

**Traditional and Western Knowledge Integration in Water
Governance and its Implications for Rural Livelihoods in Esigodini,
Zimbabwe**

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The University of Canterbury
Christchurch, New Zealand

Xolile Ncube

The College of Science
Waterways Centre for Freshwater Management

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Abstract

Globally, the quality and quantity of water resources continue to decline, and there has been a realisation that water governance systems based solely on Western science, are not providing adequate solutions to the world's water challenges. This has seen an increased interest in the integration of traditional and Western-based knowledge systems for efficient water management from the 1980s. Proponents of the notion, however, argue that although Western science and traditional knowledge are different, they can complement each other and improve the manner in which the world's water resources are managed. In Zimbabwe, 70% of the population resides in rural areas, and 50% of the total population lives on communal lands, and utilises traditional knowledge on a daily basis to manage water. A plural legal system exists in the country, however, water statutory instruments do not recognise Indigenous knowledge systems. There are no provisions in water legislation and policy for improved access to water for the expansion of subsistence agriculture, which is mainly practised on communal lands.

This qualitative study draws on fieldwork in Esigodini, Zimbabwe, to explore the different traditional water management practices of the Ndebele group. It identifies the opportunities and challenges of establishing a system that integrates traditional and Western-based water management, and considers how such a system can impact rural livelihoods. The research finds that small-scale agriculture is the main livelihood practised in Esigodini Village, and the villagers have, over time, developed traditional water management systems to support this livelihood. The local knowledge systems have, however, evolved over the years to address current water challenges including climate variability, and increased water demand. The study concludes that traditional water management systems practised in Esigodini, encourage the sustainable use of water. A water governance system that integrates traditional and Western-based knowledge can support improved and diversified rural livelihoods and reduce donor dependency in the village. Challenges such as local communities losing faith in government-initiated collaborative processes, have impelled the study to recommend that a third space be established. This space will allow for cross learning and formulation of information that contributes to decision making, legislation, and policy. A monitoring framework that is based on traditional and Western ways of knowing will need to be developed to monitor the outcomes of the implementation of the integrated system. All stakeholders need to participate with respect for each way of knowing and in good faith, in order for the collaborative process to have positive outcomes for rural livelihoods in Esigodini Village.

Keywords: Water Governance, Traditional Knowledge, Rural Livelihoods

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Acronyms

DDF	District Development Fund
EMA	Environmental Management Agency
IWRM	Integrated Water Resource Management
RDC	Rural District Council
ZIMSAT	Zimbabwe National Statistics Agency
ZINWA	Zimbabwe National Water Authority

Working Definitions of Terms

Integrated water resource management

“The process which promotes the coordinated development and management of water, land and related resources, in order to maximise the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.” Global Water Partnership (2000)¹

Traditional Knowledge

“Traditional knowledge refers to the knowledge, innovations and practices of Indigenous and local communities around the world. Developed from experience gained over the centuries and adapted to the local culture and environment, traditional knowledge is transmitted orally from generation to generation. It tends to be collectively owned and takes the form of stories, songs, folklore, proverbs, cultural values, beliefs, rituals, community laws, local language, and agricultural practices, including the development of plant species and animal breeds. Sometimes it is referred to as an oral tradition for it is practiced, sung, danced, painted, carved, chanted, and performed down through millennia. Traditional knowledge is mainly of a practical nature, particularly in such fields as agriculture, fisheries, health, horticulture, forestry and environmental management in general.” Convention on Biological Diversity (1992)²

Rural Livelihoods

“A rural livelihood is defined as the capabilities, assets and activities that rural people require for a means of living. It is considered sustainable when it can cope with and recover from stresses and shocks, and maintain or enhance its capabilities and assets both now and in the future while not undermining the natural resource base.” Food and Agriculture Organisation (2003)³

Water Governance

“Water governance is about the set of formal and informal rules, norms, practices, institutions and actors that exist and operate in an interactive manner to ensure conservation, sustainable use, and fair and equitable access to or allocation of water resources for all life and human activities. These rules, norms, practices, institutions and actors cut across a broad range of areas including the ecological, social and cultural, political, and economic dimensions of water resources.” Kambu (2010: 254)

¹ Retrieved From <https://www.gwp.org/en/GWP-CEE/about/why/what-is-iwrm/>

² Retrieved From <https://www.cbd.int/traditional/intro.shtml>

³ Retrieved From <http://www.fao.org/3/Y8349e/Y8349e.htm>

Chapter One

Introduction: Integrating Traditional and Western-Based Knowledge in Water Governance

1.1 Introductory Statement

Across the globe, Indigenous people, especially in marginalised communities, continue to rely heavily on traditional knowledge to make decisions about how water resources are managed. These traditional water governance systems have been in existence for hundreds of years, and are a valued part of the lives of Indigenous groups. However, in most countries, these ways are not acknowledged in water legislation. This study will therefore explore the potential of integrating traditional and Western-based knowledge into water governance and how this will impact rural livelihoods in Esigodini, a rural community in Zimbabwe.

According to the Asian Development Bank (2003), most of the water problems faced globally today can be attributed to poor governance. De Loë and Patterson (2017) have identified limited involvement of citizens, corruption, and lack of political will as some of the factors that have led to ineffective water governance. Despite most countries having established Western-based water governance frameworks that are meant to ensure equitable distribution, sustainability, and conservation of water, access to the resource in a quality and quantity that sustains life continues to evade many across the globe (Anwar, 2011). Traditional and Western-based management systems have developed independently, however, they exist in parallel, and they usually strive towards the same outcomes (Strauch and Almedom, 2011). Although the 1980s saw an increased interest in Indigenous ways of knowing (Berkes, 1999), in some scientific circles these are still considered as inferior and are rarely included in formal decision-making processes (Kambu, 2010; Anwar, 2011). In many instances where Indigenous knowledge systems are part of decision making, they are often assigned a supportive role, with Western or scientific ways of knowing being the dominant discourses (Chikozho and Latham, 2005). Contrary to widely held belief, traditional knowledge is not static. It evolves through contact with other ways of knowing and adapts in its quest to solve current environmental problems (David, 2006; Anwar, 2011). This has allowed Indigenous ways of knowing to remain relevant for Indigenous groups over centuries and to withstand, in many cases, the influence of colonisation, globalisation, westernisation and modernisation (Mawere, 2011).

In Africa, local communities have their own ways of managing water that pre-date the colonial era, but their potential effectiveness and efficiency has been overridden and overshadowed by Western water governance systems. Current water governance regimes, which are largely informed by foreign paradigms, have come under the spotlight worldwide for not delivering

anticipated outcomes, especially in rural communities where livelihoods are primarily dependant on consistent water availability and access (Mehta et al., 2014). Strauch and Almedom (2011) state that traditional knowledge systems become vulnerable when top-down policies are forced onto communities. Those who oppose the imposition of foreign paradigms, argue that Africa has its own development path, which does not need to replicate that of the 'developed' world (Mapedza et al.,2016:2). Considering the current global water and governance crisis, it is imperative that innovative methods, such as integrating traditional and Western-based knowledge into water governance, are explored. The United Nations, in 2008, supported this notion and highlighted that for Africa to overcome its challenges of providing access to clean water, the continent will need to first understand the impact different management institutions have on water quality (Mapara., 2009).

It has been reiterated that both traditional and Western water management systems have strengths and weaknesses, and this has prompted several researchers and scholars (Derman, Hellum and Sithole, 2005; Kafudzaruwa & Sowman, 2009; Kambu, 2010; McGregor, 2014; Von der Porten et al., 2016) to recommend water governance regimes that incorporate traditional and Western-based water management systems for improved water governance. Indigenous groups have also collectively supported such assertions through the Indigenous Peoples Kyoto Water Declaration of 2003, where they stated that:

“Indigenous Peoples’ interests on water and customary uses must be recognised by governments, ensuring that Indigenous rights are enshrined in national legislation and policy.”

Kambu (2010) identifies some of the challenges of water management in developing countries, highlighting lack of resources, including technical, administrative, human and financial. Kambu (2010) suggests that developing synergies between traditional and Western water management systems can provide an environment that enables the mobilisation of scarce resources that can be found in Indigenous and Western-based water governance regimes.

1.2 Background

1.2.1 Water Governance through Different Eras

It is near impossible to discuss traditional knowledge and the state of current water governance systems without reference to the influence of the colonial era on both systems. This section will begin by giving a general overview of this influence and conclude by narrowing it down to the Zimbabwean context. Prior to colonisation, in some countries, Indigenous people lived on their traditional lands in harmony with their environment and also had structures to govern the use of natural resources (Braun, 2014). In Africa, no one could lay claim to natural resources and they were considered as common property (Mapara, 2009).

