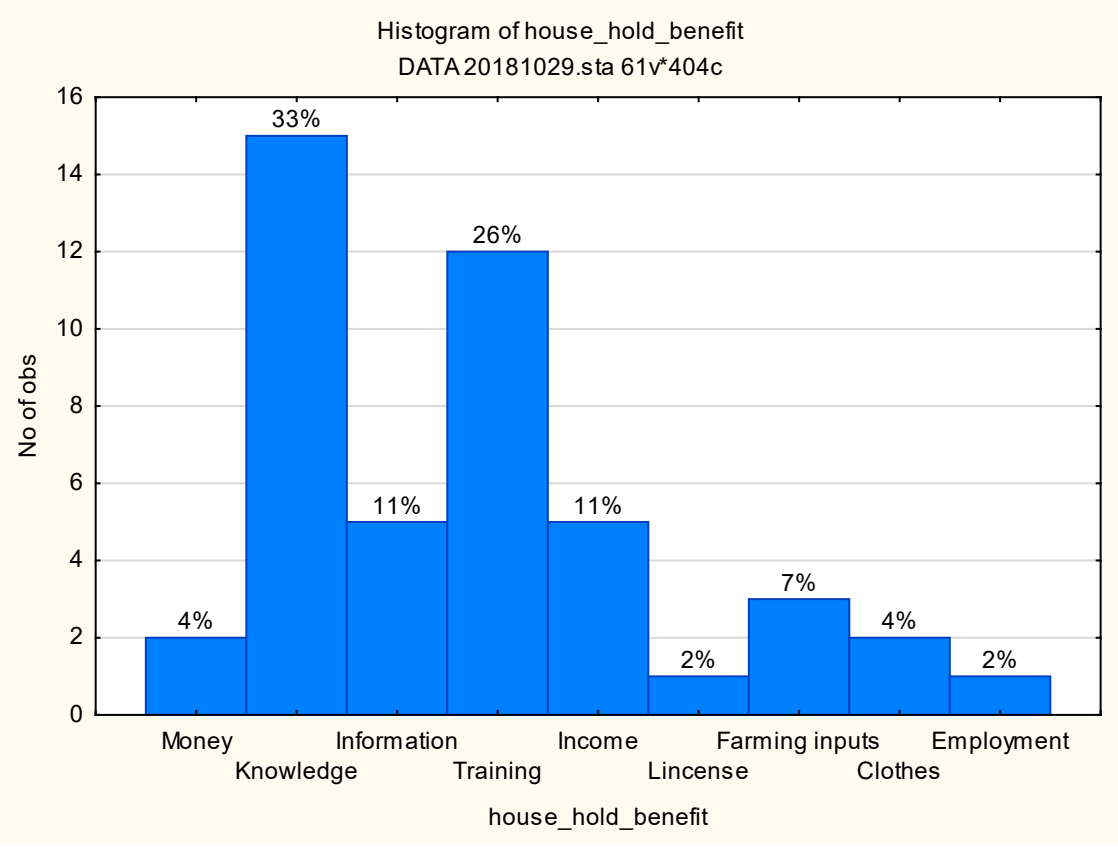
Boxplot by Group



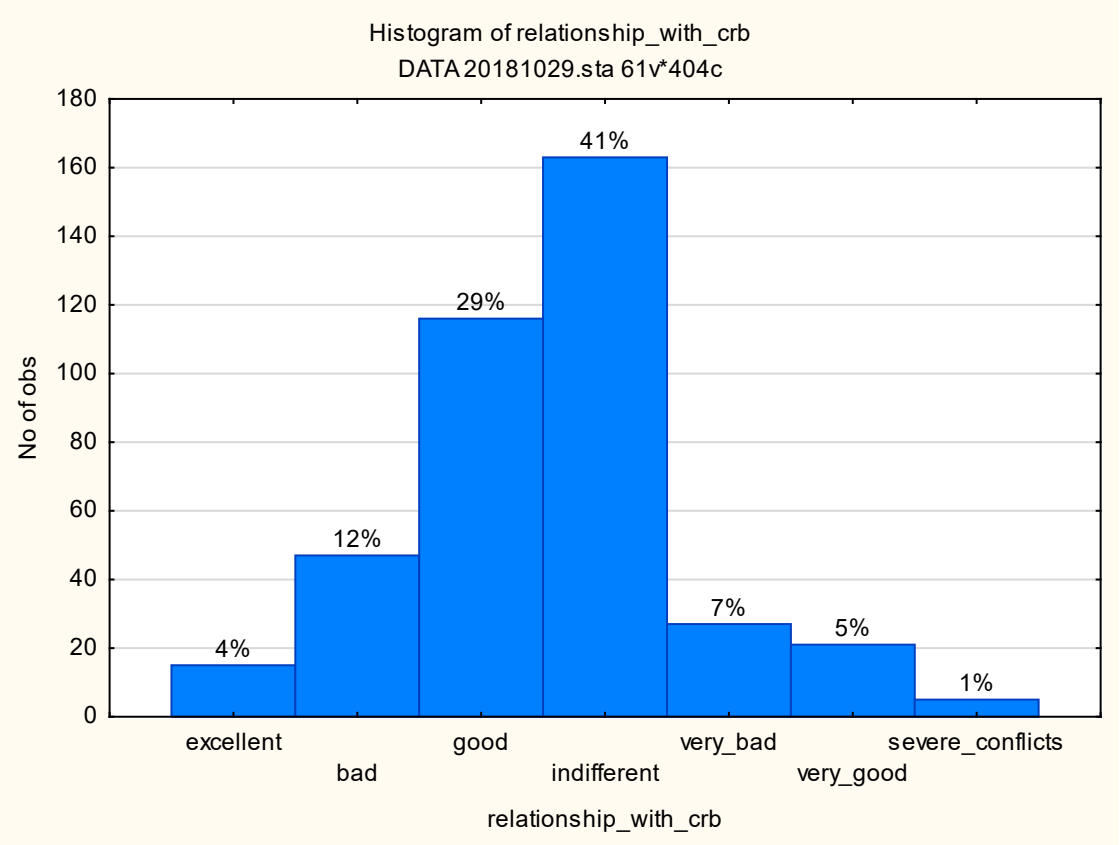
APPENDIX 13: AVERAGE PERCENT CONTRIBUTION TO HOUSEHOLD INCOME

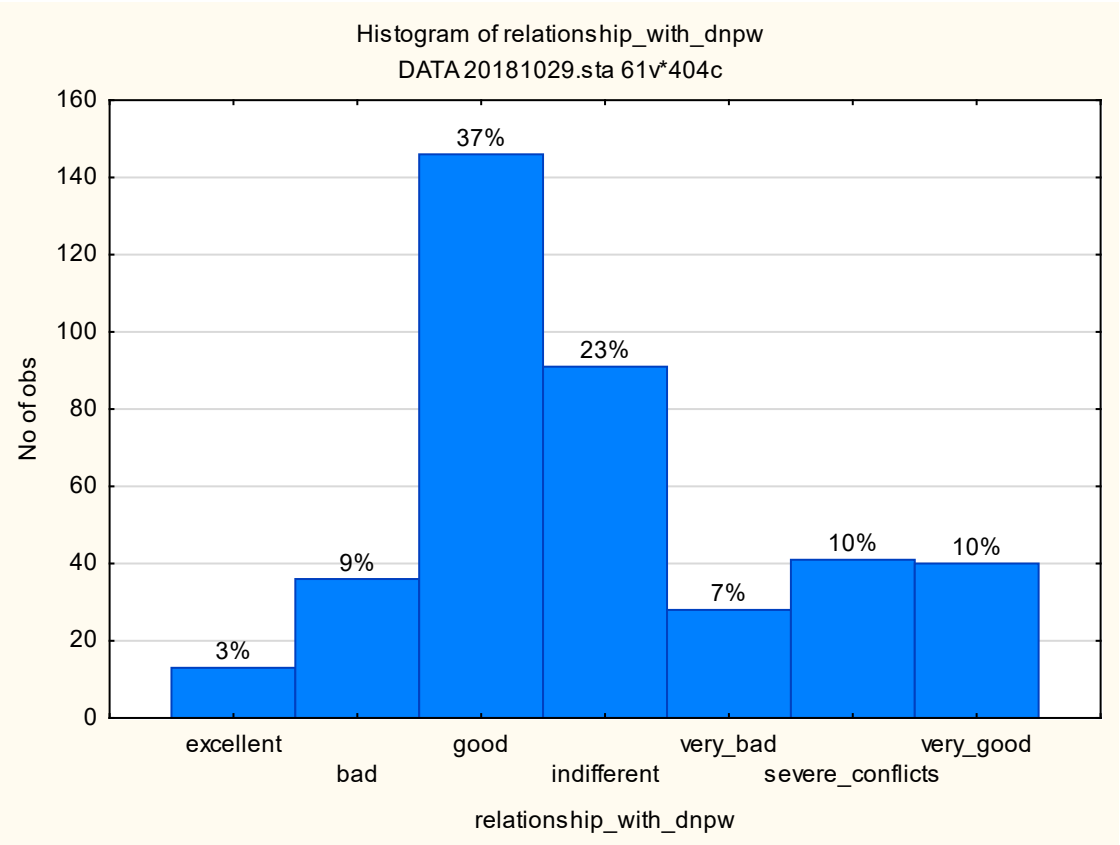


APPENDIX 14: HOUSEHOLD BENEFITS



APPENDIX 15: PEOPLES RELATIONSHIP WITH CRB AND DWNP





APPENDIX 16: ACCURACY ASSESMENT OF THE LAND USE LAND COVER CLASSIFICATION FOR 2006,2014 and 2018

Table 15.1 Accuracy Assessment for 2006

	Forest	Grassland	water	Built-up	Farmlands	Barelands	Total (user)	User's accuracy
Forest	5	0	0	0	0	0	5	100 %
Grassland	0	8	0	0	0	0	8	100%
Water	0	0	2	0	0	0	2	100%
Built-up	0	0	0	5	0	0	5	100%
Farmlands	0	0	0	0	8	1	9	88.8%
Barelands	0	0	0	0	1	1	2	50%
Total (Producer)	5	8	2	5	9	2	31	
Producer's accuracy	100 %	100%	100%	100%	88.8%	50%		93.5%

