UNIVERSITY OFZIMBABWE

FACULTY OF SOCIAL STUDIES

MASTER OF SCIENCE IN SOCIAL ECOLOGY

An Institutional Assessment of Watershed Management Systems As A Strategy of Improving Community Resilience: A Case Of The Save Low Veld Watershed, Chipinge District.

BY

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DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS OF MASTER OF SCIENCE IN SOCIAL ECOLOGY

JUNE 2017

ABSTRACT

Resilience refers to the ability of communities to cope with shocks and be able to adapt to the changing environment to earn a living. Most of the communities however depend on their watersheds and natural resources to cope against climate change induced droughts. It is however necessary to understand the institutional arrangements of communities as they try to manage their natural resources to improve their resilience. This study sought to (a) investigate the governance mechanisms in place for the sustainable watershed management as a measure to mitigate against natural shocks in Chipinge low-veld; (b) established the level of community engagement in the management of the watersheds (c) establish the dependency of households on watershed resources for resilience. The study employed both exploratory and explanatory research design to interview the local leadership and district stakeholder as key informants. Quantitative Data that was collected was analyzed using descriptive statistics and qualitative data was analyzed using Thematic Analysis. The results indicated that there are various structures responsible for the management of the natural resources in the Save Lowveld of Chipinge. At ward level there are DRR, ESC and watershed management committees, which work closely with the traditional leaders to enact and enforce local by-laws on resource use and conservation. At District level there are a number of stakeholders which are coordinated by the DA's office to help the communities to manage the natural resources. For watershed management related interventions there is need to nurture a culture of collective action amongst the resource owners, so that they strike a balance between resource use and management. The ward level committees work together with the traditional leaders to mobilize people and capacitate them on sustainable watershed management. A cocktail of activities have been mentioned to be part of watershed management and the main ones are gully reclamation, tree planting, contour ridges, veld fire management and conservation farming which they undertake to sustain the watershed. The committees at ward level have managed to coordinate and mobilize the communities in the development of by-laws and submitted them to the district council for endorsement. The committees also worked with the stakeholders in the enforcement of local regulations especially those on deforestation and veld fires. The communities mentioned that they depend more on the natural resources in the watershed to cope with issues of food shortages and droughts especially in this changing climate. Most households engage on crop production, gardening, livestock rearing, petty trading, sell of fish and bee keeping to earn a living. There is a lot of dependency on the wild fruits and extraction of forest products for livelihood sustenance. The save low-veld is well known for and rich with baobab fruits and most people thrive on these fruits for income and food. The women in the low-veld confirmed that the watershed has so much value to them because it gives them valuable products for food and income. The community has worked with the local council to enact by-laws on veld fires and deforestation to keep their trees intact. However, the watershed is facing problems of politics, corruption, lack of resources and short staffed departments at district offices. The study recommends that there is need for participation by all stakeholders in policy development, benefit sharing mechanisms should be put in place for all resource owners, and capacity building should be enhanced as well as promoting community watershed management initiatives through early response to community needs regarding natural resources. There is also need to incorporate accountability measures in all watershed strategies both at district and ward levels.

Key Words: *Resilience, Watershed management, Institutions, Governance, Natural resources management, Climate change.*

DEDICATION

This dissertation is dedicated to my parents; ***Amon*** and ***Kundai*** for their inspiration, sacrifice and encouragement.

ACKNOWLEDGEMENTS

For the past two years, which I embarked on a great journey of mentorship, I have met some of the finest minds on this planet who helped me to shape my academic life. I would like to express my gratitude to these folks, for their invaluable contributions. First and foremost, I want to thank our dear Lord for his grace and strength that enabled me to sail through this process. I want to extent my acknowledgements to my family (Baba na Mai, Taka, Tom, Taye, Nzunza, Dombo, Taff, Tachi, Tadas, Tana) for their love, support, sacrifice and encouragement. To the Maigurus, I am forever in debt of you. I am grateful to my supervisor and mentor Prof K. Nyikahadzoi for his unwavering support, his robustness and firmness, throughout my study period. The entire scientific family Dr B.B Mukamuri, Dr G Chikowore, Professor Manjengwa, Dr Sadomba, Dr Zanamwe and Professor Dzingirayi, I salute you all for graduating me from lower ranks of mentorship to a finer mind that can articulate scientific issues with confidence. I also want to extent my warmest gratitude to my classmates, Rufaro Tariro, Thelma, Molly, Eulita, Albert, Dzvairo, Mapa, Bheki, Tafadzwa, Symentha and Samson, It was nice having you around. I also recognise the efforts from the watershed management stakeholders in Chipinge, who oiled the wheels of this study. I also have friends who stood by me, Jamaine and Francis. My cheerleader, Claire always refreshed me with words of encouragement. This is surely our product, I salute you all.

ABBREVIATION AND ACRONYMS

AGRITEX	Agricultural Technical Extension Services
CASS	Center for Applied Social Sciences
CBNRM	Community Based Natural Resources Management
CIFOR	Center for International Forestry Research
DFID	Department for International Development
DRR	Disaster Risk Reduction
EA	Environment Africa
EMA	Environmental Management Agency
ESC	Environmental Sub-Committees
FAO	Food and Agricultural Organisation of the United Nations
FD	Forestry Department
FGD	Focus Group Discussion
KII	Key Informant Interview
NGO	Non-Governmental Organisation
NRM	Natural Resources Management
NTFP	Non Timber Forest Products
RDC	Rural District Council
SAFIRE	Southern Africa Alliance for Indigenous Resources
SAZ	Standard Association of Zimbabwe
SFM	Sustainable Forest Management
SLF	Sustainable Livelihoods Framework
SPSS	Statistical Package for Social Sciences
TFCA	Trans-frontier Conservation Areas

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CHAPTER ONE: BACKGROUND AND INTRODUCTION

1.0 Background

Zimbabwe just like many African countries is predisposed to natural disasters. Most rural communities in Zimbabwe thrive on natural resources found in large watersheds as a coping mechanism (Mupaso, 2014). Despite the importance of natural resources for community resilience, the watersheds that support most natural resources are largely being degraded and the net productivity is very low and lags behind the population growth which is growing at an exponential rate resulting in food insecurity, hence affecting resilience. As emphasized by the United Nations International Strategy for Disaster Reduction (UNISDR), there is a strong link between the natural resources, environment and the occurrence of natural shocks because of the sturdy relationship and connectedness of these variables which co-exist together across the watersheds (UNISDR, 2010). Heavy destruction of forests, dilapidation of catchments/watersheds, dilapidation of land and ecosystem destruction, diminution of ranges and tropical water resources, among other factors, affects the capacity of the natural environment to withstand shocks and hazards and this worsens the impact of shocks on the communities (FAO, 2013). These disturbances have a bearing to land degradation and depletion of the ecosystems, as well as increased soil erosion, deteriorating grazing land quality, soil depletion, and loss of biodiversity. Continued destruction of the natural ecosystems in watersheds shrinks the readiness of resources and livelihood options for the local rural communities. The high levels of food insecurity that is exprienced is also as a result of the collapsing economic prospects and reduced coping mechanisms which are emanating from environmental degradation in most watersheds (Chisholm, 2012). Disasters also drive increasing numbers of people to marginal and fragile environments hence further depleting water resources. In addition, water scarcity is compounded by poor water quality, which exposes communities to major water and food-borne diseases which threatens public health and livelihoods hence limiting the ability of communities to withstand shocks (Hadush, 2015). The utilisation of subterranean water resources, for example, is the causative agent for reduced biodiversity in most rural communities which was once rich in fauna and flora. As underground water resources diminish, the earth surfaces dry up and vegetation wither and die in most watershed areas and this compromises the resilience of the communities which depend on those watersheds (Salas, 2014). With continued cutting down of trees and utilisation of underground water resources, it is likely that this will spread like a

cancerous disease which will affect many parts of the world hence reducing the available community livelihood options (Brooks, 1997). It is against this backdrop that Disaster Risk Reduction efforts should be spearheaded to support enhanced supervision and controlled utilisation of underground water reserves and protect the natural resources for community resilience. This can be achieved through enhanced capture and exploitation of rainfall, such as collection of the runoff, and the uptake of climate smart techniques which conserves water to increase productivity in the crop fields. To mitigate against shock, it is also of importance to enhance the capacity of the environment to absorb some of these shocks, and to stimulate sound environmental and natural resource management techniques and the utilisation of the ecosystem in a sparing manner (Caritas, 2014). Well sustained and balanced environments withstand shocks well and this has been discovered as the most efficient way to minimise costs while properly managing disasters. To address this problem, the Zimbabwean Government designed a strategy which aims to use natural resources management as the base for the community's overall development by establishing community based institutions to govern and manage natural resource base to improve rural livelihoods. This strategy aims to enhance the net productivity of the watersheds to improve food security in developing communities through the stimulation of irrigation infrastructure. However, governance issues have been neglected hence affecting the sustainability of the catchments and watersheds holistically. Acknowledging the enabling strategies, irrigated food production is intensifying enormously in those areas where there is right to use water for irrigation to step up resilience in a changing climate. The Chipinge low-veld is one of the areas where a lot of irrigation infrastructure is being established for food production and income, small livestock production and harvesting of Non-Timber Forest Products. This is meant to improve the household coping strategies in a changing climate, but however there is some discord between infrastructure development, utilisation of water resources, management and governance of the entire watershed by the institutions. At present water resources of the Save catchment are strikingly overused mainly due to water extraction for irrigation, forest clearance, excessive grazing, stream bank cultivation and soil erosion. As a consequence of high water abstraction for irrigation coupled with high levels of siltation into the rivers and streams, the water level of some of the boreholes and flowing water in the rivers have declined (Dzinomwa, 2005).

Management of land and water resources in the low-veld is complex due to increased competition for scarce resources without much attention being given to institutions which are supposed to coordinate the utilisation of the watershed in a sustainable manner. Furthermore,

climate change may affect the precipitation amounts and distribution and have need of a strong policy, as well as proper governance mechanisms to be put in place from community to district level. The context of this discourse therefore is to evaluate the socio-economic and governance issues of current watershed management which may contribute to (re) design of improved resource management options.

1.1 Problem statement

Watershed management is subsumed in many governments' policies as a strategy to reduce poverty, while sustaining the environment for future generations, but implementation has been focusing on the physical rehabilitation of the watershed with funding mainly coming from the external stakeholders. Many of these watershed management related interventions throughout the world have taken into account land use capacity, its restoration and prevention potential but neglected the local institutions, governance and management regimes in place for disaster risk reduction and natural resources management. They have centred on activities that although important at the household level, do not add up to transformation and resilience at the watershed or community level (Hudson, 1991). Additionally, most watershed management related interventions have been top down, have not accommodated the interests of resource users nor motivated their interests, and have not incorporated all stakeholders nor learned from their feedback There is however, some discord between infrastructure development in a watershed, utilisation of water resources, management and governance of the entire watershed systems and the role of institutions is not certain. A lot of studies and interventions have been done to try and improve watershed management strategies and initiatives, as well as the focus on physical rehabilitation of watersheds, but very little has been done to understand the institutions and governance mechanisms in place for sustainable management. One cannot assume, however, that any approach to poverty alleviation supports effective and long-lasting natural resource management, or vice versa without fully taking into consideration the role of local institutions. Hence, there is a need for a better understanding of the institutions, governance mechanisms and management regimes in place, which could contribute to improvements in the management of disaster risk mitigation natural assets. This research contributes to the above mentioned effort with a focus on the institutional understanding of watersheds and resource utilisation as indicators of disaster risk reduction for resilience. The aim of this research is to assess the institutions available in the management of the watershed in Wards 1, 3 and 4 of Chipinge in the low veld basin, to identify operational constraints, and options to improve their performance. The results of the

study will help to fill the knowledge gap on institutions and how they work to enhance community engagement, participation and coordination for a healthy watershed that supports the community wellbeing.

1.2 Study objectives

The general objective of the study is to analyze the institutional and organizational aspects of watershed management systems, and investigate the nature and determinants of collective action to mitigate against natural disasters in Chipinge low veld. The research will also expound the role of community based watershed management for disaster risk reduction and resilience.

More specifically, the study aims to:

1. To investigate the governance mechanisms in place for the sustainable watershed management as a measure to mitigate against natural shocks.
2. To establish the level of community engagement in the management of the watersheds.
3. To assess the household dependence on watershed resources for resilience.
4. To recommend appropriate mechanisms for sustainable watershed management.

1.3 Research questions

- What is the current management level of the Watershed in wards 1, 3 and 4 of Chipinge?
- What legal framework/ governance mechanisms or institutions in place for sustainable watershed management?
- How effective are the legal framework/governance mechanisms in watershed management?
- To what extent are the communities involved in the sustainable management of the watershed?
- How effective are the strategies used by the community in sustainable management of the watershed?
- How are the communities benefitting from the watershed?

1.4 Justification of the study

Trepidations have been raised as to the poor performance of watershed management activities at community level and the performance of the governing institutions have been overlooked. However, documented evidence that connects watershed management to livelihoods, collective action, disaster mitigation, institutions and governance remain scanty. This study hopes to provide value to water resources by assessing the benefits of watershed protection from the perspective of economic, social and environmental dimensions that will bolster watershed management plan for sustainable utilisation at community level. In addition, the data gathered will help the communities and stakeholders to realise the importance of the environment to the economic system of Chipinge lowveld watershed. Furthermore, the study provides valuable information to policy makers, development institutions, water concessionaires and irrigators to fully realize the value of watershed resources from the improved management of the Save watershed. It will be also provide an insight into the relationship between the performance of the governing institutions, accountability, transparency and the underlying reasons for collective action in a watershed of Chipinge to attain a level of resilience. It is evident from many studies that a lot of benefits can accrue from watershed management but no substantial evidence is available as to how this can be achieved and sustained. This study will help to examine the contribution of watershed resources to human wellbeing and recommend the strategies to make this sustainable for the future generations.

1.5 Key Definition of Terms

1. **Watershed-** An area or land that drains water, sediments and dissolved materials to a common receiving body or outlet. This can also provide settlement, habitats, food and resources for human livelihoods (Zingari, 2000).
2. **Watershed Management-** includes all actions that take place in a watershed: from small erosion control projects to development to ranching to large-scale restoration. These are all investments, and we strive for a sustained return on our investments.(FAO, 2013).
3. **Resilience-** Is the capacity of a system, an individual, a community an ecosystem or an economy to deal with change and being able to develop forward (FAO, 2013). It is the ability of the communities to thrive in midst of shocks and disasters. A resilience approach (Holling 1973; Gunderson and Holling 2002) is therefore useful when

considering the potential to maintain, revitalize and rebuild landscapes, catchments and seascapes because it embraces a holistic approach.

4. **Climate change** is a long-term change in the statistical distribution of weather patterns over periods of time that range from decades to millions of years (Manjengwa et al. 2014).
5. **Climate change adaptation technologies-** are agricultural adaptation measures informed by science. It aimed at meeting the goals of increasing agricultural productivity and communal farmer incomes while enabling adaptation and resilience to Climate Change. In other word it is a way of doing agricultural production that reduces the high levels of risks that communal farmers face every day (FAO, 2013)
6. **Food security** exists when all people, at all times, have physical and economic access to adequate, safe nutritious food that meets their dietary requirements and food inclinations for an active and health life" (World Food summit, 1996).
7. **Food availability**: the readiness of adequate amounts of food of suitable quality, supplied through domestic production or imports including food aid (FAO, 2006).
8. **Food access:** Right to use by individuals to adequate resources (entitlements) for acquiring appropriate foods for a nutritious diet. Entitlements are defined as the set of all commodity bundles over which a person can establish command given the legal, political, economic and social arrangements of the community in which they live including traditional rights such as access to common resources (FAO, 2006).
9. **Utilization:** Consumption of food through adequate diet, sanitation and health care to reach a state of nutritional well-being where all physiological needs are met. This brings out the importance of non-food inputs in food security (FAO, 2006).
10. **Stability:** To be food secure, a population, household or individual must have access to adequate food all times. They should not risk losing to food as a consequence of sudden shocks, (for example an economic or climatic crisis) or cyclical events (for example seasonal food insecurity). The concept of stability can therefore refer to both the availability and access dimension of food security (FAO, 2006)
11. **Adaptation:** The IPCC defines adaptation as adjustment in natural or human system in response to actual or expected climatic stimuli or their effects which moderates harm or exploits beneficial opportunities (IPCC, 2007).

1.6 Chapter Summary

This chapter has delineated that proper institutional arrangements and management of the watershed by communities is a worthwhile initiative that can provide a critical avenue towards poverty reduction and biodiversity conservation. It is assumed that there is a strong relationship between proper natural resources management and the benefits that accrue from the watersheds and catchment areas, this also takes into consideration the regulatory mechanisms in place, the structures, community engagement and rules to harvest the watershed resources. However, it is imperative to understand the role of watershed management as it can influence the success or failure of communities to cope against hardships and shocks. The following chapters will therefore unravel the issues to do with watershed management in Chipinge and bring to light the proper recommendations for sustainability.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This chapter reviews the related literature that discusses the main efforts to analyze the effects of community based watershed management strategies, institutions, governance mechanisms and collective action on community resilience. The available literature on watershed management in rural areas (agro-ecological region V) in relation to farming seem to be superficial as it is divorced from lived realities and the situation on the ground in Zimbabwe. This section of research seeks to re-examine previous works that have been conducted. It also takes into consideration watershed management technologies and institutional framework as an approach to mitigate or adapt to climate change, natural shocks and other environmental problems. It is given that the subject on watershed management has received a fair share of scholarly attention. However, knowledge gaps still exist on the comprehensive analysis of the impact of governance, institutions and technologies on community wellbeing and resilience.

2.1. A review of community resilience frameworks

The importance of sustainable development in every country is subsumed into country's policy as a guiding principle to balance environment, livelihoods and sustainable agriculture for the betterment of human beings. This was addressed to mitigate the looming environmental degradation which is escalating as far as population and globalization is concerned (Brooks, 1997). The influence of humans on our natural resources has paved way to degradation and over-exploitation of resources. This is however deemed to be an important issue because humans need nature to survive as it influences the human life (Jeong 1997). Thus, if there is no mechanism to regulate the use of a particular resource such as water and the entire watershed resources (Ebarvia 2003), then environmental degradation will outweigh preservation of the resource base hence communities become less resilient (Jeong 1997). The fact that every nation puts watershed management as a strategy for natural resources management, that in itself is not adequate, but a strong holistic framework should be put in place to guide and balance environment and what communities benefit from that watershed (Chisholm, 2012). There should be strong institutions and an arena for conflict resolution, combined effort, participation by resource owners so that they will be able to benefit from the

watershed that they will be managing. Resilience is however the ability of communities to withstand shocks and able to cope in case of a disturbance and watersheds are regarded as key to community resilience (EPA, 2012).