According to Mapara (2009) Indigenous people lived off the land mainly through small-scale agriculture, hunting of wild animals, and gathering of fruit and herbs, leaving very little negative impact on the environment. In the eyes of the colonisers, these ways were primitive and the local groups “feared natural resources” and had no capacity to profit from them. Locke’s theory (as cited by Braun, 2014), has been identified as one of the main pieces of writing that justified appropriation of Indigenous people’s land and natural resources. According to Locke, man has a mandate to productively utilise natural resources and by virtue of fully using these resources, he⁴ can thus claim ownership. The author purported God gave people the divine mandate to subdue and conquer the earth for the benefit of mankind (Braun, 2014). Equipped with such utterances and beliefs, the colonisers believed that due to the scale of traditional agriculture and the minimal use of related resources, Indigenous groups had no claim over water, minerals, flora or fauna on their native land.

The act of colonisation went further than the invasion of the land and appropriation of natural resources. It was also a dominance over the cultural heritage of Indigenous groups who were robbed of their freedom of cultural expression (Smith, 2012). According to Braun (2014), after years of being subjected to colonial rule that declared these ways of knowing as superior, and those of local groups as inferior, Indigenous people also started to believe this school of thought. Although many traditional knowledge systems survived through this period, former colonies still struggle to reaffirm, reclaim, and reconstruct their traditional ways, and this can be witnessed in the manner in which their governments manage natural resources such as water (Miller and Dittoh, 2004; Mapara, 2009). The section that follows will document water governance in Zimbabwe through the pre-colonial and colonial eras, and how it has evolved into the post-colonial water management system that is in place today.

1.2.2 Water Management in Zimbabwe – Past and Present

Zimbabwe is an agriculture based, landlocked country in Southern Africa with a total land area of 390,760 square kilometres. The country is prone to El Niño-induced droughts, with erratic rainfall constraining crop cultivation across 60% of the nation (Food and Agriculture Organisation, 2009). Eighty percent (80%) of the Zimbabwean population is concentrated where rainfall is unreliable, and agriculture accounts for 79% of the total water use in the country (United Nations International Children’s Emergency Fund, 2017). The last census in Zimbabwe was conducted in 2012, and currently the population is estimated at 16.91 million (Zimbabwe National Statistics Agency, 2018). The ZIMSTAT (2012) report states that 77% of Zimbabwe’s population resides in rural areas, with about 50% of the population on communal lands. According to the most recent (2012) census, the country showed a divergence from the

⁴ This was an era where even in the Western world women could not own land and related resources.

norm with some of its population migrating from urban centres to rural areas. It is in these communal areas, where Indigenous groups reside⁵, that traditional water management systems have stood the test of time and are still being implemented. Zimbabwe is a signatory of the United Nations Declaration on the Rights of Indigenous People (2007), which recognises the right to maintain Indigenous knowledge and practice, and section 33 of the Constitution of Zimbabwe (2013), (Preservation of traditional knowledge) states that:

“the state must take measures to preserve, protect and promote Indigenous knowledge systems ... possessed by local communities and people.”

However, current water legislation in the country, including the Zimbabwe Water Act (1998), the Zimbabwe National Water Authority (ZINWA) Act (1998), and the Water Policy (2013), make no provisions for traditional water management systems or leadership structures under this system.

Pre-Colonial and Colonial Eras

Pre-1888, Indigenous people in Zimbabwe were under self-rule where Kings were the highest governance office in the land. Natural resources including water were common property and were shared with very little conflict as the resources were considered abundant due to the small population (Manzungu and Machiridza, 2005). These authors argue that although, there was this general belief that these resources were infinite, there was a respect for the environment and its services. This underpinned the responsible use of resources, and they mainly remained in a healthy state during this self-rule period.

The country was a British colony between the years 1888 and 1980, and during this time the Indigenous people had similar experiences to those in other countries that were colonised. These include having names of water resources changed to Western ones, and their ancestral land renamed Rhodesia (Mapedza, 2009). According to Mapedza (2009), Indigenous groups were forcibly removed from fertile arable lands to reserves that had poor soils for agriculture, and these are known today as communal lands. Manzungu and Machiridza (2005) state that laws were developed, including water statutory instruments based on Western knowledge, and these were in written form and foreign to Indigenous groups, who could not read or write. Mapara (2009) indicates that export agriculture began in 1907, and by 1927 there was a need for water legislation to govern the increased need for agricultural water. This, according to Mapara (2009), came in the form of the Water Act of Rhodesia, which was promulgated in 1927 and amended in 1947 and 1976. Both the original and revised Water Acts advantaged

⁵ The first Constitution of Zimbabwe was promulgated in 1980 and was repealed by the current constitution in 2013. The Constitution, in Part 2 (s77) states that all persons have a right to safe, clean and portable water and the government has the duty to ensure the realisation of this right to water.

non-Indigenous commercial farmers who had water rights. According to Derman and Hellum (2005) water rights were issued in perpetuity to those who owned land. Reserves where native groups resided were under the traditional tenure system and the Indigenous people had user-rights to land and could only apply for water rights as a group. However, due to language barriers and illiteracy, by the time they understood this, reliable water resources had already been allocated to the settlers (Derman and Hellum, 2005). Indigenous people on reserves could therefore only practice small-scale rain-fed agriculture for their subsistence. Although reserves are now known as communal areas, the legacies of commercial farmers in rural Zimbabwe, with privately owned land gaining better access to water resources still continues.

Post-Colonial Era

Independence was gained in 1980 (Mapara, 2009), and it could be expected that the next logical step for a government led by Indigenous Zimbabweans was to take advantage of their experience of traditional and agricultural knowledge. However, post-independence, water resources continued to be managed using the same Water Act that disadvantaged the Indigenous people of the nation for another 18 years (Manzungu and Machiridza, 2005). Zimbabwe underwent a water reform process in 1995, and the Zimbabwe Water Act was promulgated in 1998. Despite wide consultation with different stakeholders, including Indigenous groups and communal farmers, this, the main water statutory instrument governing water resources in the country, remained silent about traditional knowledge systems (Manzungu and Derman, 2016).

According to Derman and Hellum (2005), the new water legislation replaced water rights with water permits (for use of water from rivers) and water agreements (for use of water from dams). The water permits and agreements are issued for fixed terms, and therefore need to be renewed periodically. Commercial farmers, industries, and mining companies, however, continue to be the main beneficiaries of this system, as they have the funds to pay for the application process, water infrastructure, and the use of large volumes of water (Derman and Hellum, 2005). The smallholder farmer is classified under the category of “primary water user” and according to the Water Act of 1998, this includes water for domestic purposes, brick moulding, and watering livestock. The ZINWA Act of 1998 made provisions for the allocation of 10% of water in government dams to smallholder farmers, however, there were no provisions for investment in irrigation infrastructure, and this water continues to be underutilised. Manzungu and Machiridza (2005) argue that changes in policy do not directly translate to improved access to water resources, but other factors, such as, access to irrigation technology and affordable financing have to be taken into consideration as well.

The new Water Act of 1998 provided for the decentralisation of water management duties, assigning different roles and responsibilities for water management to different government line ministries and parastatals. Mapedza et al. (2016) outline the responsibilities of various agencies for different aspects of water management. In rural areas, the overall management of water is the responsibility of Rural District Councils (RDCs), which are also responsible for the management and maintenance of traditional water sources including rivers and streams. Water quality monitoring and the execution of the “polluter pays” principle falls to the Environmental Management Agency (EMA). The Environmental Health Department carries out water quality testing for analysis of potential disease-causing agents in water. Borehole drilling, development, and maintenance is the duty of the District Development Fund (DDF) (Mapedza et al., 2016:5-7). According to Manzungu and Derman (2016), with the existence of legal pluralism, traditional leaders and villagers in most of Zimbabwe’s villages carry out most of the water related duties that are currently being implemented by the government. There is therefore a duplication of duties within and outside government departments and parastatals.

The Water Act (1998) also made provisions for the division of the country into seven catchments (ZINWA, 2008), as illustrated in figure 1.1 below. The Water Act provided the legislative framework for the production of the ZINWA Act of 1998, which allowed for the formation of ZINWA, a parastatal which is responsible for the overall management of the seven catchments, revenue collection, and the development of dams and related infrastructure.