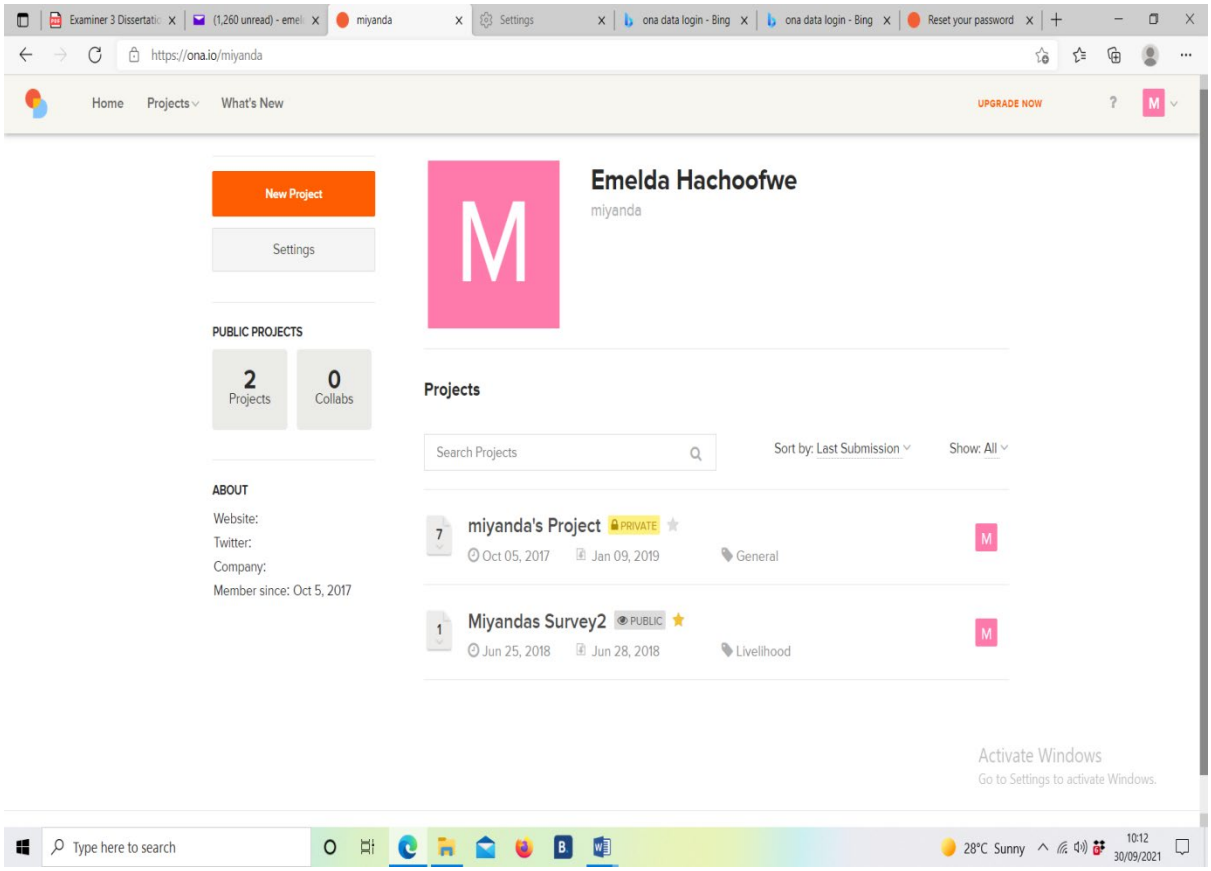
Table 15.2: Accuracy Assessment for 2014