2.1.2. Feed the Future framework for community resilience.

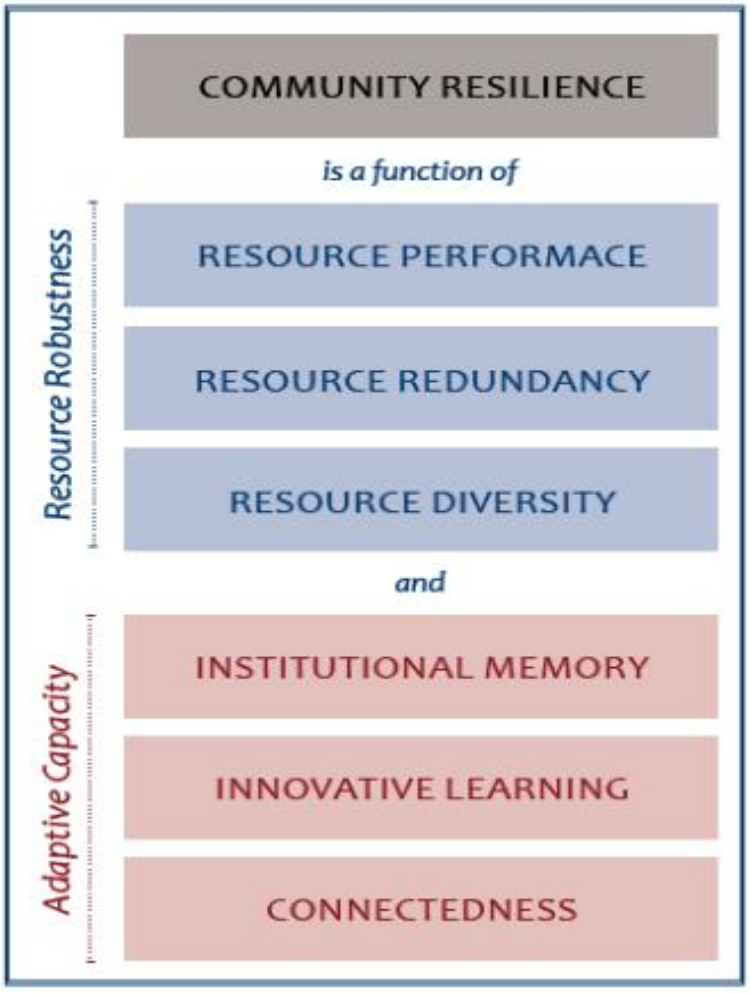
The Feed the Future framework has a number of elements which work together in a connected way, which is very essential when trying to establish community resilience in any given set up.

1. **Context:** It embraces environmental, political, social economic, historical, demographic, religious, conflict, policy conditions and institutions that affect or affected by community resilience (ability of communities to collectively cope with hardships in a watershed) (USAID, 2013).
2. **Disturbances:** these maybe rapid onset or slow onset shocks (veld fires or droughts) or longer term stresses such as environmental degradation, climate change or economic stresses. Experience shows that it is typically easier to mobilize resources for rapid onset shocks than slow onset shocks and stresses. In assessing resilience, it is important to acknowledge that some disturbances are idiosyncratic (affecting only certain individuals or households) whereas others are covariate (affecting an entire population or geographic area). Also, resilience to one type of shock (e.g., drought) does not ensure resilience to others (e.g., food price increases, conflict) (USAID, 2013).
3. **Community capacity for collective action:** Building resilience requires a holistic approach which is integral and long-term commitment to improve the critical capacities which are absorptive, adaptive and transformative capacities (Frankenberger, 2012). ***Absorptive capacity*** is the ability to minimize exposure to shocks and stresses (*ex- ante*) where possible and to recover quickly when exposed (*ex post*). ***Adaptive capacity*** involves making proactive and informed choices about alternative livelihood strategies based on changing conditions. ***Transformative capacity*** relates to governance mechanisms, policies/regulations, infrastructure, and community networks, and formal social protection mechanisms that are part of the wider system in which communities are embedded (USAID, 2013). The capacity for collective action is evident in the processes of customary and formal institutions in five main areas relative to community resilience: disaster risk reduction, conflict

mitigation, social protection, natural resource management (Frankenberger, 2012). The three capacities mentioned above can be reached through, ***community assets*** (man-made and natural), ***community social dimensions*** (relationships, innovations, connections, conflict resolutions) and ***areas of collective action*** (disaster risk reduction, conflict management, social protection, natural resource management) (USAID, 2013).

Therefore according to the Feed the Future Framework, ccommunities that are able to combine their assets, social dimensions, and collective actions to manage the shocks or stresses and incrementally reduce their vulnerability are less sensitive and are on a resilience pathway. Those that have little or no capacity to engage in collective action to manage shocks or stresses are sensitive and are likely to follow a vulnerability pathway (Frankenberger, 2012).

2.1.3. Homeland security affairs framework: Aspects of building community resilience in a watershed.



Source (Longstaff, 2010)

According to Homeland Security Affairs preliminary Framework for assessing community resilience in a watershed that was formulated by Long staff (2010), community resilience is a function of resource robustness (resource performance, resource redundancy, resource diversity) and adaptive capacity.

2.1.4. Resource Robustness

According to (Longstaff, 2010), robustness of a resource in a watershed encompasses the resource redundancy, which is the availability of resources in a watershed, which helps communities to cope to different shocks. For example a degraded watershed does not have the capacity to allow the community to survive either a fast onset or slow onset shock. For a community to be resilient, a watershed should have abundance of resources that will allow

them to bounce back to normal after a disturbance (Longstaff, 2010). There is also another component of diversity, which is a measure of different types of available resources that perform a particular function. A community that has high diversity of its available resources for critical functions, will have a multitude of options for accomplishing those particular functions. For example technically, hammers, nail guns, and other hard objects all provide a diversity of options to sink nails (Longstaff, 2010). The same applies in a watershed where a number of functions and products can be extracted hence allow communities to cope with any challenges that may arise against their survival (Celeste, 2009). To give an example, a watershed with fruits, water resources, timber, fertile soils, tubers, small game, birds and grazing lands is more resilient than the other that lacks these products or resources.

Over and above resource diversity, in a watershed there is an issue of performance which ultimately cements redundancy and diversity of resources. Resource performance looks at the general level of capacity and quality at which an element or elements of a system performs an essential role. Resource performance also embraces the institutions, governance mechanisms in place, regulations, by-laws, structures and leadership arrangements for the available resources in that specific watershed. A vibrant watershed allows a community to be resilient when the institutional performance is very high and the governance mechanisms are well functioning to maintain and allocate the resources.

When combined, the performance, diversity, and redundancy of available resources in a watershed system determine a system's overall robustness. That is, its ability to provide critical functions under a variety of conditions and situations. For example, the robustness of a catchment system would be greatest when the system has high performance (i.e. regulations, leadership, governance, collective action, by-laws), redundancy (abundant resources), and diversity (multiple sources such as rivers, lakes, aquifers, fruits, timber, soils, fish and runoff) (Longstaff, 2010). Every system within a community, must decide on how to allocate time and effort between performance, redundancy, and diversity, keeping in mind that it may be best to have a balance of the three attributes – not maximizing one to the detriment of the others but in the end it is performance which balances the entire system (Longstaff, 2010).

2.1.5 Community adaptive capacity.

This is a combination of the ability of individual communities and or groups in a community to store and remember experiences then use that memory and experience to learn, innovate,

and reorganize resources in order to adapt to changing environmental demands. The households should be able to connect with others inside and outside the community to communicate experiences and lessons learned then self-organize or reorganize in the absence of direction, or to obtain resources from outside sources (collective action) (Longstaff, 2010). This allows the community to cope with any disturbances that may arise and ultimately a community like that will be regarded as more resilient.

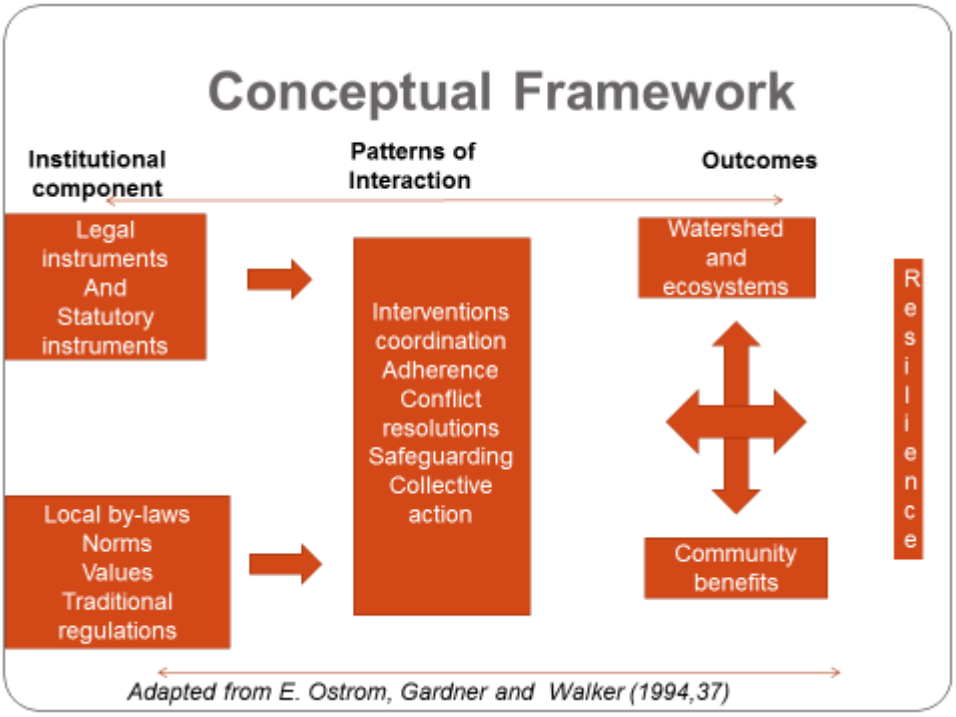
Thus the institutional memory, innovative learning, and connectedness determine the foundation of adaptive capacity of a group of people in a community. Institutional memory is the accumulated shared experience and local knowledge of a group of people (Chisholm, 2012). Over time, institutional memory is amassed through group-level observation and stored in a variety of ways such as documented records or repetitive rituals and ceremonies that are carried on as group membership evolves over time. Collective action reinforce institutional memory by facilitating and reinforcing the recollection of rules and policies as well as the interpretation of changes or disturbances in the environment (Caritas, 2014).

Innovative learning is the ability of the group to use its information and experiences to create novel adaptations to environmental changes or to avoid repeating old mistakes and failures (Longstaff, 2010). Innovation is a form of dynamic learning that places emphasis on the capacity to identify and "create new responses or arrangements in a watershed or community system. Innovative institutions sometimes encourage trial-and error type learning by allowing "errors and risk-taking behaviour. Other times innovations occur in a more deliberate way by putting new ideas or resources together with old ones when current strategies are not working. It is true that necessity is often the mother of invention. Innovative learning can be reduced by a failure to admit that something is not working to provide an important resource or function. Leadership is also a vital community resource which plays a pivotal role in establishing such a culture of collective action and cooperation on resource management and utilisation (Brooks, 1997). Therefore the creation of new ideas, resources, processes, and forms of organization give a community a position to learn and innovate when individuals and groups are able to experiment through trial and error of strategies to sustain a watershed ecology. Ultimately, innovative learning allows the ability of a social group to anticipate both future opportunities and future hazards hence able to manage their resource base accordingly (Longstaff, 2010). In Zimbabwe innovative learning is embraced at all levels which are ward level and at district level where environmental sub committees, DRR committees and District

civil protection committees work together to harness resources in a watershed to expand coping options for communities (Mararike, 2011).

Finally, according to (Longstaff, 2010), interpersonal and group connectedness is critical to the diffusion of institutional memory and innovative learning throughout the community. Community systems and subsystems typically have a variety of internal and external links between their various component parts of the system and the higher or lower levels of the system. These links are commonly characterized as social (informal) and organizational (formal) networks. In the absence of formal direction, these connections which often vary in strength contribute to a community system's ability to exchange, store, and recall knowledge, and take collective action in light of changing conditions. However, the tightness or looseness of these connections can be both the community's strength and its vulnerability. In a tightly system it may be difficult for the community to adjust or cope quickly in case of a disturbance while in a less tight system. In tightly coupled systems, a change in one component (individual or subsystem) of the system engenders an immediate response from (or impact on) the other components.

Figure 1: Focusing the study



2.1.6 Theoretical framework

To carry out an institutional assessment of watershed management systems in Chipinge for resilience, the study built its approach on the foundation of the institutional analysis and development (IAD) framework (Ostrom, 1994). These concepts formed a combined interrelated framework within which the research objective were formulated. This section will first review and describe the concepts of the IAD framework and their components in detail and then interlinking these concepts to the study objectives.

Institutional component: This covers the first objectives which looks at the governance mechanisms in place, legal instruments, statutory instruments, local by-laws, norms, values and traditional regulations for watershed resources. The issues of general management of the watersheds are closely interrogated under this section and check from the literature on the gaps and how they can be addressed.

Patterns of interaction: The objective number two looks at the patterns of interaction and investigate how people are engaged in collective action. The exogenous characteristics, the incentives, the actions, and the other actors all contribute to the patterns of interactions. In a commons, how the actors interact strongly affects the success or failure of the resource (Ostrom, 1994). It also involves the coordination, collective action, adherence, conflict resolutions and how the entire community safeguards the watershed. Using the framework

the study assess the effectiveness of the strategies that the communities are implementing in their watershed for sustainability.

Outcome: The third objective is covered under the outcomes, where the quality of the watershed and the ecosystem is examined as a result of the activities in the patterns of interaction. The institutional component when combined with the patterns of interaction should lead to the positive community benefits that they extract from the watershed.

Resilience: In this case as an outcome the environmental conditions in which people live enable or limit their risk, exposure and the opportunity to absorb, adapt and transform in the face of shocks. Thus a range of environmental factors are considered, such as climate and climate change, the state and management of natural resources, agro-ecological zones and changes in the risk landscape associated with the environment and ecological systems.

2.2 Governance Mechanism for the sustainable watershed.

2.2.1 Comparison of major watershed management development issues

FAO conducted a study between 1985 and 1986 to try and unearth the challenges on the management of watersheds specifically in Asia and the pacific and one of the outputs was the identification of major issues and constraints with respect to how watershed management projects are implemented (FAO, 1986). These main issues and constraints were used as a baseline for comparison with the key issues and constrictions that were later discovered by Tennyson (2009) after the completion of other similar projects. Key findings or examples were inadequate coherent policies to promote good watershed management, inadequate coordination policies, scope of watershed management activities was often not clearly defined and monitoring often started after, rather than before project started also there was institutional gap in the implementation. This is also a sign that the community transformative capacity and adaptive capacity in a watershed, that enables them to adjust in case of a shock (Frankenberger, 2012). The monitoring of the watershed management activities was however supposed to be done by various institutions and structures in place for them to be sustainable (Tennyson, 2009). Nearly all of the peculiar concerns and constrictions discovered in the 1986 FAO study continue to be of importance even up to the present day and as renowned by a number of scholars in the field and nothing has been done to bridge the gap between the governance mechanisms or institutions and watershed management activities in order for the watershed to be resilient (FAO, 2013). Most institutional, operational, planning of projects

and investigation matters mentioned in 1986 FAO study have been reported again by present and contemporary scholars (Tennyson, 2009). The dilapidation of the ecosystems and natural habitats in many watershed areas have occurred for decades on a massive scale. In an endeavour to combat these effects, alarmed nations and non-governmental organisations, institutions and partners started to employ principles of sustainable watershed management since the 1960s (Hadush, 2015). Nevertheless through the period of development, the principles and guiding principles and approaches to watershed conservation and management have been shifting as new ideas kept on coming to replace those old ones. The discipline became dynamic through reacting to research results, lessons drawn, flaws, strength, project reviews and post evaluations of interventions coupled with flexibility to make adjustments and modifications to cope with the new needs (German, 2005). Over the past era of watershed conservation, the discipline began to accept the social and economic variables to enhance sustainability of the interventions, these have been granted high priority. Furthermore the participation of the grassroots people has been respected and recognised as the key aspects to enhance the success of watershed management activities (Chisholm, 2012). The cohesive model has been modified to recognise the needs of the community and their problems as part of the holistic approach to sustain watershed interventions. The latest evaluation and review of watershed protection development approaches and strategies that was done by FAO was held in 1985–1986 brought about so many issues with regards to the governance and institutional coordination of these sensitive resources which marks the pillar of livelihood for so many communities in Africa (FAO, 2013).

The FAO survey on the key actors which included the organizations, agencies and institutions discovered three main categorical issues which are major issues that require detailed investigation and analysis, major constraints in the past and the future and challenges, needs and way forward for future sustainable management of watersheds, (Tennyson, 2009). Among the major issues that require further investigation and in-depth analysis there were issues to do with movement of water, soil fertility in relationship with land management, better natural resources management strategies, bio physical and socio economic issues, the changes in natural resource use and intensification, multi-institutional approaches to facilitate collective action in watershed management (Tennyson, 2009). This however means that there is need to create links among central governments, local authorities, civil partners and donors together in a well-coordinated and effective international community of aid. It is also essential to find ways of: considering the ecosystem amenities of catchments and the damage

to on and off-site environments from the viewpoints of communities and society; developing choices establishing well managed catchments which benefits all the concerned stakeholders including inter-sectorial or downstream-upstream transfers as well as factoring in trade-offs and conflicts. (FAO, 2013). Institutions and stakeholders need on the job training on how to manage people in a watershed and the role of youths should be clearly outlined to allow effective coordination in managing and utilisation of watershed resources in a sustainable (German, 2005). In its response to some of these issues, World Bank outlined the need to establish the right ways to solve policy frameworks and find incentives affect the watershed resources such as water, land, forests should not be overlooked. This should consider governance issues such as local vs. central, upstream users vs. downstream users, community organization, mechanisms for water allocation and property rights are pivotal mechanisms (Tennyson, 2009). As noted from the above issues, the challenge is not a theoretical examination of these matters, but rather the institutional will to move in the positive way for quality improvement and also putting the right mechanisms in place to effectively manage the watershed resources. There are so many actors and stakeholders that are concerned by the status of the natural resources in a watershed but there is no platform or mechanisms in place to fuel the harmonisation of the approaches to effectively work together for these resources to be resilient (Caritas, 2014).

Basing on what FAO has unveiled supported by (Tennyson, 2009), major constraints for the present watersheds include the reconciliation of the participatory needs assessments with the people from the grassroots at heart, the poor systems of research in developing countries, the need to equip the local or central authorities to take responsibility and the institutional will to allocate establish sound governance mechanisms in place. Watershed management is about conflict resolution, thereby making issues of governance a major constraint to sustainable management of watershed ecosystems (FAO, 2013), furthermore, concepts based on the process are lacking across all watershed scales. There is need to understand the reasons behind the success of large-scale watershed interventions, while others are failing, it is clear that there is no capacity to replicate best practices (Brooks, 1997). The absence of effective institutional and financial mechanisms was identified as the other challenge of watershed management interventions (Tennyson, 2009).

The main barriers for the future covers the present issues continuing and furthermore it is clear that some of the challenges in the future are related to lack of access to water resources, with serious environmental degradation as water quality and floods become more important

in highly populated areas, the issues of water users both downstream and upstream issues become more significant where water supply limits productive land use which will make the conflict resolution mechanisms very important especially at community level (Chisholm, 2012). Proceedings of the European Regional Workshop on Watershed Management held in 2012, also highlighted that there is a need to improve project design and management in order to increase the participation and commitment of key actors from grassroots to national level. The most significant and identifiable constraints for catchment development is often the willingness/capacity of national governments to act, in the area of land tenure and payments for ecological services of watershed, as well as that of water resources (Zingari, 2000).