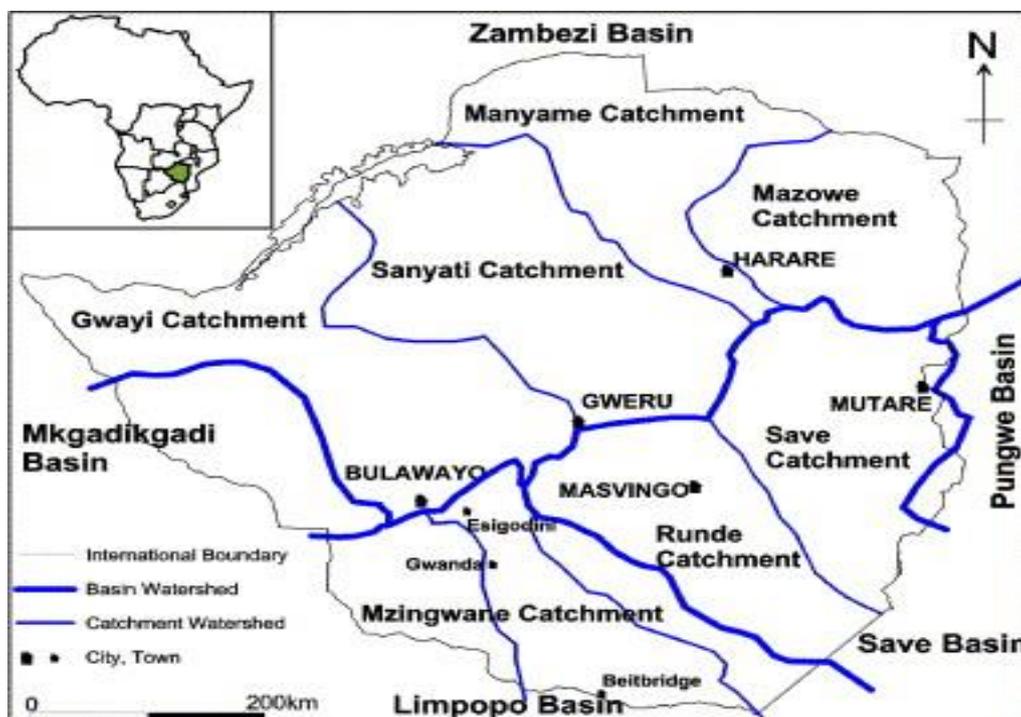


Figure 1.1: Map of Zimbabwe’s seven catchments with an insert of the location of Zimbabwe in southern Africa
Source: ZINWA (2010)

Catchment councils are also provided for under the ZINWA Act under direct supervision of ZINWA, and are responsible for handling water permit and agreement applications (Mapedza et al., 2016). Guided by principles of decentralised integrated water resource management (IWRM), sub-catchment councils were created to allow for participation of stakeholders, including communal farmers, at the lowest possible administrative level. Since their establishment, they have not yielded the desired results of broad and equal participation, as commercial farmers mainly dominate, and issues discussed are centred around revenue collection, which is largely irrelevant to small-scale farmers (Mapedza et al., 2016). According to Mapedza et al. (2016), lack of funding has rendered most sub-catchment councils defunct, and therefore communal farmers currently do not have a platform to contribute towards decisions in the water sector. Current water statutory instruments in Zimbabwe clearly have very little consideration for traditional knowledge and the water concerns of the smallholder farmer who depends on this knowledge on a daily basis. Mapedza et al. (2016:9) assert that water reform in Zimbabwe has had a negative impact on communal farmers in the country, who continue to experience challenges in accessing water to sustain and expand livelihoods.

1.3 Thesis Rationale

This research explores opportunities for the integration of traditional and Western knowledge in water governance. Although similar research has been carried out in this field, very few of these studies have focused on Indigenous, non-scientific actors and their perceptions of their traditional knowledge systems (Taylor and de Loë, 2012). Information on the integration of African traditional knowledge and Western science is also limited, particularly in relation to the knowledge of the Ndebele group of Zimbabwe. Compared to similar studies across the globe, the research aims to go a step further and investigate how inclusion of traditional knowledge in the current Western-based water governance regime could impact rural livelihoods for different groups in the rural village of Esigodini.

1.4 Research Aim, Objectives and Questions

1.4.1 Research Aim

The overarching aim of the research is: To understand the role of traditional knowledge systems around water use, and the implications of integration of Indigenous and Western-based knowledge for water management in Esigodini, Zimbabwe.

In addressing the research aim, the following research objectives are specified for the case of Esigodini:

- i) To identify traditional knowledge systems around water management
- ii) To assess the contribution of traditional knowledge to water sustainability

- iii) To identify opportunities and challenges for integration of traditional and Western-based knowledge into water governance
- iv) To establish how changes in water governance will affect rural livelihoods

1.4.2 Research Question

Can traditional and Western-based water management systems be integrated in water governance for effective water management and how will this affect rural livelihoods in Esigodini?

The study sought to answer the following specific research questions:

- i) In what ways are livelihoods in Esigodini dependent on water and what are the traditional water management practices that underpin this?
- ii) How are water management systems based on local knowledge contributing to the sustainability of water resources?
- iii) How do traditional knowledge systems impact access to water for different groups in the community (e.g. women and men)?
- iv) How would incorporation of traditional and Western knowledge into water governance impact rural livelihoods?

1.5 Thesis Overview and Structure

This thesis comprises eight chapters. This section gives a brief summary of the focus of each chapter. Chapter one introduces the topic of the research, and the background of this chapter provides the context of the issues and problems the research explores. The chapter also documents the research rationale, aim, objectives and questions. Chapter two reviews the relevant literature for this study. The literature presented in the chapter can be grouped into four categories, which align with the main focus of this research. These are: traditional knowledge systems; water governance and integrated water resource management (IWRM); rural livelihoods (focusing mostly on water accessibility for agriculture); and the integration of traditional and Western-based knowledge. Chapter three is an overview of the research methods used for this study. The chapter introduces the study area (Esigodini Village) and the rationale for the selection of this area for this particular study. It also gives an explanation of the data collection methods, and documents the criteria used for the selection of research participants. Challenges faced during the data collection process of this research are identified, and a reflection of the field research process is also given.

Chapter four is the first of three results chapters, and discusses the Ndebele People's traditional knowledge using the knowledge-practice-belief framework for analysis adapted from Berkes (1999). The chapter is divided into four main sections, addressing: local

knowledge of land, water and animals; water management systems; social institutions; and the worldview of amaNdebele. Chapter five is the second of the results chapters and it seeks to establish if traditional water management systems encourage the sustainable use of water resources in Esigodini Village. Two areas in the village are used for the purpose of comparison, and these are Diana's Area, where Indigenous knowledge is still being used, and Emsehleni Area, where traditional ways have been eroded. The two examples are compared to establish the state of water resources in terms of quality and quantity. Chapter six is the third of the results chapters and documents the opportunities and challenges for integration of traditional and Western-based water management systems that were identified by research participants. It also identifies the outcomes of an integrated system that participants envisage and expect for rural livelihoods in the village.

Chapter seven, the discussion chapter, critically analyses the results of this study in relation to the literature reviewed in chapter two. It establishes the similarities and differences of the results of this thesis to studies by other researchers in the field, and also identifies the gaps that this study has addressed. Chapter eight concludes the thesis with a summary of the research as well as recommendations. The recommendations section is divided into three sections, with the first directed to the international community, the second to the Zimbabwean government and decision makers, and the third to the Esigodini villagers.

1.6 Chapter Summary

This chapter has given an introduction to the issues that the research addresses. An account of the development of water laws and policies in Zimbabwe from the pre-colonisation era through to the current post-colonisation era was provided. The section also discusses how these have affected the practice of traditional knowledge, as well as access to water resources for rural livelihoods. Gaps in scholarship that this research will contribute towards filling were identified in the thesis rationale section. This chapter also outlined the aim, objectives and research questions for this study, and the last section provided an overview of the thesis structure. The chapter that follows (Chapter 2) examines literature that is relevant to this study under four themes, namely traditional knowledge systems, the IWRM paradigm, access to water for rural livelihoods, and the debate over the integration of traditional and Western-based knowledge.

Chapter Two

Indigenous Knowledge and Water Management: A Literature Review

2.1 Introduction

This chapter reviews the literature that is relevant for this study. Globally, there has been an increased critique of Western-based water management systems such as those founded on the principles of integrated water resource management (IWRM). This has seen traditional knowledge gaining prominence as part of the solution to global water challenges, over the past three decades. There has been a lot of research into integrating traditional and Western-based water management systems for more effective water governance. However, researchers are divided over the ontological differences of the two ways of knowing, and the feasibility and effectiveness of such an integrated system.

The chapter will critically analyse existing literature under four main sections. The first section, on traditional knowledge, draws on a broad literature to discuss key characteristics of Indigenous knowledge. The section also highlights the development of traditional knowledge as a field of study and the importance of this way of knowing to Indigenous people. The second section addresses IWRM as a set of principles and a water management paradigm. The section discusses the emergence of the concept in the international arena, and goes on to look at some of its merits and drawbacks as documented by researchers, mainly from the developing world. The section ends by documenting some of the challenges of contextualising the IWRM concept in Zimbabwe. The third section focuses on access to water for rural livelihoods, and it discusses some of the legislative and policy gaps that lead to poor access to water for rural communities to meet their agricultural needs. The last section of this chapter analyses some of the debate around the concept of integrating traditional and Western-based knowledge. The section also gives a working definition of integration of traditional knowledge and Western-based knowledge into water governance, which is specific to this thesis.