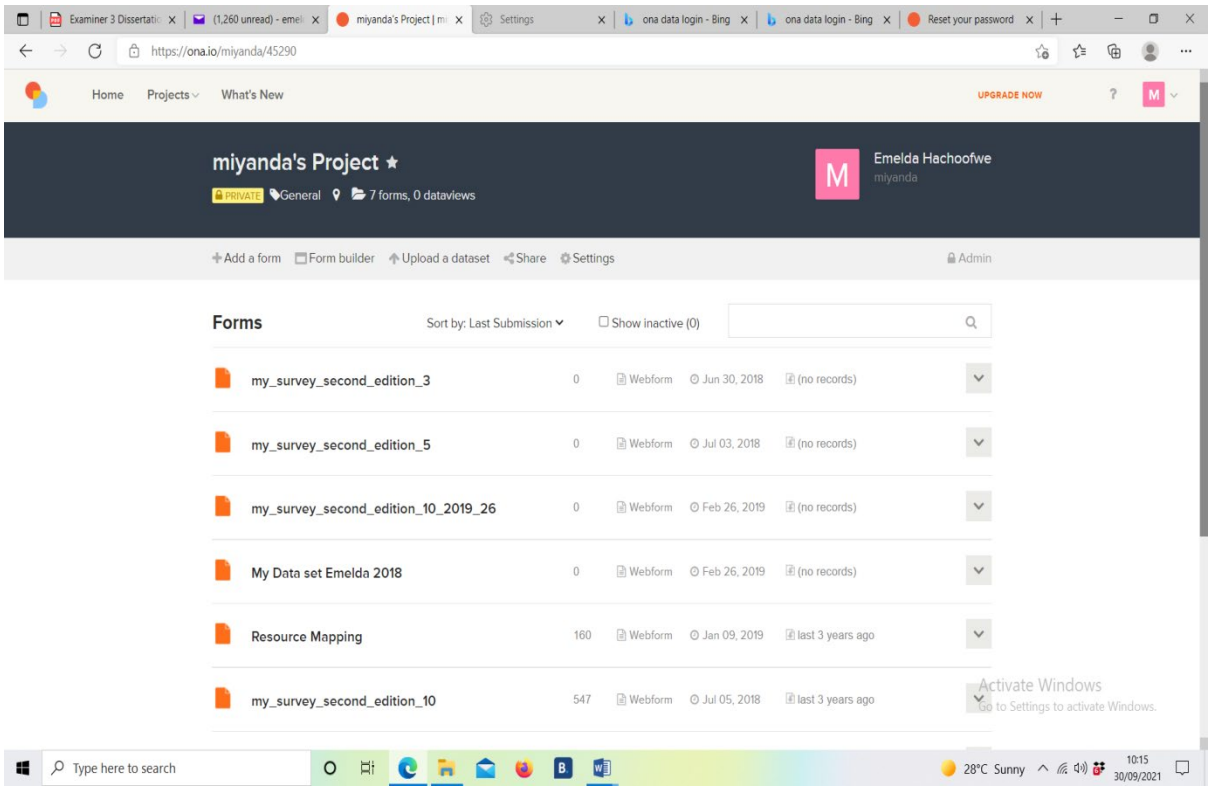
	Forest	Grassland	water	Built-up	Farmlands	Barelands	Total (user)	User's accuracy
Forest	5	0	0	0	0	0	5	100%
Grassland	0	10	0	1	0	1	12	83.3%
Water	0	1	8	0	0	0	9	88.8%
Built-up	0	0	3	2	0	0	5	40%