2.2.2 Politics and management of water resources.

The recent gush in funding for and interest in watershed management must be viewed and scrutinised carefully in terms of its political motives, foundations and desire. This can be viewed as the political ecology which helps us to understand the way in which the agendas of different players globally lead to different ideas which may lead or leverage to particular ends in a community (Agrawal and Gibson, 1999); Leftwich, 1994). The watershed domain is not different from any other arena where multiple actors in the approach avenues to meet other unrelated objectives. This has given actors and stakeholders multiple visions on watershed approaches, because among agronomists they see it as a means to scale up climate smart technologies, for soil water conservation and environmental protection more generally. This is different from water resource sector and policy makers who fantasise on enhancing environmental outcomes and public services generated by the upper catchments to foster trans-boundary natural resources management (Van der Linde et al., 2001), in which livelihood concerns are often addressed only to the extent that they help to further conservation goals, which poses a huge challenge when we try to strike a balance between what the communities get and the incentive to manage the watershed. Yet among social scientists and others, watershed management is seen as a framework for enhancing collective action and equity in natural resource access and governance, or livelihood problems that cannot be solved at the level of the farm or household (Dick, 2002). This means that in a set up like this, tensions are likely to exist between stakeholders or actors of different backgrounds, therefore making political ecology an area of concern when it comes to sustainable watershed management for communities to be resilient especially in a changing climate.

According to (German, 2005) a critical question that we must ask ourselves to unravel the political ecological foundations of watershed management aims and methods (in terms of who benefits and whose agendas are furthered by the approach) is, "watershed management for whom?", a clarification of the intended beneficiaries, whether local users, society at large or diverse external stakeholders (that is, agricultural, conservation or health organisations), is needed to define everything from watershed objectives to watershed boundaries, stakeholder, and methods, if implemented for the benefit of local users, for example, boundaries can be defined by the issue at hand- whether inscribed within a set of contiguous farms, the micro-catchment at other spatial scales. If the aim is water provision for society at large, then boundaries become the basin. If for scaling out technologies or reforming policies, administrative units may be equally useful units. Any attempt to operationalize watershed management must therefore be grounded in a preliminary statement of aims, beneficiaries and the nature of problems to be addressed (German, 2005). Therefore for communities to take ownership of the local watershed, it is paramount to pay attention to the benefits that will accrue from watershed management and also to make sure that these local people do not feel threatened by the outsiders who claim to have a stake on the local resources (Murombedzi, 1994), this will therefore make an action arena a conflict zone hence tearing off the natural resource base.

2.2.3 Sustainability of local institutions

The sustainability of local institutions depends on the ability to address community needs, capacity to take decisions regarding the program planning and implementation through joint efforts, maintaining accountability and transparency, and availability of sufficient funds. The projects in study are more concerned with arresting and reversing on-going environmental degradation (Salas, 2014). This is not to say that these objectives do not benefit the people, the poor in particular. But improving the living conditions of the people and the poor in particular, is only of secondary or even the last order of the objectives. Hence, to assess the ability of the projects in targeting the community needs and the poor in particular, the project' reach in addressing community-based activities and the disadvantaged section of society is taken to reflect the poverty focus of the program. In the studies by FAO, 2005, activities were concentrated on government lands that provide immediate benefit through employment for the poor. The second set of activities targets the needs of individual households through delivery-based activities. However, these delivery-based activities may not sustain people's interest and provide incentive for the poor to move away from the poverty (Celeste, 2009).

Community-based activities that involve mobilizing the community for management (for instance irrigation) provide direct immediate benefit to all the landowners, indirectly through employment for the landless, and towards integrated watershed management. Many of the water storage structures in most communities, benefit a larger community in the village and with proper managing institutions these resources proved to be sustainable (Celeste, 2009). Further, rehabilitation of these structures such as weir dams, wetlands and pools will not only enhance community participation, but also act towards IRM, reducing siltation in the hill slopes, harvesting water in the foothills and agriculture practice in the plains. This will enhance water use efficiency in the basins (Seckler, 1996). However, efforts to address these are limited, as they involve convincing people to resolve their differences, share their land, and mobilize people for increased contribution (Dzinomwa, 2005). Acknowledging community-based activities is also advantageous for the people, as they receive employment and generate funds for the village through watershed works, without any conflicts within the community, this can only be possible with strong sound structures in place to coordinate these activities (Caritas, 2014).

2.3 Community Engagement in the Management of the Watersheds

2.3.1 Collective action in watershed management

It has become paramount to every stakeholder and well recognised that collective action is a central pillar of land scape or watershed level management of resources and it bestows a sense of ownership to those responsible people (German, 2005). As opposed to private property or farm level management collective action helps to regulate rights and accountabilities as well as responsibilities to common pool resources and or public goods (Ostrom, 1990, Scott, 2001), to manage natural resources which includes biophysical elements that cannot be confirmed within farm boundaries, to coordinate and negotiate collective investment, technological innovations for enhanced land productivity and guard against benefits capture. According to (Shiferaw, 2009), in the recent participatory diagnosis of watershed-level natural resources management problems in highland areas, communities identified five different types of problems. These include, problems associated with the management of common property resources (water, grazing land, forest). Secondly problems associated with natural resources access and distribution. Third, is the trans-boundary problems between neighbouring farms and landscape units, forth, is the reduced productivity as a result of poor collective action, as well as institutional and livelihood problems which

can be addressed by collective rather than individual action. The above mentioned problems are best addressed by collective action, which calls for common property institutional strengthening for improved management to regulate extraction of resources and avoid resource degradation which is a characteristic of open access institutions, (Ostrom, 1990).

Successful participation for management of common pool resources is usually characterized by well-defined rules, ability to monitor behaviour and punish violators, and mechanisms for conflict resolution and negotiated solution (Wade, 1988; Ostrom, 1990). There is evidence showing that demographic characteristics, institutional and organizational structures are related to cooperative and implementation capacity for collective management of resources (McCarthy 2004). Heterogeneity along ethnic, religion and social classes often has negative effects on cooperation. Group size and inequality also seem to reduce cooperation and on the watershed level there is need for well capacitated institutions to drive the cooperation and how people are engaged (Murombedzi, 1994). Despite the increased policy relevance and interest on watershed projects and decentralized resource management, very little is known about factors that influence the level and effectiveness (success) of collective action within the context of community watershed programs (Murombedzi, 1994).

The subject of the access and distribution of natural resources require collective decisions on how to distribute the benefits within the communities without conflicts, as well as making it clear on the operating guidelines of those parties providing the services so that external interventions will not accelerate further existing inequalities. Trans-boundary problems may require to engage and facilitate dialogues among neighbouring resource owners or policy reviews to improve the governance of watershed boundaries in a biophysical arena that crosses boundaries (Chisholm, 2012). The last two glitches require a dialogue for individual resource owners to come together to map a way on how agricultural productivity might be stimulated by collective action over the individual approach and to formulate rules and regulations to govern such initiatives.

Given the sheer number of users in a watershed and the norm for external interventions to structure governance positions of privilege vis-à-vis any available resource (Ashby, 1996; Schroeder, 1993), but on the contrary collective action in a watershed set up or management involves a diverse functions where solutions and progress must be negotiated and tested. The large size of resource consumers and the scale of the watershed itself also need the effective and representative structures and mechanisms for organizing the community boundary be

considered to curtail the operational outlays for local and outside actors. Therefore, given that the arena of natural resources management is an inherently political, it also means that collective action is needed for the conciliation of benefits from the watershed itself and other project in a watershed (Ostrom, 2004).

2.3.2 Watershed development and community participation

While the participation of people is viewed as the core necessity and has been recommended for many projects, national and international plans, it however not evident that it is being taken into consideration especially at the grassroots level where impact is expected to manifest (Brooks, 1997). The most challenge with involving people in projects emanates from the experts who keep on changing their methods of operation, which at particular cases are top down and fail to consider the reality of situations in which find themselves in (Sithole, 2001; Murombedzi, 1991; Nemarundwe, 2003). The people on the other hand, find it difficult to enter into a new type of relationship as they continue to see themselves as the recipients and the outside experts as the providers of material assistance. However, what slows things down most often is failure to recognise the local people and their associations as true partners, the local institutions play a pivotal role as well as conduits between the local people and the outsiders who at times drive the development initiatives (Crowhurst, 2013).

What has been so far of the participatory system makes one wonder how to deal with the various situations brought about by the use of this approach, even when it is properly implemented we always have communities falling back or disengaged (German, 2005). There has been a shift from the top down approach, based on the provision of services, to one giving priority to individual demand. We have also witnessed governments everywhere disengaging from taking the lead but even the bottom up approach needs external support to groom and capacitate the local institutions in various ways (Chisholm, 2012). Having governments disengaging could leave vacuums which could adversely affect the less well-prepared communities. By giving priority to the local people is a good step in itself but we now have a situation where more people are making decisions without being able to see the broader picture (Sithole, 2001). So as not to succumb to some of the dangers of the participatory approach, such as dilution, decentralization will have to be strengthened; in other words, the intermediate levels, that is, the regions and provinces, will have to be given the means to provide the interface between national requirements and local expectations

(Cleaver, 2000; Mandondo, 2000), so that the institutional relationships are kept intact and fuctional for better management of natural resources.

2.3.3 Protection of water resources.

It was indicated in the proceeding section on the evolution of collective action and participatory approach and water use and water law have become the fundamental objectives for managing Zimbabwe's water resources to achieve equitable access to water resources, and their suitable and efficient use (Dzinomwa, 2005). When the government was formulating the strategies needed to balance supply and demand, it was concluded that the country's water resources will be insufficient to support development for the foreseeable future. Equitable access has both a short term and long term dimension. It is important that the needs of current and future generations are considered in the management of water resources (DWAF, 2004).To give effect to the interrelated objective of sustainability and equity an approach to managing water resources has been adopted and it involves the holistic approach to watershed management. This introduces measures to protect water resources by setting objectives for the desired condition of resources, and putting measures in place to control water use to limit impacts to acceptable levels (DWAF, 2004).

2.3.4 Participatory vs Collaborative Watershed Management

Community participation involves holistic integration and participation has been another essential attribute of good watershed management practice for more than 20 years. In 1983, FAO issued a conservation guide on community participation in upland management. Some of the aspects mentioned in that guide are still relevant today: (1) natural resource management cannot be successful and sustainable without the support and participation of natural resource users; (2) participants should have decision-making capacity and responsibility (empowerment) and the promotion of participation in watershed management is a long and time consuming process that requires appropriate means (Nemarundwe, 2005; Anwar, 2005).

It is now clear, however, that beneficiaries, people or communities are not the only important actors in participatory watershed management programmes and civil society is now increasingly mediated by a variety of institutional actors, including legally recognized user groups in the watershed, unions, associations, cooperatives, local administrations, line agencies, NGOs and private companies (Dzinomwa, 2005). As these actors have diverse and

sometimes conflicting interests and concerns, the main goal of participatory watershed management has shifted from awareness raising and social mobilization to negotiation and partnership (Nemarundwe, 2005; Anwar, 2005). Central government watershed management institutions must be replaced by new ones that can create conditions for dialogue among farmer organization, stakeholders and other watershed players who takes the lead in the sustenance of the resources. These new institutions must create, convert and strengthen intermediate institutions, which in turn should guide the formation of government policies to accompany decentralization. Intermediate watershed institutions should collate and regionalize the demands of rural people, and build partnerships with other rural development players to become the mediation and arbitration (Nemarundwe, 2005; Anwar, 2005).

2.4 Dependence on watershed resources.

2.4.1 Realising benefits from the ecosystems

An international conference to increase people's awareness of the contributions that watershed management can make to future land stewardship was held in Tucson, Arizona, on the 13th of March 2000 (Baker et tal., 2000). The effectiveness of land stewardship must be enhanced to meet a growing population's need for conservation, sustainable development,and use of natural resources. Ecosystem-bases, multiple-use oriented land stewardship is necessary when considering the present and future uses of land, water, and other natural resources on an operationally efficient scale in any given watershed (Celeste, 2009). Holistically planned and carefully implemented watershed management practices and programs will always be needed to meet the increasing demands for commodities and amenities, clear water, open space and uncluttered landscapes (Brooks, 1997). Considering the above, sound management of watershed and watershed resources is therefore prerequisite to sustainable resource-based production systems were communities can harvest a diverse basket of resources such as fish, water, timber, fruits, meat, insects, grazing lands, cultivation and honey, these can increase their coping mechanisms hence attain resilience (Caritas, 2014). Watershed management, which in essence is the application of land resource management system, is considered by many scholars to be the most appropriate approach to ensuring the preservation, conservation and sustainability of all land-based resources and improving the living conditions of people in the uplands and low lands areas (Tennyson, 2009).

Healthy intact watersheds provide many ecosystem services that are necessary for our social and economic well-being. These services include water filtration and storage, air filtration, carbon storage, nutrient cycling, soil formation, recreation, food and timber (EPA, 2012). Many of these services have not been monetized and therefore the economic contributions of healthy intact ecosystems are often under-valued when making land use decisions (EPA, 2012). Ecosystem services provided by healthy watersheds are difficult to replace and most often very expensive to engineer. An engineered ecosystem service replacement may only provide a fraction of the services provided by highly functioning natural systems. Preventing impairments in healthy watersheds protects valuable ecosystem services that provide economic benefits to society and prevent expensive replacement and restoration costs. Maintaining riparian connectivity and natural processes in the landscape provide a supporting network for ecological integrity, ensuring the sustainable and cost effective provision of clean water over time as well as many other fundamental resources to community or society resilience (FAO, 2013).

Watershed provides the quintessential good for human beings such as water. Water in a universal sense is a natural resource and has many attributes that are of economic and social importance (Celeste, 2009). The essentialness, mobility, heterogeneity and variability of water in terms of space, time and quality (Hanemann 2005) contributes to the economic and social activity of human for sustainable development in case of shocks such as drought and famine. Natural resources such as water provides inputs to our economic system (Hartwick and Olewiler 1998) and because of its intricate interconnectedness it could affect the status of the others (e.g. land, soil, fauna flora) in various ways (White 1992) as influenced by biophysical characteristics vulnerable to artificial modifications present in the area. While watershed provides multifarious functions to human beings, it is also vulnerable to degradation and exploitation because of the upland dwellers with different farming systems, particularly land use practices (Chisholm, 2012). These can affect downstream users through hydrology, carbon stocks and biodiversity. Water (surface and groundwater) used for agriculture, commercial and domestic uses pose greater demand as population increases. The demand for water globally increases such that many countries are now having hard time to allocate water efficiently but the idea is to stimulate collective watershed management and conservation for underground water recharge as well as the surface water resources which are essential to support fauna and flora (EPA, 2012) . But if these resources are exploited, as in the case in antique, where conjunctive use of groundwater is ubiquitous, it may affect the

quality and quantity of water stocks in the future. Thus, withdrawal of water from the aquifer must be regulated to conserve supplies for future use (Ebarvia 2003). Moreover the protection of watershed which plays crucial role in the recharge of aquifers must also be addressed by various institutions which have stake on the water resources, they should also have a conflict resolution mechanism in place because aquifers are a sensitive resources in many areas (Dzinomwa, 2005). Protection of natural resources is a multidisciplinary task that involves watershed stakeholders and professionals from all fields of specialization. It is hard to implement such actions that both upstream and downstream users can benefit the water resources, such that, assessing the potential for watershed management needs to consider two key elements according to White (1992). First, the vested interests are asymmetrically interdependent (i.e. upstream activity affects downstream value); and second the degree of uncertainty (behavioural and physical) exists as to the impact of this interdependence (i.e. downstream owners are uncertain of upstream owner behaviour and of the physical impacts of that behaviour) (White1992). However, all these conflicts between the interest of upland and lowland stakeholders, and externalities corollary to the development is due to the intricate interdependencies and interactions in the ecosystem (Falkenmark 1994 as cited by Boberg 2005). This is also aggravated with the lack of policy mechanism to promote conservation of resources (Ngugi, 2008) and its open access scenario added to the opportunity of every individual exploit the resources which would give way to market failures, which makes economic valuation of watersheds and other ecosystems complicated (Ngugi 2008). Failure to account the benefits and cost of environmental goods and services would lead to degradation if there is no proper government intervention. One of economic methods used to estimate the benefits of environmental change- for specific increases or decreases in the level of the service (Boberg 2005) using hypothetical market for non-marketed goods is called contingent valuation method. Contingent valuation method (CVM) is a stated preferences approach that uses survey questions to elicit individual's preference for public goods and services by finding out their willingness to pay for the good and has the capability in capturing both use and non-use values that comprises the total economic value (TEV) of watershed. This valuation of water resources measures environmental benefits that are directly hinged to the economics welfare theory that a certain change in environmental quality will likely to influence the preference of the people to remain in his/her utility level (EPA, 2012).

Watershed is a land-based ecosystem (David 1985) that collects, converts large amount of rain and drains water to a single exit point also known as catchments. While soil type, slope and climate also influence the dynamics of surface and sub-surface water including infiltration rate, water storage and availability (Bassi 2002). It provides myriad functions from economic, environment and social aspects (e.g. plants, timber, animals, minerals and water and many intangible goods such as aesthetics and tourism). From the economist point of view, this myriad functions of watershed services is composed of total economic value such as intrinsic and instrumental values (Pearce and Warford 1993) or commonly known as use and non- use values

Types of use values and non-use values are those that are consumed or utilized directly or indirectly by people (e.g. timber, recreation) whether they are planning to use it or are with possible use in the future. These are direct and indirect use values (Barbier 2003). Direct use values are derived from actual use includes non-timber forest products, fuel wood, fodder, fruit, and various medicinal and aromatic plants, recreational value, watershed protection, and micro climatic effects (Pagiola 1996). Meanwhile, direct use values of water arise from direct interaction with water resources which are divided into productive, consumptive (use of water for irrigation) and non-consumptive (recreational swimming, or the aesthetic value of enjoying a view) use. Furthermore, the direct use values for groundwater is derived from the direct use of water for irrigation, and domestic use (Goldberg 2007), commercial, and other purposes that is directly consumed by human to satisfy their wants. Indirect use values of watershed are inherent in ecological systems which provide different functions like the ability to store and regulate flow of water, hold the soil intact in spite of heavy rains (soil retention), ability of the forest trees to sequester carbon, to store a wide diversity of plant and animal species as well as wild fruits and vegetables. Other functions of the forest include nutrient cycling and microclimate regulation (Francisco, 1999), erosion control, enhanced soil quality, and improved water yield, stabilisation of stream flows. Option value are the goods and services maintained for future use which arises due to uncertain demand (Barbier, 1997). It deals with individual's preference or willingness to pay (WTP) for the preservation of natural resource or for ensuring that the good will be available in future use which also affected by various socioeconomic trends and the welfare change to keep the option open of being able to avail oneself of the direct and indirect uses of the forest at some future time (Celeste, 2009). Types of non-use values are derived from the services that exist as a consequence such as preservation of watershed areas. It comprise a significant portion of a watershed system's

total economic value (Goldberg 2007) that is important in implementing policy for watershed management. Non-use values are derived from the knowledge that a resource is maintained for future use intertwined to ethical and altruistic preferences which often times can be more of self-interest of preserving the resource for own and society's benefits (Goldberg, 2007). Non-use values also called instrumental values is something a person willing to maximize from knowing that the good can offer him/her something in the future, mostly considered as anthropocentric or human centred. Because these values are given for those goods and services that are not actually consumed making it hard to quantify the benefits of environmental goods and services such as water (surface and groundwater). Bequest value measures what a person is willing to pay to protect the resource for the legacy of environmental attributes or is derived from the knowledge that a feature of a nature resource (e.g. water resource) will be passed on to future generations so that they will have the opportunity to enjoy it. Existence value is the desire to have the resource intact or preserved in its own right or wanting to have the resource available to mankind for some altruistic or humanitarian reasons regardless of any personal use.