2.2 Traditional Knowledge

The World Bank (as cited by Haverkort and Reijnjes, 2010) states that all persons have a right to “choose and create their own culture” (cultural liberty). Haverkort and Reijnjes (2010) argue that cultural liberty for Indigenous peoples should include the right to learn, experiment and understand the world through their own ways of knowing. Indigenous peoples’ ways of knowing are referred to variously as ethnoscience, traditional, Indigenous or local knowledge, and are embodied in myths, taboos, stories, beliefs, proverbs, and through the observation of their rituals and symbols (Kanene, 2016). Traditional knowledge has been described as “a way of life” and “part of the social capital of Indigenous peoples” (Kambu 2010). In the 1960s, Levi-Strauss’ unconventional research claimed that Indigenous people have scientific curiosity

and that the only difference between Indigenous and scientific knowledge is that the former is extremely 'abstract', and the latter is highly 'concrete'. Morgan (2006), summarises the characteristics of Indigenous knowledge as holistic, reinforcing a sense of belonging, surviving through many generations, and associated with a unique culture and language. Indigenous peoples' ways of knowing are passed down from generation to generation orally and are learnt through everyday practice. It is imperative that the culture of passing on these ways of knowing is maintained, as it is a means of keeping local knowledge alive⁶ (Kambu, 2010).

In societies where Western governance systems do not reach rural communities, local knowledge is used to manage common pool resources. According to Strauch and Almedom (2011), traditional governance systems work in such communities because they are in a form that local groups understand, and this makes them more willing to participate and comply. According to Strauch and Almedom (2011), Indigenous groups have a very close relationship with the environment, and they normally derive their livelihoods from environmental services⁷. Changes in their surroundings can negatively affect the entire group. It is therefore common practice for them to adapt their knowledge based on lessons learnt from environmental observation in order to survive (Berkes, 2008). Kambu (2010) goes so far as to assert that in regions where Indigenous groups are highly dependent on environmental services for their livelihoods, adaptation becomes a matter of "life and death". Adaptation also means that there are very few places in the world where traditional knowledge is still practiced without outside influence. Typically, it continues to evolve with exposure to other ways of knowing and modern-day environmental challenges (Berkes, 2008).

Indigenous knowledge is culturally bound and context specific, however, Indigenous people around the world have in common a respect for nature, a sense of reciprocity between people and the natural environment, and a holistic approach to managing the environment and resources (Anwar, 2011). This notion of similarities among Indigenous cultures is supported by Haverkort and Reijnjes (2010) who assert that traditional knowledge is holistic, and life is viewed through a lens of three interrelated domains or spheres. These spheres are: the social domain, which includes conflict resolution, gender dynamics, local organisation and the management of natural resources; the natural domain, which encompasses knowledge about the climate, plants, water, soils and animals, and; the spiritual domain, which revolves around

⁶ By keeping their oral tradition alive, a First Nation (the Nisga indigenous group) in Canada used their accounts of oral history in a court of law to claim that they were the original occupants of a piece of land. It had been argued that pre-colonisation the land had been un-occupied, however in the absence of a treaty the indigenous group successfully contested this claim and changed the manner in which First Nation land claims are handled in Canada (McConville, 1999).

⁷ Nature's capacity to provide quality of life and comfort. Retrieved From https://pib.socioambiental.org/en/Environmental_services

knowledge about spiritual forces, the invisible world, ancestors and divine beings. Berkes (1998) similarly describes traditional knowledge as a knowledge-practice-belief complex, with four interrelated elements. The first element is the local knowledge of land and animals, the second resource management, the third social institutions, and the fourth the worldview. Haverkort and Reijnjes' (2010) spiritual domain, and Berkes' (1998) worldview aspect of the knowledge-practice-belief complex, are least understood through scientific enquiry. This has led to traditional knowledge being misconstrued as immeasurable, archaic, superstitious, static and limited in its application (Haverkort and Reijnjes, 2010).

Although there are aspects of local knowledge that are still misunderstood, there has been a significant growth in studies in this field in the past three decades (Berkes, 2008). There are, however, researchers (Haverkort & Reijnjes, 2010; Ludwig, 2016) who have asserted that when such research is conducted, it is not studied as a holistic system but there is usually interest only in the empirical dimension. An example of such research is the study by Gagnon and Berteaux (2009), who examined the integration of traditional ecological knowledge (TEK) and ecological science. The authors state in their paper that they did not explore the spiritual aspect of TEK as it is outside their field of expertise. However, for Indigenous groups, traditional knowledge is holistic and should be studied as a whole. The growing interest in traditional knowledge research, coupled with Indigenous groups' increasing assertiveness in relation to their rights, has also seen an increase of Indigenous people undertaking studies of their own people and knowledge (Johnson et al., 2016). It has been argued, however, that researchers in the field of traditional knowledge tend to undergo gruelling enquiry from their scientific counterparts when they share their findings (Johnson et al., 2016). The section that follows will give a brief overview of the emergence of the field of Indigenous knowledge research.

2.2.1 The Emergence of the Field of Indigenous Knowledge Research

According to Berkes (2008), whose research is mainly based on the Canadian context, the 1980s saw an increased interest in traditional knowledge, and by the 1990s it started gaining popularity in mainstream media. Berke's (2008) observations are supported by Hoagland (2016), who found an increase in the number of Google Scholar articles containing the phrase "traditional ecological knowledge" during the period 1975 to 2014 (as illustrated in figure 2. 1 below).

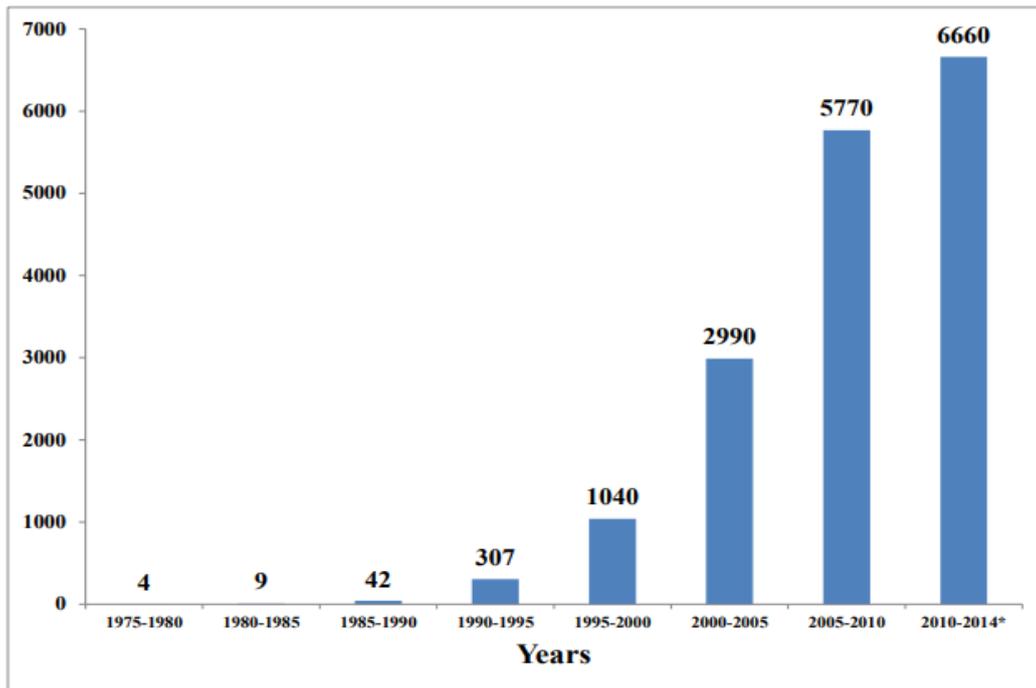


Figure 2.1: An increase in the number of Google Scholar articles with the phrase “Traditional Ecological Knowledge” during the period 1975 to 2014
Source: Hoagland (2016)

According to Hoagland’s (2016) findings, between the years 1975 to 1980, there were only 4 articles with the phrase “Traditional Ecological Knowledge”, by the period 2010 to 2014, there was a significant increase to 6,660 papers. Berkes (2008) and Escott, Beavis and Reeves (2015), attribute the increased interest in Indigenous knowledge to the international realisation that environmental management systems solely based on Western science were not yielding the desired results of sustainable resource management. Research in traditional knowledge began as a way of exploring other methods of managing the world’s natural resources, which were diminishing in both quantity and quality (Escott et al., 2015). Initially research in this field was based on the comparison of the two ways of knowing, that is science and Indigenous knowledge, and was mainly conducted ex-situ by non-Indigenous people (Berkes, 2008). Its focus and scope have, however, changed to examine integration and complementarity, and the demand for self-determination by Indigenous groups has seen an increase in research involving and led by local communities (Ludwig, 2016). Berkes (2008) indicates that the audience for Indigenous research has also widened to include rural and local groups. These groups use this information as a medium to educate the youth, as an expression of their political voice, and to better manage natural resources.