Farmlands	0	0	1	0	4	0	5	80%
Barelands	1	3	0	0	0	4	8	50%
Total (Producer)	6	14	12	3	4	5	44	
Producer's accuracy	83.3%	71.4%	66.6%	66.6%	100%	80%		75%

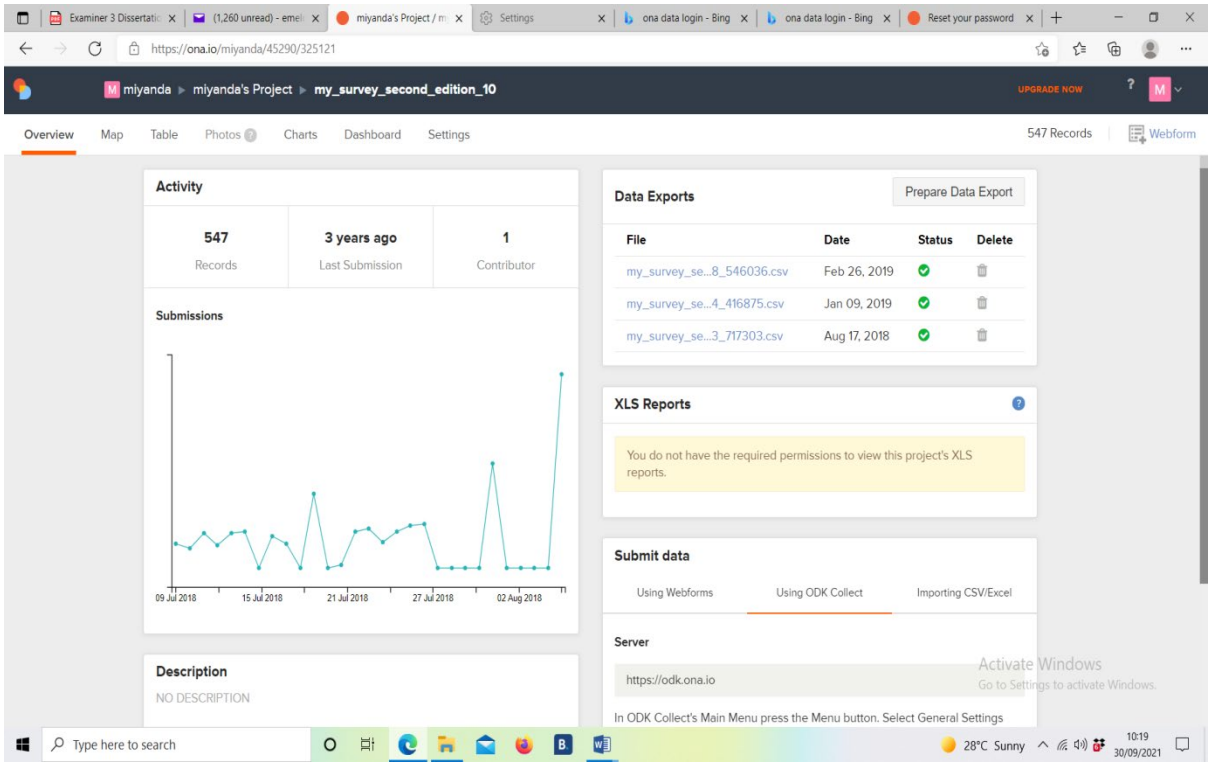
Table 15.3: Accuracy Assessment for 2018