2.4.2 Management to mitigate against natural shocks.

Large-scale removal of forest lands by humans in the nineteenth and early part of the twentieth centuries created significant changes in the hydrologic function of watersheds (Tennyson 2009). Downstream flooding occurred more frequently, with subsequent increases in loss of life and damage to infrastructure. Accelerated erosion, produced by changes in the biotic and hydrologic components of natural drainages (watersheds), created unprecedented large-scale siltation of developed lowlands (Brooks, 1997). At times, the general consensus was that the removal of forest was causing these undesirable impacts. However, the mechanisms for reversing the process through sound scientific management had not been developed (Tennyson, 2009).

Over time and in response to changing needs, the scope of watershed management has broadened from the initial concept of technical management of the water resource to an integrated discipline that applies biological, technical management of water resources to an integrated discipline that applies biological, technical, social and economic principles to maintain the productivity of headwater and lowland areas through the scientific management of soil, plant and water resources (Tennyson, 2009). Watershed management in its truest form is the conservation management of the soil, plant and water resources of a catchment to

benefit humanity and can be a tool to mitigate against shocks (Caritas, 2014). It involves managing the land and human resources of the drainage in a manner that sustains adequate levels of water, soil, and food and fibre production. This form of management requires a participatory integrated approach that includes the various physical, vegetative and human components of areas that range from a few hectares to large river basins (FAO, 2000). To reduce risks, it is also vital to build the resilience of the natural resource base, and to promote sound environmental and natural resource management practices and the sustainable use of ecosystems (Caritas, 2014). Healthy and diverse ecosystems are more resilient to hazards and forests are estimated to save between USD 2–3.5 billion per year equivalent in disaster damage restoration of key forest ecosystems (FAO, 2013). To address this problem the Zimbabwean Government designed a strategy which aims to use natural resources management as the base for the community's overall development by establishing community based institutions to govern and manage natural resource base to improve rural livelihoods.

2.4.3 Impacts of watershed management technologies.

Watershed management technologies have proven to be effective on the mitigation of erosion on sloping land, stabilizing landscapes, providing clean water, and stabilizing and in some instances improving agrarian production systems on the small to medium scale (Chisholm, 2012). With modification, these existing technologies can be used successfully in most terrestrial environments inhabited by humans. The degree of success of watershed management interventions is primarily a matter of the will of the people and the scale of the activities (FAO, 2002). Regarding the upstream effects, examples exist throughout the world where upland resource conservation activities have been successful on the micro scale, for example micro to meso scale activities in Honduras, the Philippines, China, Thailand, Burundi and many more (FAO, 2013). Regarding the downstream effects, the impact of upland watershed management activities on downstream water quantity, quality and siltation remains a controversial issue, partly because of economies of scale, and partly because of difficulties in predicting with reasonable accuracy the results of these activities. Until the magnitudes of natural and human-induced erosion and subsequent sedimentation can be quantified with reliability in a watershed, the controversy will remain regarding upstream effects on downstream infrastructure (FAO, 2002). The same applies to the quantifiable effects of land use on the hydrologic cycle and water supply and quality.

2.4.4 Training and Education for innovative learning

Watershed management training and education programmes have progressed significantly during the past decade but there is need to create a platform where research results are shared with all stakeholders (Brooks, 1997). The results of the study by Brooks (FAO, 1992) of the Asia and Pacific region indicate that there are many talented professionals who can conduct research to add value to the school of thought on watershed management as a tool for community resilience (Brooks, 1997) . The study also pointed out that there are excellent education institutions in the region and none of the respondents to the global survey stated that there was a dearth of well-trained professionals. The Brooks study pointed out the need for training/education of all the key actors, from policy and decision-makers to field-level technical and villagers who are implementing watershed management activities. The regional FAO watershed management training in Asia project (FAO, 2000) indicated the need for training in participatory methods and interpersonal skills at all administrative, professional and technician levels. The major training constraint that surfaces in all the study reviews in the need for more emphasis on well-designed training programmes for local government staff and for the villagers who are directly involved in implementing field-level activities (FAO, 1996).

2.5 Chapter Summary

Clearly, this review shows that there is a debate about what exactly is happening or that should be done by institutions that might give rise to a better watershed/ecosystem that can yield more benefits to communities for resilience. There are some scholars, researchers who developed models and frameworks on community resilience, others believe and others deny and still others who doubt that watersheds can improve community resilience. These observations call for research that looks into the institutional components or factors that influence the relationship between patterns of interaction and outcomes in terms of both rural livelihoods and resource conditions to guide policy and management.

CHAPTER THREE: RESEARCH METHODOLOGY

3.0 Introduction

The preceding chapters reviewed the literature on the watershed management, specifically looking at the institutions, governance mechanisms, participation and the contribution of watershed resources to resilience. The chapter defined the processes of how to assess the institutional systems and watershed management initiatives in Chipinge District, starting with the specific geographic location of the research area, climate, forest composition and status. It further elaborate on the research design, approach, selection criteria as well as the data collection techniques used to solve the research problem at hand.

3.1 Geographic location

The area of study is Chipinge District which is located in Manicaland Province, about 200km south east of Mutare and about 475 km East of Harare. This is a second-order administrative district which depicts features of the agro ecological region 1, 2, 3, 4 and 5. The save watershed which is specifically under study is mainly agro ecological 3, 4 and 5 with most of the streams or tributaries draining from the mountains in region 1 and 2. It is located at an elevation of 1,108 meters above sea level and its population amounts to 298,841 (ZIMSTAT, 2012). According to FAO (2015), different communities in Chipinge are affected by shocks differently and their livelihood options also differ. The save watershed therefore becomes a vital pillar for food to most communities.

3.2 Climate and forest composition

The climate of Chipinge District falls within the Savannah sub and rainfall season starts from late October to end of April. Temperatures may rise up to 32 ºC in summer and 2 ºC in winter and end up receiving the highest rainfall in some wards, while others in the valley experience drought. The District is located in the savannah-region which have different woodland types namely Miombo, Mopane, Teak, Acacia, Terminalia and baobab mostly in the Save watershed.

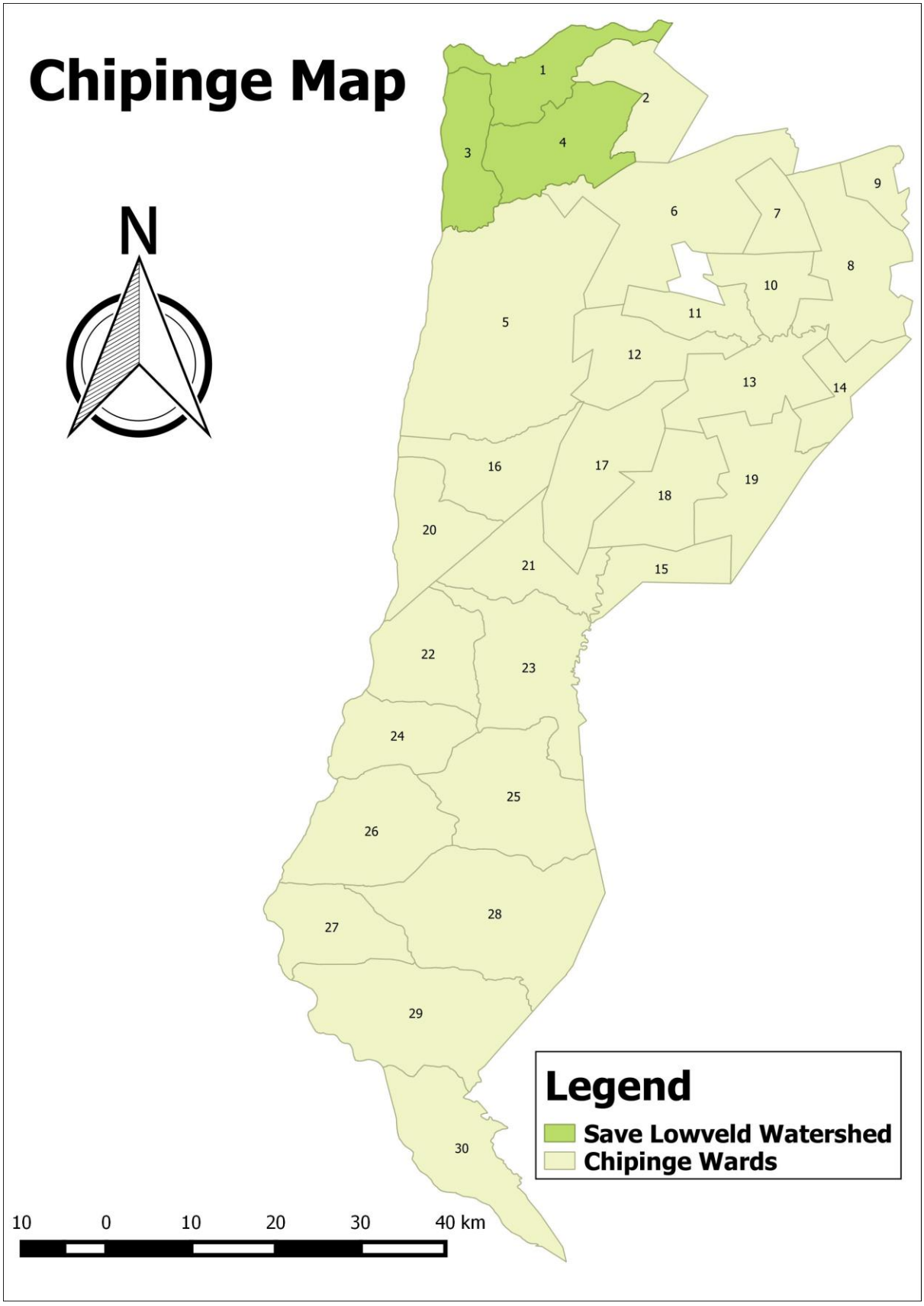


Figure 3.2: Chipinge Map showing the wards under study.

3.3 Selection criteria

The target population for this study were people in the 3 wards that are covered by the Save watershed within the boundaries of Chipinge district. Various stakeholders and Government Departments involved in the management of the watershed and natural resources conservation were also included. The research used one stage of sampling, where the respondents were directly sampled from the frame of households in each ward. A comprehensive list of households was compiled before fieldwork and it was ordered by ward and villages prior to sampling, so that the systematic selection of respondents was spread across all the wards and villages. Once a comprehensive list of households was established, the next step was to randomly select households from the sampling frame using fractional interval systematic sampling.

3.4 Data collection methods

This research used both explanatory and exploratory approaches, where it endeavoured to provide a descriptive evaluation of existing institutional arrangements in the Save watershed in relation to community engagement, participation on watershed management and livelihoods. Thus, both secondary and primary data was utilised in order to address the study objectives. A variety of methods was used to collect data and this allowed the room for verification and Validation of data. The use of multiple methods makes it convenient where some methods fail to extract the expected information due to various circumstances like busy work schedules and other commitments at community level.

3.5 Respondents of the study

3.5.1 Respondents for Questionnaire

The respondents were drawn from three selected wards in Chipinge Lowveld, targeting the selected households in the basin who were knowledgeable on the structures, leadership, guiding norms and interventions that are being implemented in the watershed. This sampling method was used to ensure that each member of the population has equal opportunities to take part in the research. This is the most effective and efficient sampling procedure because it eliminates bias and also uniformly spread the respondents across the entire watershed. In-order to employ random sampling, the interviewer defined the population and then selected members to make a sample.

3.5.2 Respondents for Focus Group Discussions and Key Informants.

A number of sampling techniques were employed at different stages of the research process. The target respondents of FGDs and key informant interviews were traditional leaders, opinion leaders, committee members and ward based government staff. Different stakeholders who are involved in the implementation of watershed management strategies and initiatives were also part of the targeted respondents. The selection of respondents was done using purposive random sampling together with its subset which is snowballing. This was used to gather relevant information relating to the level of community engagement to conserve and utilize the watershed resources in a sustainable way. Purposive sampling is when the researcher starts with a purpose in mind and the sample is thus selected to include participants of interest (Evan, 2007), this allowed the researcher to specifically target the people who were participating in community based watershed management strategies and interventions. Snowballing was also employed to identify potential respondents, particularly key informants who were doing these initiatives at homestead level. Referrals through snowballing were quite useful in locating potential respondents as well.

3.6. Data collection and techniques

In order to investigate the governance mechanisms in place for sustainable watershed management, the study used FGDs, Household Questionnaires, Key informant interviews and secondary data sources.

Focus Group Discussions

These were conducted with the traditional leadership, villagers and committee members in the wards of study. FGDs helped the researcher to interview a group of people who had a particular experience or knowledge about the subject of watershed management or those that have particular interest in it at community level. The same groups of people that were interviewed were also assuming leadership roles and monitoring of watershed management activities at community level. Issues that were addressed by the FGDs are dynamics in natural resources management from past to present, focusing on control, access, inheritance, ownership, conflict resolution mechanisms, participation and leadership structures in place. 12 people were selected per ward and helped to interrogate the following issues.

- Structures for watershed management that are in place in the three wards and their importance.

- The district stakeholders which support them on watershed management initiatives at ward level.
- The regulations, by-laws, controls, ownership and conflict resolutions and collectively agreed by-laws to sustain watershed resources.
- The community based initiatives that are being undertaken by the community and channels of mobilisation for collective action.
- Livelihood sources and coping options available in a watershed in case of a shock.
- Specific challenges that the community face and how they collective work together to mitigate against these challenges.

The FGDs exposed present management arrangements from different perspectives and served as a crosscheck for consistency of data that was collected through the household questionnaire and offered content insight (the why of what people think). Further, the process saved time and gathered relevant information in a short period of time because people were gathered in one place.

Key Informant Interviews

Key Informant Interviews allowed the researcher to have a specific form of applying semi structured interviews to experts of watershed management interventions in the three wards and also gave a provision for suggestions and recommendations. District experts on water resources, forest, settlements, agriculture and land tenure (donor agencies, government, NGOs) were interviewed using this method because it provided detailed opinions and world's views from concerned stakeholders in the watershed within a short period of time. The detailed issues were structured in a checklist covering the following areas:

- Their roles in watershed management activities in wards 1, 3, 4.
- Policy issues in place, implementation and enforcement. Also other external stakeholders that help them at district level to implement watershed management initiatives.
- Community structures capacity buildings and how they enforce the local by-laws.
- The community based initiatives to manage the watershed and the support that they give to the community.

- The benefits that the communities get from the watershed to expand their coping and survival options.

KIIs also helped me to compare perceptions of decision makers/opinion leaders and local people in the watershed who are the immediate beneficiaries or victims of management decisions. Experts or opinion leaders also gave this study a thematic structure according to the conceptual framework presented in the literature review**.**

Secondary data.

This was a review of document**s** (reports, Journals, manuals, minutes from council, proclamations, rules, by-laws and regulations) with regards to watershed management activities in Chipinge district. The Information on the relationship between institutional arrangements and watershed management was found readily available in many secondary sources at District forestry and EMA offices. Copies of rural districts by-laws were obtained at district offices for an understanding of trends in natural resources laws and compliance systems.

This also helped me to get an overview and enriched my research on aspects that were explored before and I was able to validate the information that I collected using FGDs, KII and household questionnaires. Reports especially those produced by Chipinge government departments and NGO were handy in illuminating institutional arrangements with regards to watershed management and access to resources.

To establish the level of community engagement in the management of the watersheds, the researcher used Key informant interviews, and household questionnaires.

In-depth Interviews

In-depth Interviews were conducted with specific people who seemed to be key during FGDs and those who are in leadership to exhaust particular themes especially those in the household questionnaire that needed further probing. In addition to creating rapport, this method helped in eliciting required detailed information on the effect of watershed management structures on the rural livelihoods. In-depth interviews were conducted with community members and district stakeholders to unpack issues of community capacity building, by-law formulation, law enforcement, effectiveness of watershed intervention and specific challenges that they face during implementation. This was more of as a follow up activity to qualify issues and also provide more evidence on results. This proved to be a flexible technique since some of the respondents were reached on phone, where they might have travelled or not in the office.

Questionnaires

Since quantitative data was also of interest, questionnaires were also used as they are amenable to quantifiable data**.** This is a standardized way that the researcher used to collect data about people's thoughts and behaviours in a systematic manner. Open ended and closed questions were used to allow the researcher to probe further on issues that were left hanging. The households were systematically selected to accommodate variability in age, gender and other demographic aspects in a community. These factors helped in examining similarities and variations among households with regards to participation and benefits from the watershed. A total of 84 questionnaires were administered to randomly selected households in the three wards for the actual study. The questionnaires addressed the three objectives on the governance mechanisms in place, the level of participation, engagement and the level of community dependency on watershed resources as coping strategy.

The questionnaire was structured in way that allowed the researcher to interrogate community demographic issues, people's understanding on watershed management, their involvement in leadership roles, participation in community based watershed management initiatives and household well-being. All the aspects that were reviewed were assessed with regards to shocks and benefits that they get from the watershed for the researcher to understand the level of community dependency on the natural resource base. The data from the questionnaires was analysed using SPSS. The questionnaire is however attached as an annex of this study.

In order to assess the household dependence on watershed resources the researcher used key Informant Interviews, observations, and Secondary data to unravel how the communities depend on the watershed resources. Most of these tools have been discussed in the sections above.

3.6.1 Other general techniques to complement

The study also employed other techniques to help to expound some information and evidence that could not be easily extracted by the mentioned techniques under each of the objectives above. The following techniques were used:

Observation and Transect walks.

Observation is defined as the systematic description of events, behaviours and objects in the social setting chosen for study (Marshall and Rossman 1989). Observation allowed me to observe landscape performance with regards to watershed management and resource

conservation. Observation were conducted in the form of transect walks during field work. They helped the researcher to collect exceptional information that was skipped intentionally and unintentionally during the study by giving it a visual analysis. However, observation was weak in generating information about network of actors and also past information of the resource base. Transect walks as defined for fauna and flora are tools for describing and showing the location and distribution of resources, features, landscape, and main land uses along a given transect were also relevant to this study. This is helped the researcher to fully appreciate the community initiatives in the watershed and helped to confirm the information gathered by other instruments. Transect walks helped me to identify and elucidate the cause and effect relationships among topography, soils, natural vegetation, cultivation, production activities and human settlement patterns in a watershed.

Face to face Interviews

Face to face interviews gave the study an interactional exchange of dialogue between the researcher and the participants on a certain watershed management themes or topics as a backup to other mentioned techniques. Face to face interviews with environmental officers, any community members and donor agencies were useful to measure attitudinal changes in relation to the environment, ecosystem and watershed. I could relate what the person was saying to his body movements and facial expressions, hence able to understand the depth of the matter.

3.7 Processing and analysis of data

Quantitative data was analysed using SPSS version 20. The main tests which were run by SPSS are descriptive statistics (frequency, cross tabulations). Thematic analysis were used to analyse qualitative data gathered by FGDs and key informant interviews. According to Braun and Clarke (2006), thematic analysis is a qualitative technique that is used to identify, scrutinize and report patterns within a data set. Thematic analysis focused on identifying and describing implicit and explicit ideas. Thematic analysis required widespread interpretation of data by the researcher that is why a number of techniques was used. Data was read and re-read to envisage for trends, keywords, ideas and themes from the different methods which were used. Codes were produced to indicate themes and throughout the thematic analysis process, transcriptions were read and re-read and on the data that was gathered on institutions with relation to the community participation and engagement in the watershed and effects on livelihoods and on conservation. The researcher also used quotes to review what the

respondents said during their engagements, it also gives evidence of how people expressed themselves concerning watershed management in Chipinge.