Traditional knowledge has also gained recognition at international fora including the United Nations Declaration on the Rights of Indigenous Peoples (2007), Convention on Biological

Diversity⁸ and the Ramsar Convention on Wetlands' Culture Working Group (Strauch and Almedom, 2011). Although there has been an acknowledgement of Indigenous knowledge worldwide, and in some countries (such as Canada, New Zealand and Australia) it is recognised in legal instruments and policy, implementation still remains a considerable challenge (Ludwig, 2016; Strauch & Almedom, 2011). Ludwig (2016), in a study on overlapping ontologies, documents case studies where implementation of systems that integrate traditional and Western-based ways of knowing has been successful and where it has failed, and identifies different goals and agendas as one of the main causes of failure. Von der Porten, de Loë and Plummer (2015), whose studies are mainly based on the Canadian context, argue that current participatory approaches are mainly Eurocentric and foreign to local people, as they are referred to as stakeholders, interest and minority groups. Berkes (2008) warns that in the rush to solve environmental problems, there is a risk of removing traditional knowledge from its cultural and historical context. Such concerns have led researchers such as Smith (2012) to call for the decolonisation of methodologies to advance Indigenous self-determination and rights. Smith (2012), an Indigenous scholar from New Zealand, asserts that the capacity of Indigenous people to conduct research on their own people and ways of knowing should be built as part of decolonising methodologies. Founded on such assertions, the section that follows will explore how the current Western-based education system is equipping Indigenous learners, and how this influences decision making and legislation.

2.2.2 Western-Based Education versus Traditional-Based Social Learning

Although there has been something of an awakening to Indigenous knowledge worldwide, Western knowledge continues to underpin the bulk of studies in institutions in countries in the global South, while traditional knowledge only informs a small proportion of studies in Western countries (Anwar, 2011). Traditional ways of knowing, according to (Anwar, 2011), are built on a foundation of lifelong on-the-ground learning and not education as defined by the West, and yet Indigenous scholars continue being equipped with Eurocentric research skills. Kambu (2010) argues that students in Africa are not being empowered with the skills to conduct holistic research on Indigenous people. It is these Indigenous researchers who produce information which excludes traditional knowledge and is used to inform water legislation and policy (Kambu, 2010). Zimbabwe is a good example of a country where the bulk of its population draws on Indigenous knowledge to make decisions about water resources, however, this type of knowledge and governance system is not acknowledged in water legislation and policy (the Water Act, 1998; the ZINWA Act, 1998; the Water Policy, 2013). It

⁸ Article 8(j) – Traditional Knowledge, Innovations and Practices

has been argued that traditional knowledge challenges science and the positivist-reductionist paradigm it is founded on. Indigenous governance systems are said to also challenge dominant power structures and integration of traditional and Western-based knowledge, would mean new leadership dynamics and research methodologies. Radical changes in the form of integration of the two ways of knowing are not easy to face and deal with (Johnson et al., 2016).

Battiste (2010) highlights that before the colonial era, learning consisted of sharing of traditional knowledge in local languages. The colonial era brought a Eurocentric concept of education and learning, where languages foreign to colonised countries such as English and French were used as the medium of instruction. This is a major threat to the sustainability of traditional knowledge. Vygotsky's (1978) theory of social constructionism⁹ further reinforces this notion by stating that language and culture determine how people view the world around them. Therefore, the community plays a vital role in shaping the manner in which people perceive reality, and individual development cannot be understood outside the social and cultural context in which people's reality is shaped. Local languages encompass knowledge about nature and how to protect and conserve it, and if directly translated into foreign languages and concepts, they lose their original meaning (Kambu, 2010). English is the language of instruction in Zimbabwean schools, and yet less than 2.5% of the nation's population views English as their first language (Mapedza et al., 2009). There was a recent change in the school curriculum, and this has seen the introduction of Heritage Studies as a subject¹⁰. However, the subject is taught in English and therefore there is a risk of the loss of cultural relevance.

Kambu (2010) states that the loss of traditional environmental knowledge will mostly impact poor communities who depend on this knowledge to sustain their livelihoods. Traditional knowledge is regarded by rural communities as a substitute for services they might otherwise not afford (Kambu, 2010). According to the Food and Agriculture Organisation (2018), in 2015, 10% of the world's population was described as extremely poor, with 80% of this population living in rural areas. According to the Zimbabwe Interim Poverty Reduction Strategy Paper (2016-2018), 92% of the country's poor live in rural areas. Schroeder (2010) argues that the hardest hit by the loss of Indigenous ways of knowing will be women, who make up almost 70% of the world's population living in poverty. In instances of poverty, women who reside in rural communities of developing countries have the least access to water and sanitation

⁹ Social constructionism "involves looking at the ways social phenomena are created, institutionalised, and made into tradition by humans. A socially constructed reality is one that is seen as an ongoing, dynamic process that is reproduced by people acting on their interpretation and their knowledge of it" (Vygotsky, 1978:39).

¹⁰ Retrieved From <https://bulawayo24.com/index-id-opinion-sc-columnist-byo-103537.html>

(Manase, Ndamba and Makoni, 2003). There is a general consensus among scholars in this field that traditional knowledge is an important part of water management and it should be preserved, acknowledged and incorporated into Western-based water governance because of its importance to Indigenous people and rural livelihoods (Battiste, 2010; Derman, Hellum & Sithole, 2005; Haverkort and Reijnjes, 2010; Kafudzaruwa & Sowman, 2009; Kambu, 2010; Kanene, 2016; McGregor, 2014; Von der Porten et al., 2016).

2.3 The IWRM Paradigm

According to Gillespie (2017), the Code of Hammurabi of 1750BC was the first recorded example of regulation for fresh water. Colby (1991) asserts that before the 1960s, there was a general belief that natural resources were almost limitless and most countries exploited these resources for financial gain, however, from the 1960s there was a shift from environmental exploitation to environmental management. This saw an increased focus on sustainable development globally (Colby, 1991). The concept of sustainable development saw an increased interest in participatory processes, which included the recognition of Indigenous people and women in water resource management (Gillespie, 2017). This shift in focus in the management of water and the pursuit of 'good governance' saw the development of paradigms such as Integrated water resource management (IWRM) (Allan & Rieu-Clarke, 2010). IWRM is a normative concept which has been in existence for a long time but gained prominence in the period following the International Conference on Water and the Environment in Dublin in January of 1992. Its prominence has been propelled by global bodies such as the Global Water Partnership¹¹, and it has also been promoted by multilateral and bilateral development donors and financiers such as the World Bank and the African Development Bank (ADB) (Mehta et al., 2014).

The IWRM paradigm is mainly founded on the 1992 Dublin Principles, which are:

- i. Freshwater is a finite and vulnerable resource, essential to sustain life, development and the environment
- ii. Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels
- iii. Women play a central role in the provision, management, and safeguarding of water
- iv. Water has an economic value in all its competing uses and should be recognised as an economic good

¹¹Retrieved From <https://www.gwp.org/>

Water governance in the developing world over the past two decades has been largely influenced by the IWRM paradigm (Mehta et al., 2014). There are a number of examples of countries that have apparently been able to utilise IWRM for effective water management. The Lerma Chapala River Basin in Mexico, for example, was identified as one of the world's most water-stressed basins, having lost 90% of its natural volume between 1981 and 2001. Thirty years after the implementation of IWRM, the river basin has seen an improvement in water governance, water quality, irrigation efficiency and funding for water sanitation and treatment programs has been secured (Global Water Partnership, 2010). IWRM has been hailed as the solution to the water management crisis in the global South and there has been a wave of water reform based on the concept sweeping across developing nations, including Zimbabwe, which was the first nation to adopt IWRM in Southern Africa in the 1990s (Mapedza et al., 2016). Proponents of IWRM (e.g. Van der Zaag, 2005) have argued that the concept is relevant to Southern Africa, and will guide a new generation of water managers who will push creative boundaries to solve water challenges. The paradigm has, however, earned its fair share of critics from across the globe for failing to produce expected outcomes, especially in the developing world (Mehta et al., 2014). The two sections that follow will explore some of the voices that have critiqued the use of the IWRM concept, and conclude by drawing from the Zimbabwean experience with the implementation of the paradigm.

2.3.1 The Influence of IWRM on Water Governance in Developing Countries

As early as 1977, researchers such as Worsten (as cited by Berkes, 2008) argued that the main reason for the failure of contemporary resource management concepts is that they were developed under Western exploitative regimes. Such arguments have continued into the twenty first century, with mounting debate over the effectiveness of the IWRM concept for solving global water challenges. Mehta et al. (2014) and Swainson and de Loë (2011) have asserted that transfer of such concepts from the global North to the South should take into consideration the differing contexts in which such programmes are to be implemented. According to Swainson and de Loë (2011), some of the contextual aspects to be considered include biophysical, political, social, and cultural differences. They argue that such transfers usually fail because they take a generic approach, and this is often inappropriate for the capacity, context, resources, and needs of 'receiving' countries. IWRM makes the assumption that water management can be apolitical, but Derman and Hellum (2006), argue that no water governance structure can be completely neutral and objective. In Africa, implementation of IWRM is challenged by an environment where there is uncertainty in responsibilities for the management of river basins, there are plural legal systems, and complex political environments (Mehta et al., 2014). It has also been argued that IWRM creates institutions that are superimposed over already existing governance structures, and this may cause a

duplication of duties as well as competition that further compounds inefficiencies in the water sector (Mehta et al., 2014; Van der Zaag, 2005).