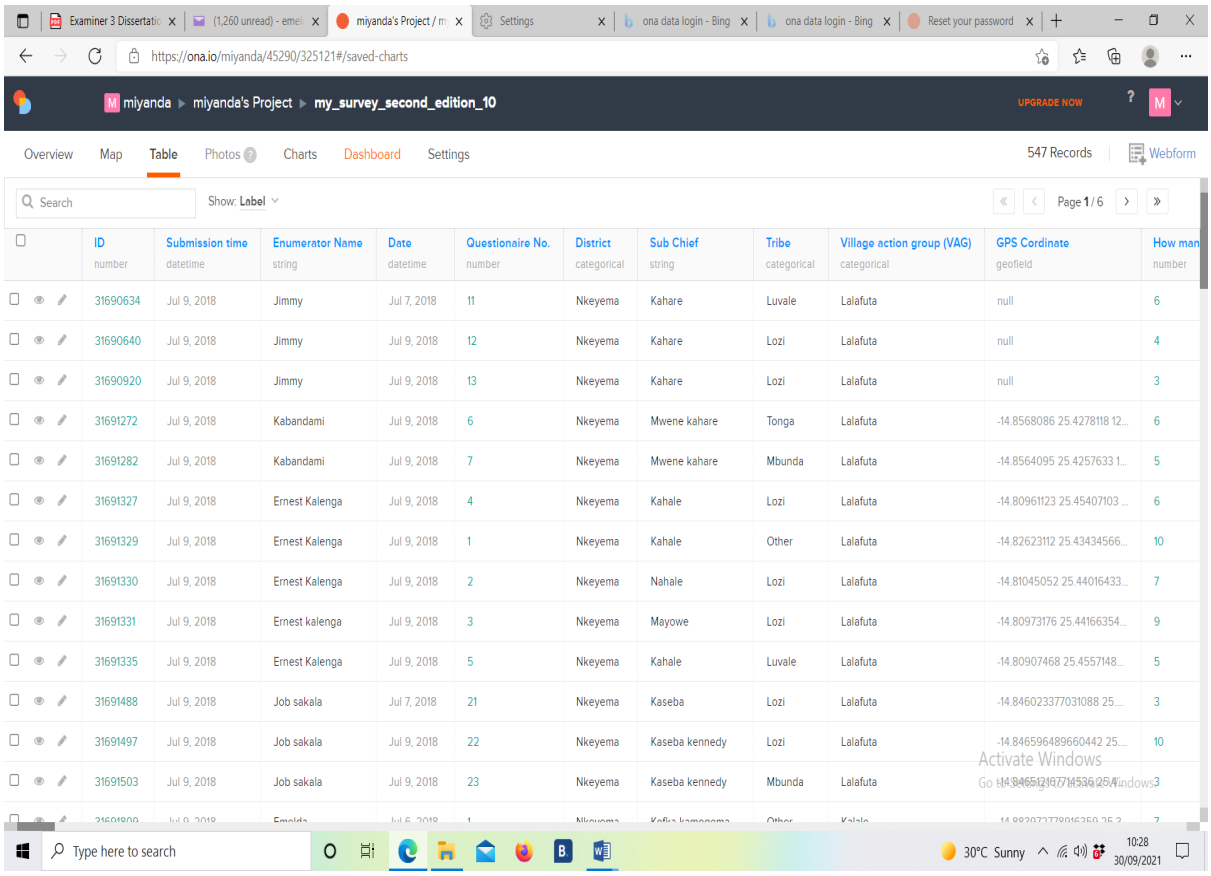
	Forest	Grassland	water	Built-up	Farmlands	Barelands	Total (user)	User's accuracy
Forest	5	0	0	0		1	6	83.3%
Grassland	0	6	0	3	1	0	10	60%
Water	0	0	6	0	0	1	7	85.7%
Built-up	1	1	0	3	0	0	5	60%
Farmlands	0	0	1	0	3	1	5	60%
Barelands	1	0	0	0	0	3	4	82.5%
Total (Producer)	7	7	7	6	5	5	37	
Producer's accuracy	71.4%	85.7%	85.7%	50%	60%	60%		70.2%