3.8 Validity and reliability of data

The study followed comprehensive research methods. Triangulation of the methodology, which is, using both quantitative and qualitative methods helped to ensure the reliability, validity, relevance and analytic strength of the research findings. Triangulation was also enhanced through the use of FGDs, key informants and observations. The blend of respondents also gave the research a composed perspective. By merging multiple sources, methods and respondents, the researcher managed to overcome intrinsic bias that is most popular with a single respondent and single method.

3.9 Research limitations

The research was limited due to the fact that it focused only on the household dependency on watershed resources and it didn't investigate the effect of initiatives on the quality of the watershed itself. Moreover, the coverage was not ideal as only one district was studied out of 4 districts that are covered by save watershed. Furthermore, data collection was conducted in a short space of time whereas dynamics in watershed issues and household coping mechanisms are long term issues which may need a longitudinal study. The concepts of the research were too technical and this means more time was needed to clarify issues with the communities during data collection. Last but not least, the issues of climate change in the country may have affected/distorted objectivity of the study and results.

3.10 Ethical Considerations

According to Boyce and Neale (2006), it is important to be conscious of the ethical principles and code of conduct when conducting social science research. This assisted the researcher in ensuring high quality work without causing any maltreatment and disappointments to the participants. The basic ethical principles which were maintained during the research were to do with the good manners and protecting the sovereignty, safety, wellbeing and dignity of all research participants. Informed consent was observed by the researcher through the village heads in the in the wards. Wherever possible, research participants were informed about the purposes of the research which is for academic purposes only. Participation in the study was voluntary and no participants were forced to take part. Chipinge District is a politically volatile district hence there was need to attune to the gatekeepers in the wards of research.

The researcher was well aware of the balance of power between different actors hence the researcher had to observe all protocols especially during focus group discussions, where before the discussions there was need to acknowledge the superiority of traditional leadership in the traditional hierarchy.

3.11 Conclusion

Triangulation, that is, using various methods helped to get the information needed for the research and also to avert some of the challenges that are normally encountered in the research for instance gatekeepers and tight work schedules for some key informants in the government departments. This chapter has focused on the various methods used to collect data that would answer the problem statement, research objectives and questions and justified why the specific data techniques are used for a specific research question.

CHAPTER FOUR: PRESENTATION AND DISCUSSION OF THE FINDINGS.

4.0 Introduction

This chapter presents research findings of the study. The chapter provides a detailed presentation of the major arguments made by communities, stakeholders and leadership groups in Chipinge District's wards1, 3 and 4. This study sought to (a) investigate the governance mechanisms in place for the sustainable watershed management as a measure to mitigate against natural shocks in Chipinge low-veld; (b) established the level of community engagement in the management of the watersheds (c) establish the dependency of households on watershed resources for resilience. Finally the research findings helped the researcher to give recommendations to the Chipinge district stakeholders and partners on how to address the existing gaps. As such, the findings of the study are presented in line with the research objectives.

4.1 Socio-demographic Characteristics

The demographic characteristics of the respondents were categorized in four age groups: 18-20 years (10%), 21-23 years (24%), 24-26 years (46%) and above 26 years (20%). There were slightly more men than women and more Christian belonging to the Pentecostal (40%), Protestant (32%) and Catholic(18%), Masowe (0.5%) and others were 8.5% respectively. 60% of the participants were single, 19% were married and 15% were cohabiting, 4% were widowed and 3% were divorced or separated.

Table 1: Socio-demographic Characteristics of the participants.

Variable	Frequency	Percentage (%)
Age (in years)		
18-20	8	10
21-23	20	24
24-26	39	46
>26+	19	20
Religion		
Pentecostal	34	40
Protestant	27	32
Catholic	16	18
Masowe	1	1
Others	6	7
MaritalStatus		
Single	50	60
Married	16	19
Cohabiting	13	15
Widowed	3	4
Divorced or Separated	2	2

N = 84

4.1 Governance mechanisms in place for the sustainable watershed management as a measure to mitigate against natural shocks.

4.1.1 Stakeholders and regulatory mechanisms in Chipinge.

From the field engagements with different households during focus group discussions, results show that, there are different structures at community level and at district level which take responsibility to manage and sustain the Save low-veld watershed. These include traditional leaders, government departments and other district stakeholders. There are 5 key structures or committees, which operate at community level to regulate and stimulate sustainable watershed management.

"We have so many committees in this ward which are concerned about our natural resources. They are elected by the community and endorsed by EMA and

the RDC. There are Disaster Risk Reduction Committees (DRR), Environmental Sub Committees (ESCs), Watershed Management Committees (WMCs), Save Sub Catchment Council, ZINWA and the traditional leadership available to manage and enforce measures for sustainable watershed management".(Ward 3 Councilor, 12/03/2017).

At district level, it was also highlighted that there is a multi-stakeholder set up, where different government departments work together towards the watershed quality. The key stakeholders at district level are the district administrator (DA)'s office, Rural district council (RDC), forestry commission, Environment management agency (EMA), Agritex, Department of mechanization, Save catchment council, ZINWA and the NGOs. The district stakeholders are the ones who capacitate the local structures on key strategies to implement in the watershed as well as to endorse any by-laws formulated at grassroots level.

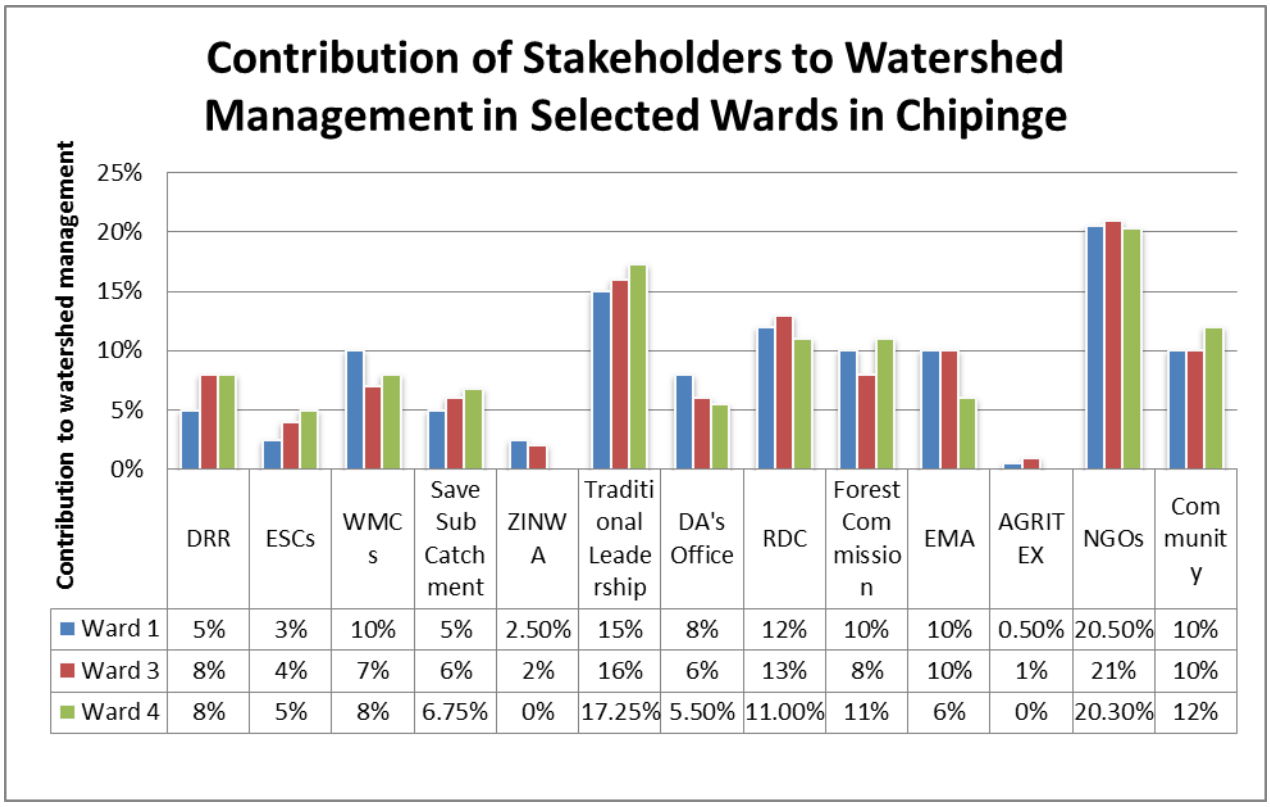
Table 2: District stakeholders and their functions.

Institution	Function
Traditional leaders	Mobilize people for collective action and enforce the local by-laws.
RDC	Enact and endorse the local by-laws.
ZINWA	Enforce the water policy.
EMA	Establish and train the Environmental sub committees.
DA	Chairs the platform of district stakeholders on watershed management.
Forest Commission	Tree planting and land regeneration.
NGOs	Mobilize resources and finance initiatives.
AGRITEX	Conservation farming and climate smart agriculture.
Department of Mechanization	Design and pegging of contour ridges.
Save Catchment Council	Management of water resource in the watershed.

Source: Field work data 2017

Table 2 above is showing the formal identified stakeholders and their key functions in the Save Watershed in a multi stakeholder set up for the enhanced watershed quality. The DA's

office takes the overall responsibility to coordinate these different functions that are undertaken by various stakeholders as they implement a cocktail of interventions in the watershed.



	DRR	ESCs	WMCs	Save Sub Catchment	ZINWA	Traditional Leadership	DA's Office	RDC	Forest Commission	EMA	AGRITEX	NGOs	Community
Ward 1	5%	3%	10%	5%	2.50%	15%	8%	12%	10%	10%	0.50%	20.50%	10%
Ward 3	8%	4%	7%	6%	2%	16%	6%	13%	8%	10%	1%	21%	10%
Ward 4	8%	5%	8%	6.75%	0%	17.25%	5.50%	11.00%	11%	6%	0%	20.30%	12%

Figure 4.3: Proportion of people who confirmed assistance from different stakeholders and committees per ward.

In this case contribution of the stakeholders refers to the respondents who confirmed that they received any form of assistance on watershed management. The assistance encompasses capacity building, watershed inspection, monitoring, awareness campaigns, contour designs, pegging of dams, tree species identification and consolidation of local by laws. Figure 1 above shows the outcome from the field on the proportion of people who received assistance from different stakeholders and committee representatives towards watershed management. It depicts that the NGOs are the most dominant actors in terms of watershed management contributing with 20.50%; 21%; 20.30% of the people having reported stakeholder's presence in ward 1, 3 and 4 respectively. The graph shows that although the traditional leadership is the custodian of the resources (15%; 16%; 17.25%) of the respondents confirmed that they received awareness on water resources conservation in the recently experienced El Niño. After public awareness the general community also engage others on peer to peer basis and (10%; 10%; 12%) of the interviewed people confirmed that they were assisted by their fellow community members to conserve the watershed resoures. Therefore

collectively traditional leaders and community members have a significant contribution when it comes to watershed management, with an average of assisting about 25% of the people in each ward. Surprisingly the RDC and AGRITEX are benefiting more from the protection of watershed as shown by data from the FGDs, but they are not providing much assistance to the community as compared to the NGOs.

> *We pay a lot of taxes to RDC but it is not keen to invest any financial resources to our natural resources. Also AGRITEX officers are doing nothing to assist people to conserve the watershed. In some cases it we feel that these stakeholders do not work together to complement each other, but rather work in silos hence creating a lot of unnecessary arguments and overlaps in the implementation. We actually depend on the NGOs especially, when we want to purchase any material to use in the watershed. For example we received cement, marsh wire shovels and steel bars to use when reclaiming the gullies*
>
> *(Watershed committee Chairperson Ward 1)*

4.1.2 Policies, regulations and by-laws.

The leadership structures and the communities are also guided by a number of policies, regulations and by-laws. There are three main Acts of Parliament which were found to be important for watershed management, namely the Rural District Council Natural Resources Management Act, the Water Act and the Traditional Leadership Act. These Acts however help to bring different players together for effective implementation of watershed management strategies as well as sustainable utilization of watershed resources.

The communities are however, through the local structures mobilized to take part in the enacting of by-laws with support from Chipinge Rural District council. For example, a by-law on utilization of water resources, helps different users to utilize the same water resource without conflicts in a conserving way. The veld fire management is also key for the management of the watershed where people are not allowed to cut down trees without permission from the village head and those who break these laws are fined by the village heads. It also came out from Key informants that in all the wards, people are not allowed to settle anywhere in the watershed or cultivate near the streams as enforced by the local council. Settlements and agricultural fields are not just allocated anywhere in the watershed but they have to be approved by the village heads with assistance from the local government extension officers. It is mandatory for every community member to help to put off veld fires whenever they are summoned.

We do not allow people to settle or cultivate anywhere in the watershed. We have by-laws against veld fires, stream bank cultivation, deforestation, brick molding and over grazing. As a village head I charge a goat for every offence. (Village Head Maunganidze 12/03/17).

These by-laws are however crafted from the main regulations from the district offices, which includes issues to do with stream bank cultivation, deforestation, use of slays, veld fires management, pollution, overgrazing and utilization of wild fruits. The traditional leaders are allowed by the law to collect fines from offenders through the different committees mentioned above. The most common fine for offenders that kept on being mentioned by the community members was the goat or $20 minimum fine, although those serious offence would end up involving the police and judicial court.

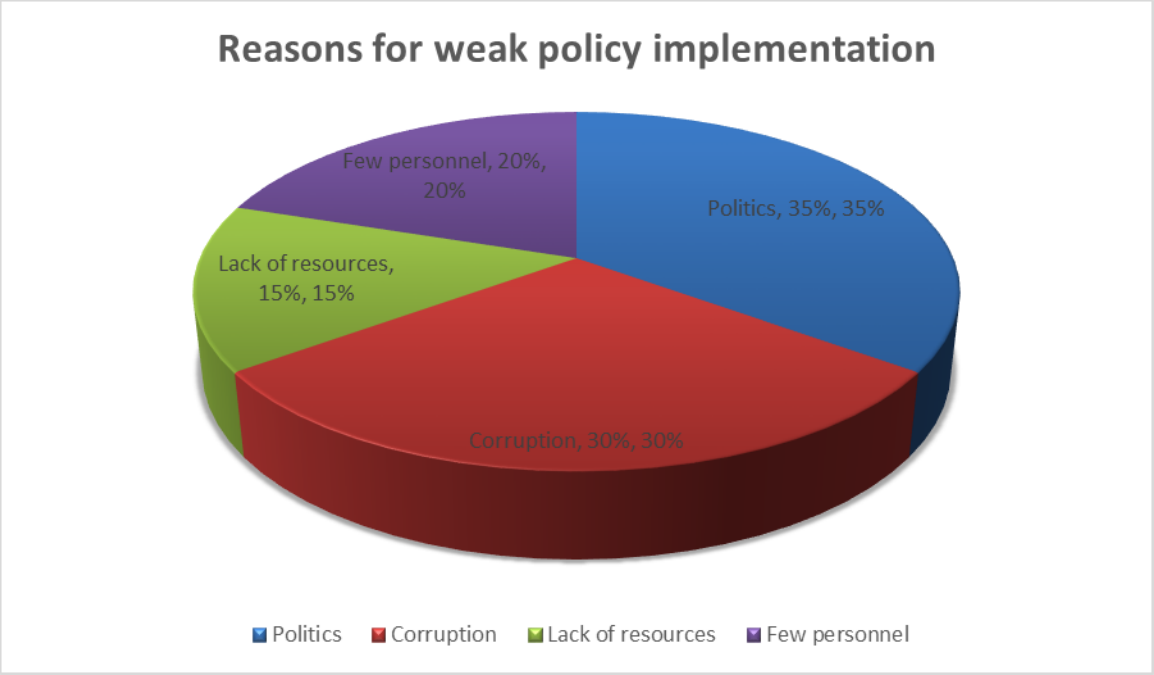


Figure 4.4: Challenges to Policy implementation in Chipinge.

Although existence of policy framework (regulations, by- laws, acts) is reported to be present in all the selected wards (1; 3 and 4), the implementation and enforcement according to the opinions of participants is hampered by the political system, corruption , lack of resources and few personnel at the various levels. 35% of the respondents mentioned that divergent objectives and interests among stakeholders weaken watershed policy implementation, 30 % of the respondents think that corruption is the main obstacle to effective watershed management, 15% of the interviewed people explained that there are no resources to fund community watershed management initiatives. The communities do not have the resources to meet watershed management costs on their own, without external support. With the current

economic crisis in Zimbabwe, most Government Departments at district level are no longer able to finance these activities at community level except with support from the NGOs. 20% of the respondents felt that due to government restructuring of staff, the extension services have also been reduced. None of the participants thought poor stakeholder involvement was a problem although they reported that in many cases the views of NGOs are taken by government officials as the views of local communities hence failure to consider grassroots people's opinions.

One respondent from FDGs explains that in Zimbabwe, the Ministry of Agriculture has recently been divided into two, to form another ministry (mechanization and the ministry of land and resettlement) and both are reported to be handling the same issues of conservation agriculture and natural resources management. There can be two to three ministries handling the same issue which leads to wastage of resources, duplication of services and inefficiencies, as such there are numerous loopholes in policy implementation as well as efforts to harmonize policies is still in vain. Theabsence of effective institutional and financial mechanisms was identified as the other challenge of watershed management interventions and in the case of the Save watershed the study seem to unearth the same factors which were mentioned three decades ago in the FAO study. This in itself is a clear indication that there are gaps to do with resources and as well as the institutional will to advance watershed quality.

> *The most significant and identifiable constraints for catchment development is often the willingness/capacity of national governments to act, in the area of land tenure and payments for ecological services of watershed, as well as that of water resources. We have areas in ward 3 where people refused to move out of wetlands simply because they a well politically positioned and it becomes difficult to enforce some of the regulatory mechanisms in place. (EMA Official, 12/03/17).*

What is highlighted here is alluding to political issues that are superimposed within the issues of tenure and payment of ecological services which are rendered inefficient and effective by corruption. It is however difficult for the established committees to enforce by-laws when some other parts of the watershed is marked as private property and the owner unwilling to cooperate for collective action.

4.1.3 Political ecology in watershed management

The study also reveals that watershed domain is not different from any other arena where multiple actors in the approach struggle to meet other unrelated objectives or fulfil diverging

interests hence tensions emerge between these actors. It came out from the Focus group discussion that, the Ministry of Agriculture and Ministry of Health are promoting the nutrition gardens for food and nutrition security and most gardens have been established in wetlands and along streams. This has led to massive siltation of streams and water pollution, such that each time when EMA comes to enforce its by-laws it opposes what Ministry of Agriculture and Ministry of Health would have encouraged the communities to do. This has given actors and stakeholders multiple visions on watershed approaches, because among agronomists, they see it as a means to scale up climate smart technologies, for soil water conservation and environmental protection more generally. This is different from water resource sector and policy makers who fantasise on enhancing environmental outcomes and public services generated by the upper catchments to foster trans-boundary natural resources management (Van der Linde et al., 2001). Politicians also see this as a strategy to gain political muscles where they allow people to degrade the environment so as to gain votes. In ward 3 or as illustrated above by the pie chart, politics has actually weakened the effectiveness of watershed interventions hence leaving the communities vulnerable.