According to Derman and Hellum (2006), most nations place more emphasis on water as an economic good than as a basic right when managing water resources based on the IWRM paradigm. This has seen researchers such as Mehta et al. (2014) criticising the paradigm as being limited by not making livelihoods of the poor a priority. Other researchers such as Derman and Prabhakaran (2016) specifically make reference to the livelihoods of women. They argue that although the concept is based on the Dublin Principles, with principle number three acknowledging women as water users, little has been done internationally in terms of ensuring women's participation in water management and decision making. According to Derman and Prabhakaran (2016), IWRM participatory processes are time consuming, and women in developing countries usually cannot take part due to their commitment to primary-care giver duties. The researchers assert that participation in sub-catchment councils is sector-based, and this poses a challenge in patriarchal societies where women do not own means of production and are 'unemployed'. The authors also argue that women often cannot make meaningful contributions to decision making during participatory processes, as customarily women do not own land or have water rights. Derman and Hellum (2006) assert that water legislation and policies in Africa usually classify women's uses of water under 'primary water use', and neglect their need for water to support small-scale agriculture. However, the Dublin Principles make no distinction between water uses or how the water is divided by law. Derman and Hellum (2006) argue that Dublin Principle three does not refer to women only in the context of primary or domestic water, but in relation to all waters, including water for commercial purposes.

2.3.2 Challenges of Contextualising IWRM in Zimbabwe

Zimbabwe joined the global trend of adopting the IWRM paradigm in the 1990s through a reform of the water sector. The initial motivation for the changes in water management was the 1991-1992 drought that exposed the glaring inequalities of water access in the country (Marquette, 1997). However, when it came to development of legislation and policy, and implementation of water projects, the main focus was on making water an economic good (Mapedza et al., 2016). The main objectives of the reform were as follows (Manzungu, 2004; Nhira & Derman, 1997):

- i. Achieve greater equality in water allocation across groups of water users
- ii. Remove inefficiencies in water use
- iii. Ensure representation of all water users
- iv. Remove administrative inefficiencies in water allocation

v. Effectively incorporate the environment in catchment management

Manzungu and Derman (2016) have accurately divided water reform in Zimbabwe into three phases: articulation, de-articulation, and re-articulation. The articulation phase encompassed the introduction of water reform based on IWRM between 1993 and 2000, with financial backing from the governments of Germany, the Netherlands, Sweden and the United Kingdom (Manzungu and Derman, 2016; Mapedza et al., 2016). According to Manzungu and Derman (2016) and Marquette (1997) the water reform in Zimbabwe was highly dependent on external funding because the country was facing economic challenges due to a failed externally introduced Economic Structural Adjustment Programme¹². Although externally funded, the water reform was driven by a national agenda which was to relieve the cash strapped government of the pressure of funding water projects. This relief was to come through the establishment of the Zimbabwe National Water Authority (ZINWA), a parastatal entity tasked to collect water revenue from users. However, ZINWA failed to collect adequate revenue, and came to depend on government subsidies (Manzungu and Derman, 2016).

De-articulation of the water reform occurred after the land reform (referred to by the international community as land invasions) of the year 2000. This saw native Zimbabweans forcibly remove non-natives from commercial farms. Sanctions were imposed on the country, leading to international isolation and lack of access to loan facilities for water and sanitation projects. The hyperinflationary environment in the country from the year 2000 to 2008 (the second highest inflation rate ever recorded)¹³ also saw a further derailing of the water reform. This period saw a decline in the quality of water infrastructure and water service delivery leading to an outbreak of cholera, mainly in urban Zimbabwe, between the years 2008 and 2009 (Mapedza et al., 2016).

Re-articulation describes the period after 2009 when a coalition government was formed, which saw the re-engagement of external donors, and the World Bank partnering with the country in the implementation of IWRM. However, there were conflicting agendas between the state and the World Bank, which led to negotiations that were conducted in bad faith. Although Manzungu and Derman (2016) discuss the 2013 general elections in their article, they do not mention that this was possibly another surge of de-articulation of water reform as the government of National Unity¹⁴ was dissolved and the only form of external funding the country

¹² A neo-liberal market-driven policy measure adopted in Zimbabwe as a prescriptive solution to the economic crisis in the 1990s (Mapedza et al., 2016)

¹³ The highest monthly inflation rate was recorded in November of 2008 at 7.96×10^{10} %, the daily inflation rate was at 98% (Parker and Whaples, 2013).

¹⁴ Funding for water projects was negotiated and secured under this government and there was a requirement for new negotiations once the government of National Unity was dispersed after the 2013 general elections (Manzungu & Derman, 2016).

could access for water and sanitation programmes was through humanitarian aid (for example United Nations International Children's Emergency Fund).

Since the publication of Manzungu and Derman's (2016) article, there have been other events in Zimbabwe that have further influenced water governance based on the IWRM paradigm. In November of 2017, there was a Presidential change which made the country hopeful for re-engagement with the international community, and this could have been viewed as a possible opportunity for re-articulation. However, post-election violence in 2018 and violent demonstrations in January 2019 can be seen as de-articulation phases as they attracted disapproval and raised concern over human rights violations from the international community. Zimbabwe's peculiar and volatile political, economic and socio-cultural environment has seen financial backing and the best of intentions for IWRM not yielding anticipated results. Some of the challenges of contextualising IWRM have been documented by Southern African researchers such as Derman and Hellum (2006), Manzungu and Derman (2016), Mapedza et al. (2016) and Mehta et al. (2014). These researchers have recommended that home-grown solutions produced by local people using local resources should be used to deal with water problems, including those of access to water for rural livelihoods.

2.4 Access to Water for Rural Livelihoods

Access is defined by Ribot and Peluso (2003:153) as "the ability to derive benefits from things". Indigenous communities around the world, especially those who live in rural areas, rely on the natural environment to provide them with a variety of goods and services. However, contemporary governance structures limit their abilities to fully benefit from natural resources, such as water (Berkes, 2008). Berkes (2008) warns of myths about Indigenous groups, such as the 'myth of the exotic other', where Indigenous groups are viewed as only wanting to utilise natural resources for subsistence and not to make a living. There is therefore a need to craft water legislation that allows local groups to have access to natural resources to ensure that they can derive livelihoods from them. However, water reform around the world has seen a requirement for licenses and permits in order to have secure access to water. In agricultural societies, this means that commercial farmers have this secure access as they have the financial means to acquire permits, establish large scale irrigation systems, and pay for the use of bulk water. General Comment 15 by the United Nations Committee on Economic, Social and Cultural Rights adopted the right to water as a basic human right, and the intrinsic link between water and livelihoods is widely recognised (Derman and Hellum, 2006). Water reform in countries such as Zimbabwe was based primarily on the Dublin Principles, with very little consideration for human rights frameworks. Derman and Hellum (2006) argue that a rights-

based approach to water management does not only recognise water for primary purposes, but also makes provisions for the livelihood requirements for small-scale farmers.

Globally, changes in water management based on paradigms such as IWRM have seen control of access to water being vested in particular persons or institutions. In Zimbabwe, for example, this control is vested in the President or the State (Water Act, 1998). In rural areas, communal farmers are forced to access water through those who commodify the resource (Ribot and Peluso, 2003). According to Fraiture et al. (2010), the inability to access and control water has negative impacts on agricultural yields, and smallholder farmers in such an environment will experience very little growth in agricultural production. The authors argue that the inability to control water resources has a negative impact on vital livelihood activities, including small livestock rearing and gardening, and these are known to be essential to the livelihoods for many women in poor rural areas. The researchers assert that without interventions to secure access to water for local groups, subsistence farmers' opportunities for agricultural expansion will remain limited.

Water legislation and policy in countries such as Zimbabwe make provisions for water for primary use for communal farmers, but no reference is made to water permits, water supply or credit facilities for expansion of small-scale agriculture in communal areas (Derman and Hellum, 2006). Although water reform has been based on decentralisation and participation of different stakeholders including water users, it has failed to transfer rights to local communities (Ribot and Peluso, 2003). The role of smallholder farmers and traditional leaders has been undermined under such water reform (Mapedza et al., 2016). In Zimbabwe communal farmers' involvement in the water reform consultative process was limited because the process mainly focused on water for irrigation, rather than water for primary use and small-scale productive processes (e.g. vegetable gardens) (Manase, Ndamba and Makoni, 2003). The common concerns of communal farmers, such as reducing distances to communal water points, desiltation of rivers¹⁵, and the repair of broken-down boreholes, were not on the agenda during the consultative process, and therefore smallholder farmers took no interest in the process. Mapedza et al. (2016) argue that former engineers in the Department of Water Engineers led the participatory process, and due to the technical nature of their field of expertise, they had no sensitivity to the needs of communal farmers. Water reform also included a consultative process with different stakeholders, which involved officers being deployed to explain science-based water management systems to rural farmers, but there was no reciprocal effort to understand local water management systems. The consultative process was meant to be

¹⁵ Smallholder farmers mainly extract water manually (using buckets) from rivers while commercial farmers draw water for irrigation from dams that are maintained by ZINWA.

informed by different water users, but participation of communal farmers was tokenistic and that of women was insignificant because the process was driven by the concept of making water an economic good (Mapedza et al., 2016).