APPENDIX 17: SCREEN SHOTS OF THE DATA BASE









APPENDIX 18: THEMATIC APPROACH TO QUALITATIVE DATA ANAYSIS

DATA FROM INTERVIEWS

1. Interview

1.GOVERNANCE (G)	2 .LIVELIHOOD (L)	3.NATURAL RESOURCES (NR)	4.CANT FIT
• There is a CRB which has 10 VAGS and its 6000km^2 • Governance is a challenge because of the size of the GMA and due to the lack of resources • The western side of the GMA geographically speaking on the western side is not easily accessible even on a motor bike • A concession was signed in 2011 with mvu safaris they have been hunting since then but the money to be realised from but getting the revenue from government has been a problem • 22 village scouts paid K450 per month which is not enough this are matched with ZAWA wildlife police officers since these are grade 12s it would be better because the village scouts are the ones doing the donkey work in the GMA. • Village scouts for Mufunta cover far areas as far as kasempa GMA and the national park which is not their portfolio • The community despite all the effort made	There is a business opportunity for the sale of mwange grass in Botswana and Namibia which the community can tap in, it also has a market in Lusaka (K15 per bundle). • There were talks to allow the community to fish in the park under the protection of the ZAWA officers (that a constrain on access) • They can't access resources such as fish in the park because of restrictions, • Individuals are collecting poles but the CRB is not collecting levy. • Charcoal is produced by individuals who say in Lusaka but the community has no access to that resource.	• CRBS should be given quarters to harvest glass and timber • This should be done through the cooperatives as to deters individual exploitation • This area is very rich in timber bordering sesheke and Mulobezi district • Per day you see 3 to 4 tracks of timber living the area but the revenue does not come back to the community • Mwange grass which is a very valuable is endemic to Mufunta. • Poles can be selectively harvested and sold at the market.	Tobacco company has a rise has a programme for children it has not done much but it mostly exploits the community. • WWF bought motor bikes which helped with mobilisation though it was not enough. • Harmer mills project was introducing for VAGS which are close to the wildlife there has bees break downs but no resources to repair them • There is a rumor that a lion sold by a safari outfitter costed $50,000 • The community especially those in Vags do not understand the concept of community benefits the