> *The recent gush in funding for and interest in watershed management must be viewed and scrutinised carefully in terms of its political motives, foundations and desires of the west.(Chipinge CPU, 14/03/17).*

The District Administrator raised those concerns because he suspected that some actors who come to Chipinge with the false intentions to conserve natural resources, but in actual fact they will be looking for minerals and other trees of commercial value.

4.1.4 Multiple User scheme planning (MUS).

Multi User Scheme planning is a concept that was brought into the low-veld firstly by World Vision then supported by RDC to allow different users to work together as they benefit from the same resources. The district stakeholders and the development partners provided technical capacity for the communities to be able to map the available resources in the watershed, prioritize and rank the most important ones. The final product of this initiative was then to harmonize the approaches on how these local resources should be utilized and well managed. MUS planning also helps to reduce conflicts over resources and allow communities to protect their resources hence being resilient especially in this changing climate. An example was given in ward 1 by a community member who cited how they managed to govern their resources in the watershed in the recently experienced El Niño induced drought for them to cope.

"Because of planning together as a community here in Changazi area, we managed to use water sparingly in the only water source that we had to save livestock. Through the local committees we gathered and agreed that priority should be given to livestock not gardens. We saw that MUS helped us to conserve water and saved our livestock (Ward 1 committee member)"

This is a typical example of a community based initiative to stimulate collective understanding on the use and management of watershed resources. What the communities agree is also taken up with the rural district council for endorsement so that it becomes legally binding.

4.1.5 Functionality of community level committees

Seventy five percent (75%) out of about 60 interviewed committee members mentioned that they have functional constitutions which have been endorsed by the local council, while twenty five percent (25%) said they are still in different stages of group maturity. Some committees are still getting trainings from EMA and RDC on how to develop a legally binding constitution, some are in the process of constitutional development, and facilitating the signing of the constitution by the RDC. Some committees have a combined constitution with WMC and DMC for example in ward 1. Sixty three percent (63%) of the Environmental Sub Committee members have so far enforced the process of by-law formulation and application in their villages. Penalties in the form of fines (goats) are enforced by these committees through the village heads who are recognized and respected by the community. The committees also work with village heads by informing them on new laws, by-law enforcement, tracking and punishing offenders who will operate outside the law.

Seventy nine percent (79%) of the committee members conduct regular meetings as defined in the constitution at least once to twice in a month and they also keep records such as minutes of all meetings conducted through their respective secretaries. Twenty one percent of these committee members mentioned that they have not yet received trainings so they have not yet planned or scheduled for such meetings.

Seventy nine percent (79%) of the interviewed committee members in the 3 wards mentioned that they do environmental patrols/environmental quality inspections in their respective areas. Sixty six percent (66%) of the engaged members mentioned that they do awareness campaigns on issues like soil erosion, fire outbreaks, and land degradation to engage the other community members. For example, in ward 1 Maunganidze, the committee mobilizes and

gives instructions on how to manage the environment for example schools, shops on issues of litter and land regeneration.

4.2 The level of community engagement in the management of the watersheds.

4.2.1 Community engagement and coordination in the Save low-veld.

To establish the level of community engagement, the communities have highlighted the functional committees, which coordinate activities on the ground and link district stakeholders.

Seventy five percent (75%) of the committee members were engaged mentioned that they have recommended to council measures for the management and protection of the environment. In ward 1, Changazi, the committees have cooperated with council to accept and implement their by-laws. Gulley reclamation through food for work from social welfare was also facilitated by the local committees. Poisoning of Changazi River by fish poachers was also reported and the council recommended the patrolling of police around the river area. In ward 4, EMA and RDC assisted to clear road spillages from tank spillages as their main road is normally affected by chemical spillage accidents which affects their water resources.

Sixty three percent (63%) of the functional committee members reported having recommended to the council ways of implementing environmental measures which the council is authorised or required to undertake in terms of any other environmental law. Forty five percent (45%)of the committees that were reached through FGDs highlighted that they have so far prepared and recommended to the council the environmental plans required in terms of EMA [CAP 20:27] as read with Statutory instrument 7 of 2007. In all the 3 wards, the committees have recommended to council on the extraction of river sand in the wards and managed to engage the entire community members.

The local structures interviewed also mentioned having organised field days, demonstrations, visits and tours for the purpose of increasing awareness, interest in and knowledge of conservation. In Tanganda area, committees have worked in collaboration with AGRITEX and conducted field days at schools, where they had a National Tree Planting Day (NTPD). The community and entire school planted more than sixty fruit trees. However, eighty seven percent (87%) of the committee members have not yet organized anything on commemorations or awareness campaigns due to challenges such as lack of resources and logistic issues.

The community also indicated that they have at once co-operated with EMA, council, farmer associations and all relevant government departments and parastatals involved in conservation. The committees in ward 3, worked hand in hand with EMA on conservation works and veld fires. In ward 1, the committee worked with Forestry on how to prune trees without damaging them and planting of Jatropha trees. All the communities have informed EMA of problems and progress and of any necessary conservation works in the area. However EMA support have not been consistent due to lack of resources. In ward 1, EMA is more engaged with implementation of activities as compared to the other wards. For example a deep gulley in Birirano village was reported to council and it needed technical expertise of engineers. It has however been incorporated into the ward DRR plan and the community was awaiting feedback from council and EMA on the reclamation. The village heads in ward 4 have cooperated with neighbouring committees in the other neighbouring wards of Chimanimani, where the watershed begins, in terms of rehabilitation of degraded areas that affect them.

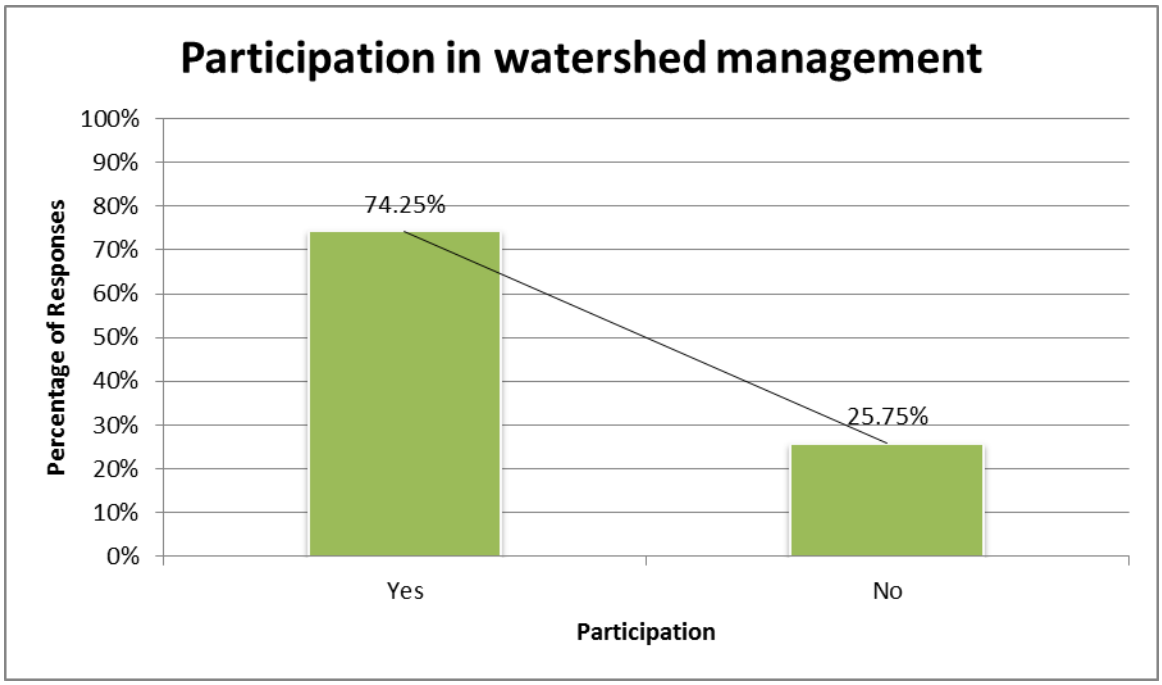


Figure 4.5: Proportion of respondents participating in watershed management

The majority of the respondents (74.25%) acknowledged community participation in watershed management which encompasses everything from being a committee member to activities, such as tree planting, gully reclamation and establishment of contour ridges. Only 25.75% of the participant believed that the communities are doing nothing to maintain the watershed. One of the respondents named Taonga (pseudo name) has this to say:

"Although the contribution of communities and individual community members is usually swept under the carpet, the communities have invaluable contribution to the general maintenance of the watershed here in Chipinge"

This shows us that the communities in Chipinge area also play a vital role in the conservation and maintenance of the watershed which gives them a sense of responsibility and ownership. However, their credit for watershed protection is usually taken by the DA's office and the RDC

Which are the custodians of the natural resources and fail to recognise the role of the local community. This was highlighted by some of the key informants during the survey.

"We play a bigger role in watershed management but the RDC and the DA take the credit away from us since they are the custodians of the natural resources"
Ward 4 Headman, 12/03/2017.

Community participation involves managing the land and human resources of the drainage in a manner that sustains adequate levels of water, soil, and food and fibre production. This form of management took into consideration a participatory integrated approach that includes the various physical, vegetative and human components of areas that range from a few hectares to large river basins in the Save catchment. According to the DA's office, to reduce risks, the District Civil Protection committee found it vital to build the resilience of the natural resource base, and to promote sound environmental and natural resource management practices and the sustainable use of ecosystems by prioritising these components in their council action plans.

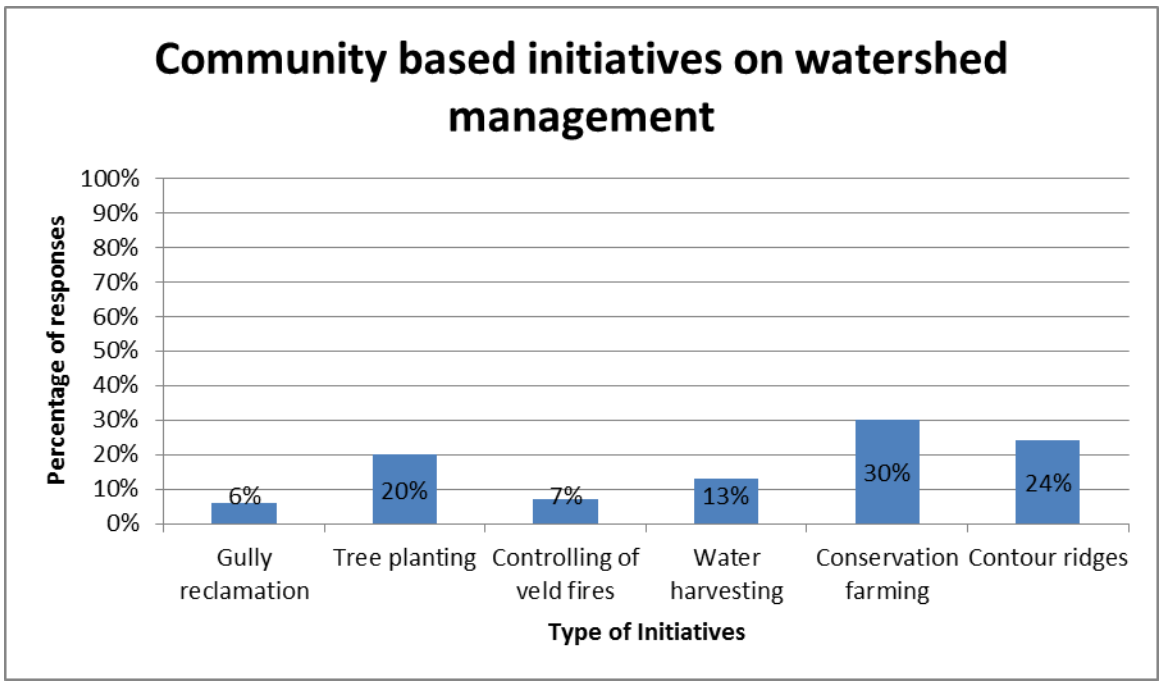


Figure 4. 6: Proportion of respondents involved in different community based initiatives.

There are various community based initiatives to ensure watershed management. The respondents (30%) felt that conservation farming is being widely practiced in Chipinge. Rather a significant number of participants (24%) acknowledged the construction of contour ridges and (20%) engaged practised tree planting along the watershed area. Although water harvesting is key in watershed management, only 13% of the respondents pointed out to the existence of water harvesting initiatives to taking place.

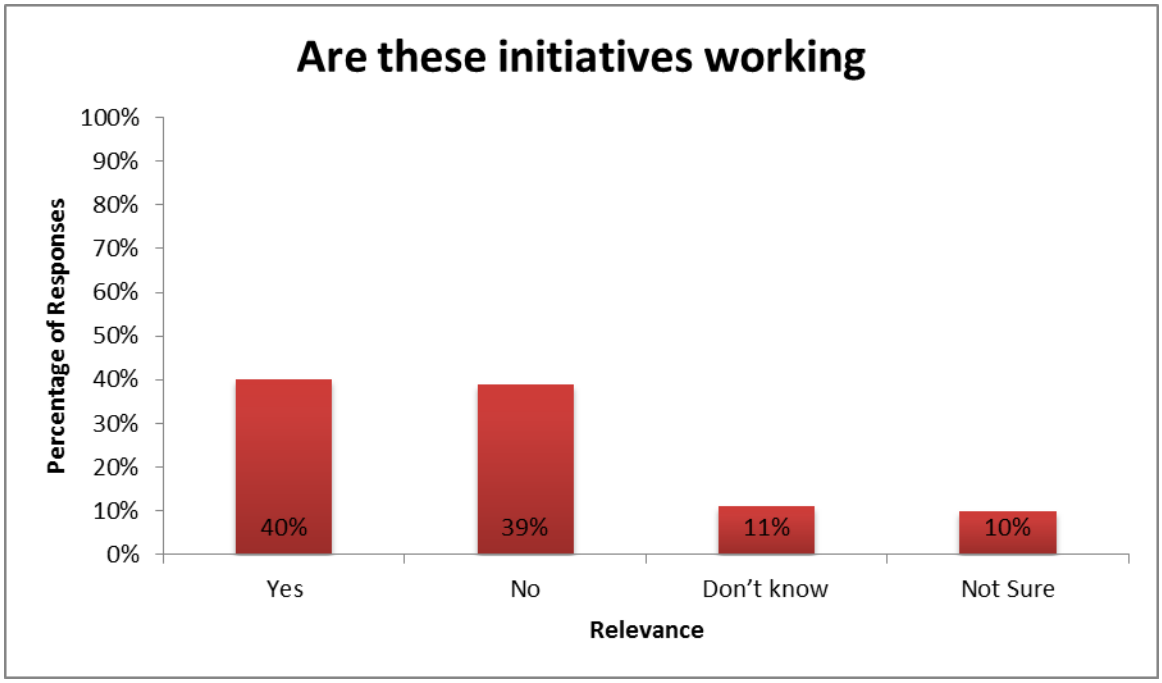


Figure 4.5: Proportion of respondents on effectiveness of watershed management strategies.

The majority of the respondents (40%) believe that the initiatives to manage the watershed are helping the ecosystem to regenerate and produce benefits to the community. Effective initiatives that the communities engaged on are conservation agriculture, weir dam construction, fire guards, tree planting, gully reclamation and establishment of contour ridges. A significant proportion (39%) felt that the initiatives are not working and. only, 11% did not understand what was going on around the watershed, when asked whether the management initiatives are working they were quick to respond saying they don't know. A very small but significant number of respondents (10%) were not sure whether the initiatives were effective or not effective in terms of watershed ecosystem conservation.

4.2.3 Collective action and participation in the Save watershed

Collective action is a fundamental pillar of landscape or watershed level natural resources management and it gives a sense of ownership to the resource owners (German, 2005). In Chipinge the 40% of the community members who confirmed that the initiatives are working effectively also mentioned that the mobilisation processes are done in a well organised way. For these initiatives to be effective, through the FGDs the communities mentioned that, they are linking all this to the benefits that they get from the watershed. "*People are unlikely to engage in watershed conservation if they realise that nothing if benefitting them from the watershed"*. Said one of the Watershed management committee members for ward 4.

However, in the Save watershed people mentioned the fruits such as baobab, mazhanje and other traditional fruits to be of paramount importance in the times of food shortages and that keeps them engaged to natural resources conservation.

The set of issues that the communities mentioned in Chipinge were problems associated with elite capture where influential people are allocated farmlands close to the water sources and some problems are politically motivated were a certain political party dominates in decision making. The study also identified that most people do not have the mechanisms to extract water from the streams for irrigation and also the El Niño has impacted heavily on biodiversity and the ecosystem balance because most animal species and vegetation suffered moisture stress.

In Chipinge the DRR, ESCs and watershed management committees working with the traditional leaders have managed to organise people into groups to undertaken various activities. In the area of land regeneration there in an ongoing program being implemented by World Vision Zimbabwe using the Food for Assets (FFA) approach to finance the labour. People are encouraged to work to rehabilitate their natural ecosystems and establishment of livelihood productive assets in the watershed, which include dams, gardens, orchards and community managed irrigation schemes, which help to absorb shock especially drought.

4.3 Household dependence on watershed resources for resilience.

4.3.1 Community dependence on the environment.

The communities have highlighted a cocktail of benefits that they get from the local watershed and this also gives them a level of food security. Brooks, (1997) highlighted, holistically planned and carefully implemented watershed management practices and programs in Chipinge helped the communities to meet the increasing demands for commodities and amenities, clear water, open space, uncluttered landscapes and other positive externalities in the figure below.

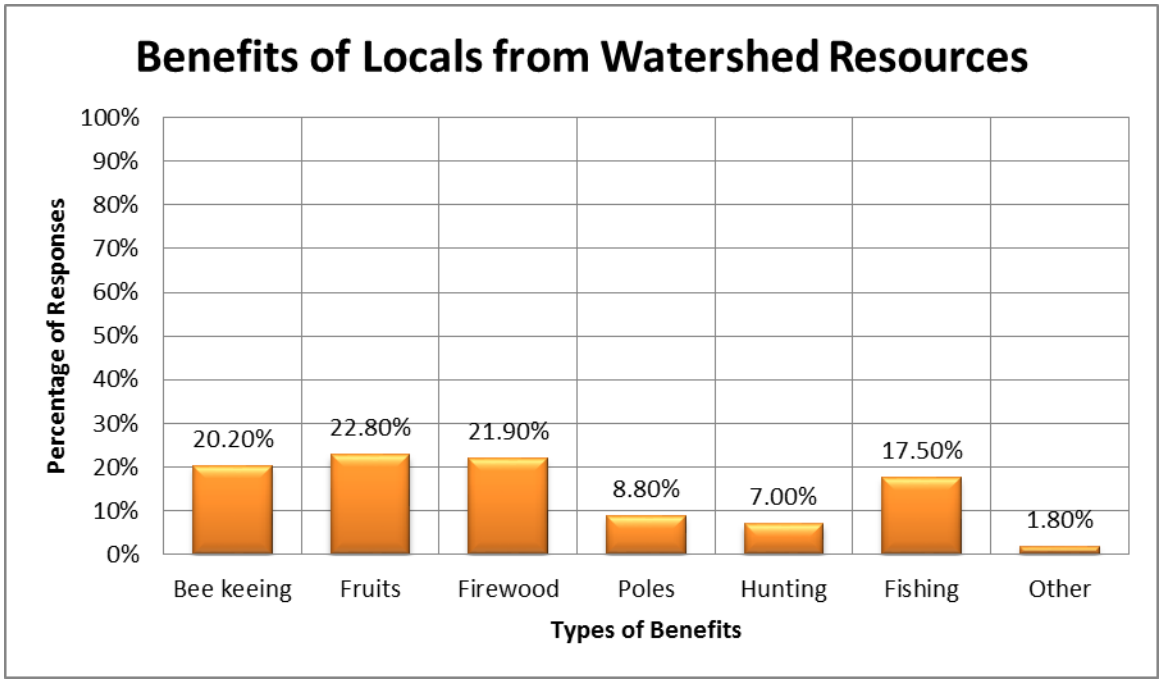


Figure 4.6: Proportion of respondents who benefit from the watershed.