In Zimbabwe, sub-catchment councils were introduced to encourage the management of water at the lowest possible level, however, most councils are currently not functioning, and one of the major challenges faced by those that are still operational is that of conflicting goals. Large scale farmers already have access to adequate water and irrigation infrastructure and their main concern is the management aspect of water. On the other hand, communal farmers have limited access to water and are mainly concerned with gaining access to water resources and related infrastructure (Mapedza et al., 2016). Although the sub-catchment councils, were created as a forum to get poor communal farmers involved in the conversation around water management, the forum mainly concentrates on water revenue collection discussions and strategies (Derman and Hellum, 2006). Commercial farmers also tend to dominate participatory processes by virtue of their relatively high levels of attendance, and because they are more literate and can more readily interpret the Water Act (1998), the ZINWA Act (1998) and the Water Policy (2013), all of which are very technical and are only published in English. Communal farmers, however, are represented by Chiefs who, because of colonial legacies, are sometimes unable to read, and the forum does not acknowledge or give them an opportunity to articulate their own ways of knowing. Sub-catchment council meetings are held at central locations and sometimes communal farmer representatives cannot afford transport fares to these locations, and thus this limits their ability to participate (Mapedza et al., 2016).

According to Ribot and Peluso (2003), where legal pluralism exists, the state holds legal powers of access, and informal governance structures such as traditional governance systems remain subservient to the dominant regime. In Zimbabwe the duties of limiting water use for primary purposes from any source have been bestowed on catchment councils (Water Act, Section 33(1)). Catchment councils can limit water abstracted by any persons or class of persons (including communal farmers) as well as the number of livestock they are allowed to water. This has a direct impact on the livelihoods of local communities who, according to Derman and Hellum (2006), have their own ways of managing and rationing water during droughts and lean periods, but these ways are not legally recognised.

Ribot and Peluso (2003) state that water legislation can be ambiguous on issues of responsibilities of allocation of water and actual access. The current Water Act of Zimbabwe does not make a clear distinction between primary water and water for productive purposes. Primary purposes according to the definition provided in Part 1 of the Water Act, include

drinking water, watering of animals, use for dip tanks¹⁶, and use for moulding bricks (for construction), but the Act makes no mention of irrigation for crop and vegetable production. Communal farmers extracting water for irrigating vegetables and crops for small-scale commercial purposes do not expect to pay for this water as it is a common pool resource/common property, and according to local norms they have a right to use the water for free. However, legally, the state controls all water resources and water for irrigation is extracted at a cost (Derman and Hellum, 2007). The Water Act, therefore, gives the state leeway to decide to collect this revenue at its discretion as traditional water management norms have no legal standing.

By vesting all water resources to the President and the State, the Water Act of Zimbabwe in principle implies that traditional governance is unlawful because contrary to the Act, traditional leaders are viewed as custodians of water resources in rural areas and make decisions about how water is managed, used, and shared in the community (Mapedza et al., 2016). The authors suggest that this informal arrangement is a potential cause of conflict, as currently traditional leaders are allowed to govern water resources at the local level with very little interference from government, and this may be mainly because communal farmers do not pay for water. However, if this group of water users starts paying rates for water, this is likely to change power dynamics, with the government having a bigger role to play in water management in communal areas.

2.5 Debate over the Integration of Indigenous and Western-Based Knowledge Systems

The differences between what Ludwig (2016), has termed ontological materialism (science) and ontological idealism (traditional knowledge), has been a cause of tension over which way of knowing is viable and can be used for decision making. However, researchers such as Morgan (2006) have conducted studies that suggest that the two ways of knowing can be combined for effective decision making in the water sector¹⁷. Collaborative processes in theory allow for local stakeholders to represent their knowledge in the broader context of what governments and other stakeholders know, and vice versa (Taylor and de Loë, 2012). Von der Porten et al. (2015), state that collaborative approaches are meant to provide a fora for all parties involved to deliberate and reach a consensus. However, Ludwig (2016) argues that from studies of examples of such approaches, the ones that failed were characterised by

¹⁶ Dip tanks are communal tanks or races that are used to immerse livestock into a medicated liquid for disease control.

¹⁷ Morgan's (2006) study on "Decision-support tools (DST)" and the indigenous paradigm is based on the New Zealand context. The researcher includes an indigenous concept (mauri) into a DST. The result of the research process is a methodology for sustainability assessment that is produced specifically for the New Zealand context but can be adapted to other contexts.

conflicting agendas. Johnson et al. (2016) suggest that for natural resource management to be effective, there needs to be a shift from the business as usual approach to a scenario where local peoples are meaningfully engaged in making decisions about natural resources. The authors have termed such relevant approaches as “methodologies that are fit for purpose.”

According to Taylor and de Loë (2012) the key to effective resource management is a thorough knowledge of environmental conditions, and Indigenous peoples usually possess an in-depth understanding of their surroundings. Local actors have immense potential in ground-truthing policy and different water management options, and this is key in anticipating the implications of water management decisions for different communities. Integration of different ways of knowing has great potential in turning knowledge into action¹⁸ and can assist in resolving conflict over which knowledges are used for decision making. As highlighted in the first section of this chapter, there is increasing global pressure to explore other ways of managing the world’s water resources that are declining in quality and quantity under Western- based governance. There also has been a growing desire among Indigenous groups to combine their traditional ways with modern ways in order to maintain cultural identity while allowing for social and economic development (Berkes, 2008). However, this approach can only be effective if local knowledge is included from inception – that is, from the identification of the problem, through to the implementation of the solution and in monitoring and evaluation of the outcomes of the water project (Taylor, de Loë and Bjornlund, 2012).

Anwar (2011), asserts that for Indigenous knowledge to gain acceptance within Western water governance, researchers and academics in the field need to formulate endogenous theories, methodologies and interpretations that will make it comparable with science-based knowledge systems. Some studies have sought to demonstrate this. An example is the cost-benefit analysis of Indigenous soil and water conservation measures in India by Mishra and Rai (2014). The research found that some of the Indigenous practices not only prevented nutrient loss and retained soil moisture, but also led to increased crop yield, which generated additional income for households. Studies and assertions such as those by Magid (2011) and Mishra and Rai (2014) suggest that traditional knowledge must be articulated in a form that is acceptable within the science fraternity to convert it into “usable knowledge”. However Indigenous knowledge does not rely on rationality, or quantitative and qualitative research, but its foundation is based on intuition and experience. Johnson et al. (2016) argue that the first step to successful collaborative processes is to acknowledge that both ways of knowing have

¹⁸ By getting multiple players and their knowledge, with a common cause involved in water management, they have the drive to implement the shared vision.

their own merits, and scientists should relearn how they construct and use Indigenous knowledge.

Bhabha's (1994) postcolonial theory of hybridity has been hailed for challenging the status quo, as it is a tool that can be used by colonised groups to assert their right to play a meaningful role in decision making. Bhabha suggests the creation of a third space where a hybrid language is co-produced. This space is where inter-epistemological dialogue occurs allowing for the merging of knowledge, languages and practices (Glasson, Mhango, Phiri and Lanier, 2010). In Bhabha's co-construction proposal, local knowledge is the first space providing for the community's experiences and worldviews, and the second space is made up of learning through Eurocentric science. The third space is proposed as an environment of mutual respect which allows for compromise, negotiation and re-articulation to produce an integrated way of knowing which benefits all stakeholders involved.

However, Duncan (2015), alludes to a stalemate where integration of and co-production between formal and informal ways of knowing could be an impossibility. Duncan (2015) refers to a continuously growing rift, or 'chasm', between the two ways of knowing which may render the two irreconcilable. Duncan (2015) concludes that integration of fundamentally different ways of knowing might not be a solution for divergent knowledge systems, but co-existence may be the answer. She proposes an organised form of legal pluralism as a potential solution. Von de Porten, de Loë and Plummer (2015) also support Duncan's (2015) assertion that traditional and Eurocentric ways of knowing can coexist. They suggest that policymakers and decision makers should, rather than trying to integrate the divergent knowledges, instead establish ways in which they can support and revitalise Indigenous ways of knowing (endogenous development). The researchers propose that state actors should seek opportunities to participate in environmental management projects initiated by local stakeholders. Western-based governance systems usually dictate the terms for engagement, and Anwar (2011) and Smith (2012) propose that Indigenous people need to be approached with a high level of respect and on their own terms.