Figure 6 above presents the benefits of locals for the watershed resources in Chipinge ward 1, 3 and 4 combined. The majority of the respondents (22.80%) benefit by gathering fruits from the watershed. A significant figure of respondents indicated that they benefit from Bee keeping, selling firewood and Fishing (20.20%; 22.80%; 17.50%) respectively. Only a few (7%) benefit from hunting in the forest this may be because of the legal policies preventing communities to hunt in the watershed.

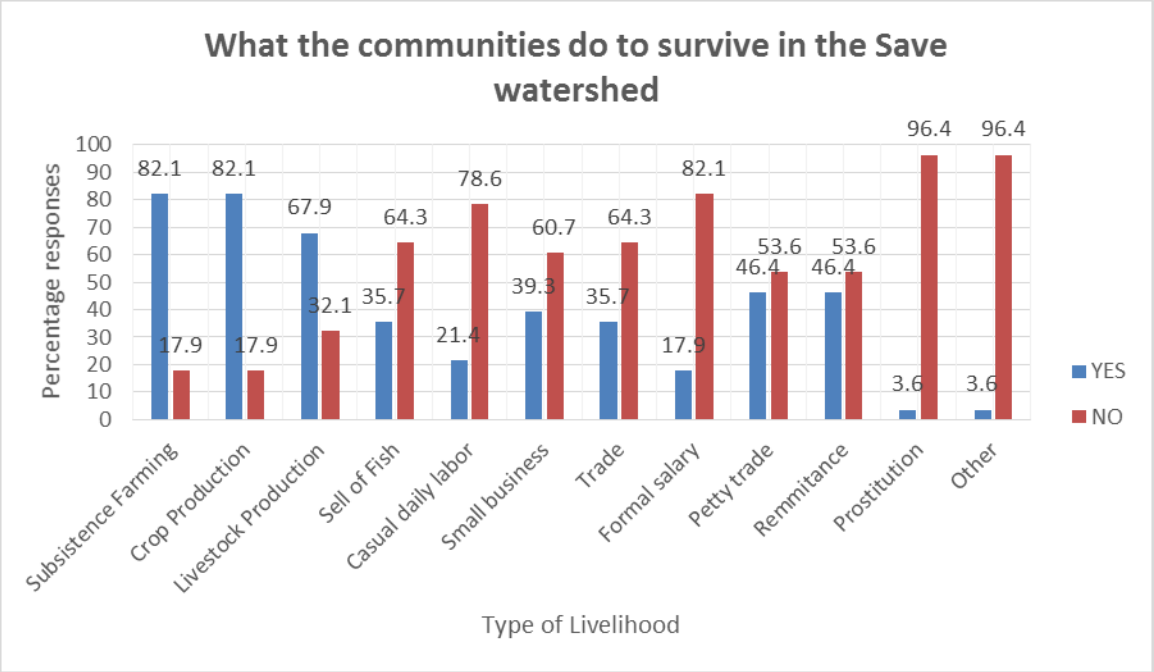


Figure 4.7: Proportion of respondents who engage in different livelihood activities to survive

In the figure 7 above it can be depicted that most of the livelihood activities are mainly subsistence for family consumption and nothing for sell. The survey also found an indication of crop production for cash mainly groundnuts, beans and cowpeas, which are sold both locally and in Harare. The main livestock enterprise is small ruminants, which are goats and sheep, and very few do raise cattle, but however the carrying capacity of watershed has been compromised by overgrazing and deforestation. This was highlighted in a face-to-face interview by a representative from livestock department.

4.3.1 Attaching value to the watershed as reasons for sustainable use and management.

In Chipinge communities mentioned that watershed provides myriad functions from economic, environment and social aspects namely plants, timber, animals, minerals, water and many intangible goods such as aesthetics and tourism. The study also found out that the communities attach their own value through land use and products that they get from utilising the watershed and once they realise these values it also motivates them to sustainably manage it.

The FGDs found out that the communities derive direct use values from actual uses which include non-timber forest products, fuel wood, fodder, fruit, and various medicinal and aromatic plants, recreational value, watershed protection, and micro climatic effects. These values were mentioned in all the three wards and it was clear that people are motivated to

manage or willing to work in the regeneration of the natural resource base in anticipation of maintaining a constant supply of benefits for survival.

Meanwhile, in watershed area under study direct use values of water arise from direct interaction with water resources which are divided into productive, consumptive (use of water for irrigation) and non-consumptive (recreational swimming, or the aesthetic value of enjoying a view) use especially in ward 4 the Tanganda area where the *Tinga mira* bottled water is found. Furthermore, the direct use values for groundwater is derived from the direct use of water for irrigation, and domestic use, commercial, and other purposes that is directly consumed by human to survive in this changing climate.

Picture 1: A farmer showing his vegetables in the irrigation scheme and beehives in the upper catchment.

The photos above are showing some of the values that the community attach to the watershed, for instance the households who have established their beehives in the watershed are willing to protect the environment for continued benefits to keep on accruing. There is also Chidzadza small scale irrigation schemes in ward 4 Biririano village and the communities have realised that for this scheme to continue to sustain their livelihoods they should also recognise the value that the watershed has to their lives. One of the farmers remarked that:

> *"This area was valueless three years ago and I had no reasons to protect or manage the ecosystem, but now that I am a plot holder in the scheme I can kill whoever will try to damage the catchment because this is our source of life. Long and gone are the days when we could not appreciate nature and give it its value"*

Picture 2: Women in Bangwe ward 1 showcasing baobab fruits from the forests.

The Save low-veld is rich with baobab fruits and most people thrive on the fruits for income and food to exorcise the spectre of poverty that is ravaging the area. The women in the picture above confirmed that the watershed has so much value to them because it gives them valuable products for food and income. The community has worked with the local council to enact by-laws on veld fires and deforestation to keep their trees intact. One woman said.

> *"We have not experienced any veld fires since year 2000, and that is the reason why we always get a bounty harvest from our forest. We need to conserve the environment so that we continue getting the fruits. Forests scratch our backs so we should conserve them."*

4.3.3 Non- use value of the watershed

The communities in the 3 wards also mentioned some non-use values which they realise from the watershed. These are not direct benefits but they have a ripple effect to the tangible benefits that they will get after conserving the ecosystem. The contour ridges, silt traps, fanya juus and trees have an indirect value to the community.

Picture 3 Infiltration pits and soil conservation techniques in the watershed (ward 3).

In figure 11 above the communities have engaged in soil conservation works because they foresee a future value in the watershed hence they are motivated to conserve the ecosystem for example the farmer in figure 10 above has recognized the benefits in infiltration pits and silt traps. This is however the good stewardship approach to watershed management where goods that we cannot quantify gives the community a sense of endowment hence giving them the motive to take ownership and safeguard the natural resources base. The infiltration pits help with underground water recharge, percolation, and enhanced infiltration of water. There is evidence of water conservation, reduced runoff in the fields and the crops have a sustained long period with enough moisture. This was confirmed by committee leaders in an FGD session that because the save Lowveld is one of the driest regions in Zimbabwe, the communities are encouraged to engage in water harvesting and conservation to enhance crop production in the watershed.

4.4 Discussion of findings

This study sought to (a) investigate the governance mechanisms in place for the sustainable watershed management as a measure to mitigate against natural shocks in Chipinge low-veld; (b) establish the level of community engagement in the management of the watersheds (c) establish the dependency of households on watershed resources for resilience.

Looking at first objective there are various structures in place to coordinate watershed management activities at ward and district level. The district stakeholders include the DA's office, Rural District Council, Forestry Commission, Environmental Management Agency, Agritex, Department of Mechanization and the Non-governmental organizations. The mentioned government departments work together to coordinate watershed management activities, as well as helping the communities to collectively work together. With the current economic crisis where the fiscal budget is so limited we have seen that most of the funding and resources are coming mainly from the NGO sector, which works closely with the responsible district stakeholders. This can be viewed as the political ecology which helps us to understand the way in which the agendas of different players in a community lead to different ideas which may lead or leverage to particular ends in a community (Agrawal and Gibson, 1999), however the ability of the Chipinge district to coordinate different players for a better output quality actually strengthens its transformative capacity. According to the Feed the Future Resilience framework, the communities need strong governance structures to improve their transformative capacity for them to be resilient.

Transformative capacity relates to the governance mechanisms, policies/regulations, infrastructure, and community networks, and formal social protection mechanisms that are part of the wider system in which communities are embedded (USAID, 2013). The capacity for collective action is evident in the processes of customary and formal institutions in five main areas relative to community resilience. The five main areas are disaster risk reduction, conflict mitigation, social protection, natural resource management (Frankenberger, 2012). The study also confirmed the presence of these five components in Chipinge and also how they are coordinated. There are several structures at community level which are responsible for disaster risk reduction, conflict resolution and natural resources management. The transformative capacity in Chipinge is being reached through, community assets which are man-made and natural. The communities also exhibit community social dimensions such as relationships, innovations, connections, conflict resolution mechanisms and areas of collective action in disaster risk reduction, conflict management, social protection, natural

resource management. This clearly highlights that the communities are following the resilience pathway that was mentioned by (Frankenberger, 2012), which states that communities are more resilient when they have strong institutional relationships for collective action.

At community level there are local structures which were set and endorsed by both the DA's office and the RDC to take charge of the natural resources and their sustainable use. The EMA also is mandated to train the environmental sub committees and monitors who are ward based to influence good behavior on environmental stewardship. The traditional leadership also has a stake in enacting and enforcing the community based by-laws as well as mobilizing the community members for collective action. It was also discovered that there are nearly 3 main committees at ward level which were selected by the community and formally endorsed by the district team to fully coordinate the watershed management activities. These are DRR, ESCs and watershed management committees who work closely with the traditional leaders for sustainable use of natural resources.

The study also discovered the contribution of these committees varies from ward to ward depending on the availability of resources as well as support from the district stakeholders. The contribution of district stakeholder is also not consistent and varies from ward to ward depending on the available NGO funding directed to that specific ward. The NGOs provide resources and transport to district stakeholders so that they can engage communities in the wards. There is a combination of community based initiatives undertaken to conserve the watershed, although there were reasons which were raised as hindrances to efficient implementation of the NRM policies and local by-laws. These challenges are corruption, politics, lack of resources and unskilled personnel to capacitate the communities on the proper designs of watershed management strategies. These results confirm what German, (2005), noted about institutions and stakeholders that they need on job training on how to manage people and coordinate grassroots for implementation of different initiatives. In the same process the role of youths should be clear and well emphasized so that the culture is passed from generation to generation. The study also confirmed the gaps that Tennyson, (2009) mentioned, as major issues that were identified in 1986 FAO study. The same issues have continued to emerge even up to present day as highlighted by this study and some of which have to do with institutional gaps, sector approaches, politics, and compartmentalization of activities which leads to lack of holistic approaches towards sustainable watershed management.

With regards to the second objective it is clear from the study that the communities are engaged although there are some people who feel that they are left out from the general mobilization for collective action. The majority of the community members expressed and confirmed that the undertaken initiatives are working effectively and well-coordinated at ward level by the DRR, ESCs and Watershed Management committees. A cocktail of activities was mentioned to be part of watershed management and the main ones are gully reclamation, tree planting, contour ridges, veld fire management and conservation farming which they undertake to sustain the watershed. The committees at ward level have managed to coordinate and mobilize the communities in the development of by-laws and submitted them to the district council for endorsement. The committees also worked with the stakeholders in the enforcement of local regulations especially those on deforestation and veld fires. There are community based patrols in the watershed which help to monitor any offenders. There are also stipulated fines for each offense in the watershed hence people respect this kind of arrangement.

Just like what (Shiferaw, 2009), alluded to in the recent participatory diagnosis of watershed-level natural resources management problems in highland areas of Ethiopia, in Chipinge the study identified five different types of problems that are most common and unique in all the wards. These include, problems associated with the management of common property resources which are water, grazing land, forest. Secondly problems associated with natural resources access and distribution. Third, there is the trans-boundary problems between neighbouring farms, Tanganda private owned estates and communal landscape areas. Fourthly, there is a declining productivity due to the absence of collective action and institutional coordination in parts of the watershed. These are livelihood problems that communities are trying to address through collective action than individual efforts. Each of these classes of problems requires collective action to be effectively addressed as shown in villages where people collectively worked together these problems were not highlighted.

As opposed to farm-level management, collective action is prerequisite to normalise rights and responsibilities to common property resources and public goods (Ostrom, 1990; Scott et al., 2001), to manage biophysical processes that do not respect farm boundaries, to negotiate joint investment and technological innovations for enhanced productivity, and regulate benefits capture. For these initiatives to be effective it was also highlighted by the study that

communities are linking all this to the benefits that they get from the watershed. People are unlikely to engage if they realise nothing from the watershed, but in the Save watershed people mentioned the fruits such as baobab, Mazhanje and other traditional fruits to be of paramount importance in the times of food shortages hence they are motivated to protect the watershed.

Looking at the third objectives the communities mentioned that they depend more on the natural resources in the watershed to cope with issues of food shortages and droughts especially in this changing climate. Most households engage on crop production, gardening, livestock rearing, petty trading, sell of fish and bee keeping to earn a living. There is a lot of dependency on the wild fruits and extraction of forest products for livelihood sustenance. This also confirms what Goldberg, (2007) mentioned that, the direct use values for the forest is derived from the use of fruit trees for food, and domestic use, commercial, and other purposes that is directly consumed by humans to satisfy their livelihood demands. The save low-veld is well known for and rich with baobab fruits and most people thrive on these fruits for income and food. The women in the low-veld confirmed that the watershed has so much value to them because it gives them valuable products for food and income. The community has worked with the local council to enact by-laws on veld fires and deforestation to keep their trees intact.

The communities have also engaged in soil conservation works because they foresee non-use value in the watershed hence they are motivated to conserve the ecosystem. For example some households have recognized the non-use values in the watershed and established infiltration pits, which is something a person is willing to maximize when they know the benefits that they can get in the future. This mostly considered as anthropocentric or human centred according to (Goldberg 2007). This is however the good stewardship approach to watershed management where goods that we cannot quantify gives the community a sense of endowment hence giving them the motive to take ownership and safeguard the natural resources base. The infiltration pits help with underground water recharge, percolation, and enhanced infiltration of water. The water conservation and reduced runoff in the fields help the crops to sustain long period with enough moisture. This clearly shows the community dependence on the watershed resources. According to the homeland security affairs framework for community resilience, resource diversity is a strong component for communities to survive any shocks. The Chipinge watershed has a vast pool of resources to sustain the livelihoods of people in the entire watershed in this changing climate and people

strongly value their natural resources. Resilience is a function of resource robustness and the community adaptive capacity (Longstaff, 2010), and from what the study found out, Chipinge is on a resilience pathway although there are a few challenges that need to be worked on for sustainable natural resources management.

4.5 Conclusion

Regarding the concept of watershed management and conservation it shows that Chipinge district has invested huge efforts and resources towards sustainable watershed management. The stakeholders are active and have managed to establish structures at grassroots level to enforce and coordinate watershed management related initiatives. It was however sad to note that despite the RDC custodianship of the natural resources it is heavily incapacitated to take the lead in the implementation of interventions to curb against environmental degradation. The communities however acknowledge the relevance of these stakeholders and their efforts to assist the execution of environmentally sensitive strategies. From the fieldwork it was also evident that there are a number of benefits that the communities drive from the watershed and this helps them to attach some kind of value to the watershed resources. The value that the communities give to the watershed determines the level of community participation and willingness to conserve the resource base Goldberg, (2004). Research findings also clearly show that watershed management has an effect on the coping strategies that the communities adopt in case of a disaster or drought. However, there are some impediments such as politics, logistical challenges, and lack of resources, tenure issues, corruption and compartmentalisation of activities at district level. All these challenges are hampering efforts on watershed management as well as the ability of the communities to cope with natural shocks. The following chapter will however give concluding remarks as well as recommendations based on the research findings.

CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

Building on the study findings, this section endeavors to summarize the institutional arrangements for watershed management in wards 1, 3 and 4 of Chipinge and assess how people are engaged as well as the role of the watershed to community resilience. The study findings are presented for each of the three main research objectives and compared with what other scholars found. The findings are also the fundamental pillars for the conclusions and recommendations of the research.

5.1 Summary of findings

Looking at first objective there are various structures in place to coordinate watershed management activities at ward level, starting with the district stakeholders which include the DA's office, Rural District Council, Forestry Commission, Environmental Management Agency, Agritex, Department of Mechanization and the Non-governmental organizations. The mentioned government departments work together to coordinate watershed management activities as well as helping the communities to collectively work together. With the current economic crisis, where the fiscal budget is so limited, the study discovered that most of the funding and resources are coming from the NGO sector, which work closely with the responsible district stakeholders. This however confirms what Jeong, 1997, highlighted that, if there is no mechanism to regulate the use of a particular resource such as water and the entire watershed resources, then environmental degradation will outweigh preservation of the resource base hence communities become less resilient. The Chipinge authorities has set up structures to regulate the use and management of watershed resources in a sustainable way.

At community level there are local structure, which were set and endorsed by the DA's office, together with the RDC, to take charge of the natural resources and their sustainable use. The EMA is also mandated to train the environmental sub committees and monitors who are ward based to influence good behavior on environmental stewardship. The traditional leadership also has a stake in enacting and enforcing the community based by-laws as well as mobilizing the community members for collective action. It was also discovered that there are nearly 3 main committees at ward level, which were selected by the community and formally endorsed by the district team to fully coordinate the watershed management activities. These

are DRR, ESCs and watershed management committees who work closely with the traditional leaders for sustainable use of natural resources.

The study also discovered the contribution of these committees varies from ward to ward depending on the availability of resources as well as support from the district stakeholders. The contribution of district stakeholder is also not consistent and varies from ward to ward depending on the available NGO funding directed to that specific ward. The NGOs provide resources and transport to district stakeholders so that they can engage communities in the wards. There is a combination of community-based initiatives undertaken to conserve the watershed, although there are reasons that were raised as hindrances to the efficient implementation of the NRM policies and local by-laws. These challenges are corruption, politics, lack of resources and unskilled personnel to capacitate the communities on the proper designs of watershed management strategies.

With regards to the second objective it is clear from the study that the communities are engaged although there are some people who feel that they are left out from the general mobilization for collective action. The majority of the community members expressed and confirmed that the undertaken initiatives are working effectively and well-coordinated at ward level by the DRR, ESCs and Watershed Management committees. A cocktail of activities have been mentioned to be part of watershed management and the main ones are gully reclamation, tree planting, contour ridges, veld fire management and conservation farming which they undertake to sustain the watershed. The committees at ward level have managed to coordinate and mobilize the communities in the development of by-laws and submitted them to the district council for endorsement. The committees also worked with the stakeholders in the enforcement of local regulations especially those on deforestation and veld fires. There are community based patrols in the watershed which help to monitor any offenders with stipulated fines for each offense in the watershed hence more people respect this kind of arrangement.

Just like what (Shiferaw, 2009), alluded to in the recent participatory diagnosis of watershed-level natural resources management problems in highland areas of Ethiopia, in Chipinge the study identified five different types of problems that are most common and unique in all the wards. These include, problems associated with the management of common property resources (water, grazing land, forest). Secondly problems associated with natural resources access and distribution. Third, is the trans-boundary problems between neighbouring farms

(Tanganda private owned estates) and communal landscape units, fourthly, there is a declining productivity due to the absence of collective action and institutional coordination. These are livelihood problems that are being addressed through collective than individual action. Each of these classes of problems requires collective action to be effectively addressed and in villages where people collectively worked together these problems were not highlighted.

As opposed to farm-level managing, collective action is prerequisite to normalise rights and responsibilities to common property resources and public goods (Ostrom, 1990; Scott et al., 2001), to manage biophysical processes that do not respect farm boundaries, to negotiate joint investment and technological innovations for enhanced productivity, and regulate benefits capture. For these initiatives to be effective it was also noticed that communities are linking all this to the benefits that they get from the watershed. People are unlikely to engage if they realise nothing from the watershed, but in the Save watershed people mentioned the fruits such as baobab, Mazhanje and other traditional fruits to be of paramount importance in the times of food shortages hence they are motivated to protect the watershed.

According to Longstaff, 2010, robustness of a resource in a watershed encompasses the resource redundancy, which is the availability of resources in a watershed, which helps communities to cope to different shocks. For example a degraded watershed does not have the capacity to allow the community to survive either a fast onset or slow onset shock. For a community to be resilient, a watershed should have abundance of resources that will allow them to bounce back to normal after a disturbance (Longstaff, 2010). Looking at the third objectives the communities in Chipinge mentioned that they depend more on the natural resources in the watershed to cope with issues of food shortages and droughts especially in this changing climate. Most households engage on crop production, gardening, livestock rearing, petty trading, sell of fish and bee keeping to earn a living. There is a lot of dependency on the wild fruits and extraction of forest products for livelihood sustenance. This also confirms what (Goldberg, 2007) mentioned that, the direct use values for the forest is derived from the use of fruit trees for food, and domestic use, commercial, and other purposes that is directly consumed by humans to satisfy their livelihood demands. The Save low-veld is well known for and rich with baobab fruits and most people thrive on these fruits for income and food. The women in the low-veld confirmed that the watershed has so much value to them because it gives them valuable products for food and income. The community

has worked with the local council to enact by-laws on veld fires and deforestation to keep their trees intact.

The communities have also engaged in soil conservation works because they foresee non-use value in the watershed hence they are motivated to conserve the ecosystem. For example some households have recognized the non-use values in the watershed and established infiltration pits, which is something a person is willing to maximize when they know the benefits that they can get in the future. This mostly considered as anthropocentric or human centred according to (Goldberg 2007). This is however the good stewardship approach to watershed management where goods that we cannot quantify gives the community a sense of endowment hence giving them the motive to take ownership and safeguard the natural resources base. The infiltration pits help with underground water recharge, percolation, and enhanced infiltration of water, water conservation, and reduced runoff and in the fields the crops will have a sustained long period with enough moisture. This clearly show the community dependence on the watershed

5.2 Conclusion

The study aimed to assess the institutional arrangements for watershed management in the save low-veld of Chipinge focusing on the governance mechanisms in place, the level of community engagement on watershed management and the level of community dependence on the watershed resources. The outcome to this that there are efforts in the district to establish structures for watershed management to strengthen horizontal and vertical linkages for sustainable watershed management. The district support also stimulates proper governance and management of local resources by community members also capacity building is so important for the leadership structures.

The level of engagement has proved to be high simply because there are responsible structures in place to take the lead and coordination. A cocktail of activities are being done in the watershed to keep the ecosystem balanced and productive. People at household level are confirming and giving testimonies on effectiveness of the collective action that they have. There are a number of by- laws formulated at community level which help them to regulate watershed resource use and conservation. People are willing to protect the environment from veld fires, deforestation and overgrazing because they attach high value to these resources.

There is high dependence on the watershed through gardening, crop production, livestock rearing and a cocktail of petty trading within the same locality. In times of shocks such as drought and food scarcity people utilize wild fruits, honey harvesting, selling fish and selling of firewood to obtain food. The study also unveiled the direct use, non- use and bequest values that the communities attach to the environment and having realized these values the communities are motivated to keep on protecting, managing and sustainably utilize the watershed resources.

However there are some challenges that hinders the implementation of NRM policies which include politics, lack of resources, corruption within and amongst stakeholders and lack of skilled personnel at community level. The district has to engage all the concerned stakeholders to improve the efficiency in policy implementation.

5.3 Recommendations

In order to enhance sustainable watershed management and for it to buffer the communities against shocks and contributing to poverty alleviation in the Save low-veld of Chipinge the following are recommended.

5.3.1 Capacity building

There is need for the development of adequate capacities among all stakeholders involved in watershed management in the district. Capacity building should be spearheaded by the RDC and the NGOs should complement these activities with resources and logistics. The community structures should be capacitated on governance and policy issues related to watershed management. There should be platforms for advocacy and lobbying for local structures to be fully financed by the ministries budget.

5.3.2 Benefit sharing and incentives

It is of paramount importance to equitably distribute the benefits of Non Timber Forest Products between local people in the district so that they are motivated to continuously conserve the watersheds. Rights to own manage and use forest resources should be recognised legally. The RDC should incentivise individuals who go out of their way to protect the environment. For example in some wards Honey production or Baobab fruits in the district should also benefit non-producers directly or indirectly through capacity building, development and financial planning. Non-producers should also be part of Fire and Natural

Resources Management Committees which consists of mainly direct beneficiaries at the moment. Furtherance to that, legal frameworks should recognise property rights of the local people so that they can mortgage their lands as well as using their forest in joint ventures with private companies for economic growth.

Understanding the incentives and motivations that influence parties, particularly their behaviours, actions they may take, and activities they may engage in is very important. Developing approaches and strategies without such understanding can lead to setbacks, delays, and dead ends. In the case of Chipinge, incentives for effective watershed management are rooted in enforcement, district personal benefits, resource benefits, and community ownership of the problems and process to address the issues. To address this issue of appropriate incentives, the watershed management program might as well issue prizes to those who implement best practises and used as positive deviance figures in the community.

5.3.3 Governance, law and policy

According to Ostrom (2004) the success in the management of common pool resources is hinged on the well and clearly defined rules, ability to monitor behaviour and punish violators and mechanisms for conflict resolutions and an arena for negotiation. An ultimate prerequisite to foster success and sustainability of a watershed management regime is therefore made possible by ensuring stakeholder participation in policy and law development especially enacting and endorsement of the local by- laws. Better synchronisation of different policies and legislation, statutory requirements and acts concerning utilization of local natural resources should be warranted in the district. There should also be clear roles and responsibilities of various actors which include RDC, traditional leadership, EMA, the DA's office as well as Ministry of Agriculture. Also recognition and support for DRR, ESCs and watershed management committees is of paramount importance.

5.3.4 Incorporating accountability measures

Operative collaborative effort on watershed management will be strengthened by clear measures for stimulating accountable involvement. This does not address only accountability for the work being done and initiatives used but the involvement of various parties as well as their constituents. Identifying key parties and the individuals that legitimately represent them significantly influences efficacy of collaborative management. Additionally, accountability is

enhanced when goals are clear and accepted and the roles and responsibilities of involved parties in achieving these goals have been identified. To address accountability, the watershed management program could ground accountability measures in law and coordinating structures.

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Annexes

Annex 1

HOUSEHOLD QUESTIONNAIRE

District Name	
Name of Ward	
Name of Village	
Name of Interviewer	
Name of Respondent	
Date of data collection :	
Instructions Introduce the survey and its purpose, summarizing the major issues that you would like to talk with the household head or the spouse.	

A. HOUSEHOLD DEMOGRAPHIC PROFILE

1. Can you please briefly tell me about your household?
Household head profile

a. What is your relationship to the household head? 1=Self; 2=Spouse; 3=Mother; 4=Father; 5=Daughter; 6=Son; 7=niece; 8=nephew; 9=Other(Specify)	
b. Name of head	
c. Sex of Household Head: 1=Male; 2=Female	
d. Age of Household Head : 1= (<18 years); 2= (18-45years); 3= (46-59 years); 4= (60 years +)	
e. Marital Status of Household Head: 1= Married; 2= Unmarried; 3= Divorced; 4= Widowed	
f. Employment status of Household Head: 1= Not employed=1; Formally employed=2; Self Employed=3	
g. Position in community of Household Head: committee member=1; Ordinary member=2 Traditional Leader=3	

2. Profile of Household Members

Total number of adults (incl head)	Male	Female
a. Total number of children (Below 18 years)		
b. Number of people chronically sick		
c. Number of people with some disability		
d. Total number of people economically active (incl head)		

3a. Are there any household member aged 5-17 years who are not going to school? 1=Yes 0=No			
3b. If any children are not attending school, what are the reasons? *(multiple responses)*			
Reasons: 1 = illness 2 = work for food or money 3 = help with household work 4 = care for ill household member 5 = care for younger sibling 6 = not interested in school 7= distance to school far 8 = hunger 9 = expensive	10= child considered too young 11= pregnancy/marriage 12 = expelled from school 13 = failure e.g. of exams	14 = completed O/A Level 15 = no birth certificate 16 = no money 17= disability 18 = other 99 = Na	
4. What are the main ways your household traditionally tries to earn income /meet basic needs with? 1 = Subsistence Farming 2=Crop production/sales 3= Livestock production/sales 4=Sale of fish 5=Casual daily labour 6= Small business 7=Trade (contractor, builder, tailor, bee keeper, artisan, shoe maker, etc) 8= Formal salary/wages 9=Petty trade (importing/selling goods, making/selling ice, etc.) 10= Remittances 11=Begging 12=Theft 13=Prostitution 14=Other, specify			
5. What are the benefits that your community is getting from the local environment? 1= Bee keeping 2= Fruits 3= Firewood 4= Poles 5= Hunting 6= Fishing 7= Other Specify			

B.PARTICIPATION IN COMMUNITY BASED WATERSHED MANAGEMENT INITIATIVES

1. Do you participate in any community based initiatives on the management of the Watershed? **1= Yes** **2= No**

2a. What are some of the community based initiatives that you undertake to manage the watershed? **1= Gully reclamation** **2= Tree planting** **3= Controlling of veld fires** **4= Construction of water harvesting structures i.e. weir dams,** **5= Conservation farming** **6= Contour ridges**	
2b. Are these initiatives working? **1= yes** **2= No**	
3a. What are the governance structure that have been put in place to manage these community based initiatives? **1= DRR** **2= WMC** **3= ESC** **4= Local Leadership** **5= Neighbourhood watch/ ZRP** *(Select all that apply)*	
3b. Do you hold any position in any of these structures? **1= Yes** **2= No**	
If yes, Please indicate the position you hold **……** **……** **……** **……** **……**	

4. **Do you think that you get enough support from the Chipinge District Stakeholders? (Circle a response for each stakeholder)**

Stakeholder	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
NGO	**1**	**2**	**3**	**4**	**5**
DA	**1**	**2**	**3**	**4**	**5**
Agritex	**1**	**2**	**3**	**4**	**5**
Mechanisation	**1**	**2**	**3**	**4**	**5**
EMA	**1**	**2**	**3**	**4**	**5**

RDC	**1**	**2**	**3**	**4**	**5**
Forestry Commission	**1**	**2**	**3**	**4**	**5**
LPD	**1**	**2**	**3**	**4**	**5**
Parks and Wildlife Management	**1**	**2**	**3**	**4**	**5**

C. HOUSEHOLD WELLBEING

2 Was the last harvest of cereal enough to meet 12 months of food needs? **1=Yes** **2=No**	
3 Beyond staple foods, where can additional food be purchased if the nutritional situation in the community deteriorates? **……** **……** **……** **……**	
4a. Do you feel that your household has enough food to last you for the next 12 months? **1= Yes** **2= No**	

4b. Coping with food shortages

If you faced any food shortage in the past 12 months, what coping strategies did you use? (Tick appropriate)

Row	Coping mechanism	(a) Did it happen Yes=1 No=0	(b) If you used strategy, how often did you use it in the last 12 months?		

1	Bee keeping				
2	Firewood				
3	Fishing				
4	Selling poles				
5	Vegetable production in gardens.				
6	Wild fruits				
7	Handicraft				
8	Mortgaged/sold assets				
9	Borrowed from neighbors				
10	Went for food for work programs				

How often: **1=Very few times (seldom) 2=Occasionally, 3=Regularly 4=All the time**

4b. Are there other organizations that have assisted you to meet your household food security requirements in the last season?

1= Yes

2= No

5 If Yes, please list the source and the type of assistance.

Name of organisation 1=NGO, 2=Government, 3=Churches 4=Politicians, 5=Zunde RaMambo	**Type of assistance** 1=Non-food Item, 2=Cash, 3=Kind, 4=Capacity Building, 5=Access to Safe drinking Water, 6= Productive Asset Creation
1.	
2.	
3.	

(if 'no', skip to next section)	
If yes, what were they? **1=Drought** **4=Lose of livestock** **5=Theft of assets** **7=Crop diseases** **9=Floods and hailstorm** **10=Rapid price increases** **12=Veld fires** **13=Social disruptions** **14= Migration** **15=Other (Specify)** **99=N/A** *(Select all that apply)*	

G How often does your household experience these hazards occurring in your community? Complete the table below.

Type of hazard	Frequency of occurrence (a)	Impact Scale (b)
Drought		
Floods		
Cattle disease outbreaks		
Veldt fires		
Crop diseases		

a) 1) once in every 5 years 2) once in every 3 years 3) once a year 4) twice a year
b) 1) Low 2) Medium 3) High 4) Very High

D. WATERSHED MANAGEMENT STATUS

4 Which farming systems and techniques (methods) do you normally use? ***Tick where applicable***

Mixed Farming	
Intercropping	
Crop Rotation	
Mono Cropping	
Agro-Forestry	
Conventional ploughing	
Terraces	
Zero Tillage	

7b. Do you have any stipulated by-laws in the management of natural resources in the watershed? **1=Yes** **2=No**	

If the answer to either of the above questions is yes, please describe each bylaw affecting land management in the table below.

(a) By-law/provision	(b) Year established	© Who enacted*	Code	(d) Community awareness**	Code	(e) Community compliance***	Code
Stream bank cultivation							
Veld fires							
Deforestation							
Use of slays							
Brick Molding							
Over grazing							

*** Codes: 1=village council 2=RDC, 3=DA's Office, 4= Government Line Ministries,**

**** Codes: 1= no one aware of bylaw, 2=minority of people aware, 3=majority aware, 4=everyone aware**

***** Codes: 1=no one complies, 2=minority complies, 3=majority complies, 4=everyone complies**

3. **Is there any action that you think can be taken to enhance sustainable watershed management?**

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End of Questionnaire

Annex 2

Watershed Management

Community Focus Group Summary Sheet

District	**Ward**	**Village**
Interviewers	**Supervisor sign**	**Date**

*GUIDE**: Ask the local leaders to help you invite local people who are knowledgeable and can talk about their community or ward. These may include mere community members, local club leaders, local religious leaders, local teachers, headmen, councilors, Agriculture extension staff, village health workers, environmental health technicians and opinion leaders. Also consider sex balance of respondents. Ten – fifteen people would be ideal for this group interview.***

1. Please **introduce** yourself and explain that you are a student from UZ who is doing a research (Please explain the objectives of the study).
2. Ensure you are having an interview with the whole group and not individuals in a group. All the responses you eventually record should reflect group consensus and not the views of one or two dominant members in the interview.
3. **Write down the responses clearly and completely.** Ask for any clarifications before proceeding

Number of Participants……males/females

1.1 What are the main structures for Watershed management and natural resources management in this area? Please give them a score in terms of importance.

Structures (USE CODES BELOW)	**Score of Importance (1= Very Much Important, 2= Somewhat Important, 3= undecided, 4= Not Really Important, 5= Not at All)**
DRR	
ESC	
Watershed management committees.	
Traditional leadership.	
Police	

1.2 What are the main district stakeholders which supports you in the management of Watershed and local natural resources? Please give them a score in terms of importance.

Stakeholders(USE CODES BELOW)	**Score of Importance (1= Very Much Important, 2= Somewhat Important, 3= undecided, 4= Not Really Important, 5= Not at All)**
DA	
Mechanisation	

RDC	
Forestry Commission	
Social Services	
EMA	

1.3 What are the regulations in place concerning watershed management in your area?

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1.4 What are the community based strategies that are in place to sustain the watershed?

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1.5 How do you make sure that people are mobilised for collective action and how engaged are they?

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1.6 What are the FOUR main livelihoods sources for the majority of households within this community/ward (Watershed)? Please rank them in terms of importance.
(1=most important)

Livelihoods Strategies(USE CODES BELOW)	**Rank of Importance(1= most important and 4 = least important)**

1. Food crop production 2. Vegetable production 3. Wild fruits 4. Cash crop production 5. Bee keeping	6. Fishing 7. Livestock production 8. Handcraft 9. Firewood 10. Artisan 11. Alluvial mining 12. Gathering natural products for sale

1.7 Which period does most of your community members struggle to access food and income?

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……

1.8 What are the potential challenges which might affect household's livelihoods (***access to food and income)*** from during that period from _____ to _____ Rank these issues (1= the **potential challenge** which is likely to have the most profound impact on households within the community).		
1.	2.	3.

1.9 Can you rank on a scale 1-10 in terms of the most common type of livestock sustained in this watershed?

Livestock in the watershed	*Rank (1 being the largely owned)*
Cattle	
Goats	
Sheep	
Pigs	
Turkey	
Chicken	
Guinea Fowl	
Duck	

2. Can you list and rank **four major** community challenges and four community development priorities you think can significantly improve the livelihoods of people in your community? **Ensure the proposed development priorities are possible and viable for the community.**

Community challenges	**Development priorities**
Priority Ranking (1=most important)	

Comments

Annex 3

Checklist for Chipinge government stakeholders key informant interviews

Watershed management:

1. What is your role in the management and conservation of the Save watershed in Wards 1, 3 and 4.	
2. Do we have a policy on Watershed management? Or any guiding strategy in place for the district?	
3. Which community structures are responsible for watershed management?	
4. What other stakeholder do you work with to sustainably manage the watershed?	
5. What are the regulations that you put in place for communities to manage the watershed?	
6. How do you capacitate people on watershed management issues?	

7. What are the community based initiatives that are being undertaken to sustainably manage the watershed.	
8. How effective are these initiatives?	
9. Is the community fully engaged in the management of the watershed?	
10. What benefits do communities derive from the watershed?	
11. Are there any remarkable changes that have happened in the watershed over the past five years? If yes what are they?	
12. What are challenges that you face in managing the watershed?	
13. Any comments with regards to Watershed management?	