Ludwig (2016) suggests the use of standpoint theory¹⁹ to overcome the challenges of incomparability of the two ways of knowing (ontological divergence). According to Ludwig (2016), marginalised knowledge including that of Indigenous groups can be a very crucial element in teasing out scientific biases and strengthening the objectivity of science based research. The author also asserts that within the political arena, standpoint theory can be used

¹⁹ Standpoint theory was initially developed as a feminist concept emerging in the 1970s. It is a critical theory about the relations between the development of knowledge and the practice of power. It has however been widely adapted to scholarship beyond feminism (Harding, 2004).

to recognise issues of Indigenous groups as a question of social justice. Standpoint theorists have earned a reputation of bringing issues of social exclusion into debate in international fora. Ludwig (2016) goes on to recommend that if issues of integration limits are to be fully dealt with, ontological self-determination has to be integrated into the standpoint theory framework. The researcher argues that there are some aspects of traditional knowledge that resist integration into Western science, and ontological self-determination²⁰ is a means of dealing with such a challenge. Ludwig (2016) draws from the work of Whyte (2015), who asserts that in their engagement with Indigenous groups, scientists tend to draw from the supplemental value of Indigenous knowledge. It is important for proponents of science to also pose the question of “what do Indigenous knowledges do for Indigenous peoples?” Whyte (2017) argues that by going beyond the supplemental value of Indigenous knowledge to its governance value, local communities can define what this knowledge means to them, as well as set the rules for sharing it, including which aspects should be shared and in what form. Indigenous groups can also give authority to individuals and organisations to use their information. Such an approach not only allows for science to benefit from Indigenous knowledge, but also allows local groups to contribute to the terms of engagement. This allows Indigenous groups to define the benefits they derive from the integration of their traditional knowledge and Western-based governance systems.

Taking into consideration the global debate over integration of traditional and Western-based knowledge into water governance, for the purpose of this thesis, integration will be defined as combining Indigenous and Western ways of knowing for research projects and participatory processes that inform water legislation, policy and institutional arrangements. The water statutory instruments and institutions that are a result of such complimentary processes will recognise the water rights of local Indigenous peoples and their right to self-determination²¹, and make provisions for the recognition of traditional leadership in decision making and water management. Inclusion of Indigenous knowledge will have to go beyond recognition in policy to include meaningful participation of local groups in the entire project cycle as suggested by Taylor et al. (2012).

2.6 Conclusion

This chapter has surveyed the literature that is relevant to this study under four sections: traditional knowledge, the Integrated water resource management paradigm, access to water

²⁰ A concept that states that science is not a superior way of knowing and it is not the only means of assessing and examining indigenous knowledge (Ludwig, 2016).

²¹ In the Indigenous Declaration on Water (2003:3), indigenous peoples assert that they have a right to self-determination which “includes the practice of our cultural and spiritual relationships with water, and the exercise of authority to govern, manage, regulate, recover, conserve, enhance and renew our water resources without interference.”

for rural livelihoods, and debate over the integration of Indigenous and Western-based knowledge systems. The literature asserts that traditional knowledge is specific to a geographical location and an Indigenous group, and is passed on from generation to generation. It includes knowledge about the environment, how to manage it, and the social institutions that Indigenous groups have developed to manage resources, and it also includes a spiritual aspect. Despite plural legal systems existing in many countries across the globe, Western-based water management systems that are informed by Western paradigms such as IWRM continue to dominate. However, there is a growing scholarship that is critiquing such paradigms, as they are not fully compatible with many developing country contexts, including that of Zimbabwe. Water management systems that are based on Western concepts continue to be utilised in developing countries and have left the world's poor communities with inadequate access to water for their livelihood requirements.

There has been growing debate over the need to integrate the two ways of knowing for better water governance and improved access to water for Indigenous groups. Based on this debate, a definition of integration of traditional knowledge systems and Western-based knowledge into water governance has been developed for the purposes of this thesis. The chapter that follows (Chapter three), will discuss the study area, field research methods, the selection criteria for research participants, and some challenges of this study, as well as reflect on the fieldwork process.

Chapter Three

Research Methods

3.1 Introduction

This chapter will introduce the study area of Esigodini Village in Zimbabwe and the communities in the village. The reasons for the selection of this specific study area will also be highlighted. The chapter will also outline the three data collection methods used for this study, which are individual semi-structured interviews, focus group discussions (FGDs), and participant observations. The selection criteria for this study will also be discussed and an overview of participants who took part in the research will be given. The chapter will also highlight some challenges of the field study as well as provide some reflections on the field work process.

3.2 The Study Area

The Southern African region comprises 14 countries spread across a total land area of 9.4 million km², and has a population of 235.6 million (Darkoh 2009). Southern Africa is located between the Atlantic and Indian oceans and is prone to uneven rainfall and frequent droughts (Darkoh, 2009). The region is characterised by two distinct seasons – the wet season (October to April) and the dry season (May to September). Zimbabwe is located in this region, and the country is divided into 5 agro-ecological regions. These regions are classified based on rainfall, temperature, vegetation and soil data (Svubure, Rhodante, Pieter and Van der Zaag, 2011). The study area is Esigodini Village, which is an agricultural village located in the semi-arid south-eastern part of Zimbabwe. The region is generally dry and rainfall periods are short, ranging from 80 to 100 days during the months of October to April. The village lies in agro-ecological region iv, receiving rainfall of 450-650mm per annum, with semi-extensive farming being the dominant livelihood (Svubure, Rhodante, Pieter and Van der Zaag, 2011). The village is home to the Ndebele group, who mainly practice rain-fed subsistence agriculture under these conditions, and this study set out to investigate the role of traditional water management practices in the resilience of Ndebele agricultural livelihoods.

Esigodini Village is located in the Upper Umzingwane sub-catchment, and specifically in the Zhulube micro sub-catchment (Svubure et al., 2011), as illustrated in figure 3.1. The Zhulube micro sub-catchment mainly relies on the sub-perennial Zhulube River as a source of water. The river's source of recharge is a seasonal wetland located within the south-eastern part of the catchment.

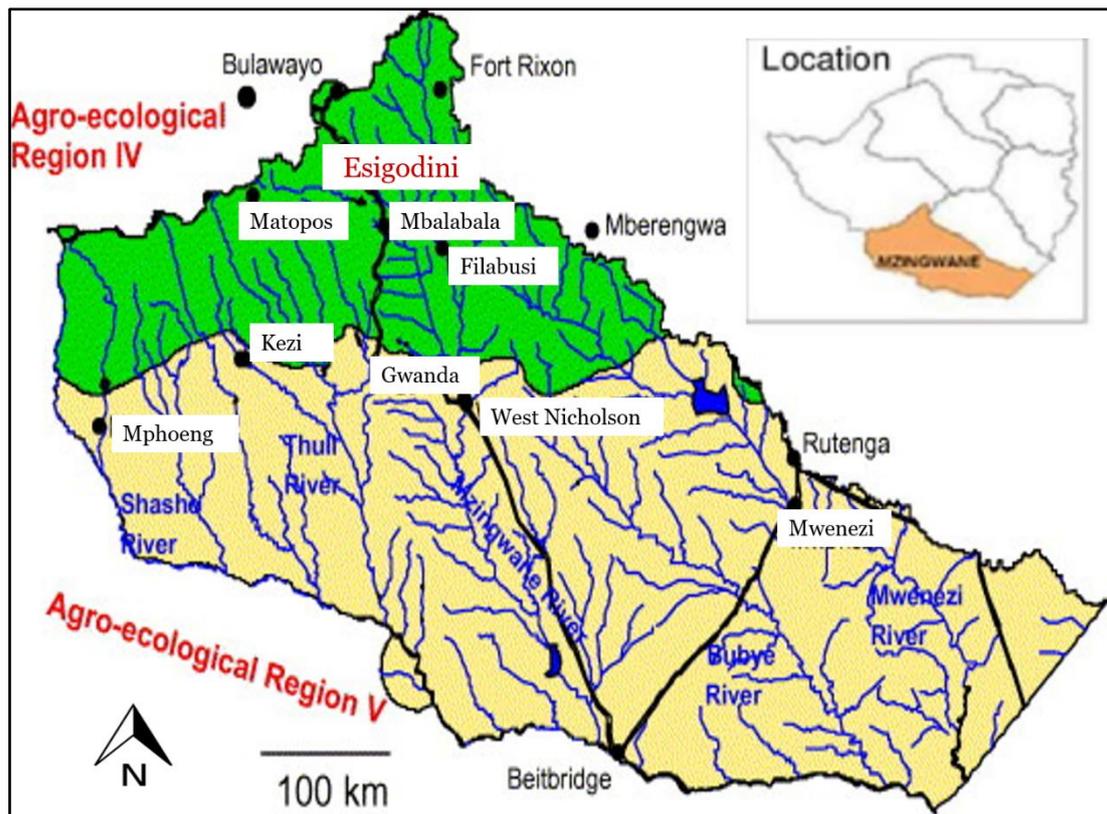


Figure 3.1: Map of the Umzingwane catchment showing the location of Esigodini in the Zhulube micro sub-catchment
Source: Svubure et al. (2011)

The village was selected for this research because it has both privately owned and communal land. It is on the latter that traditional knowledge continues to be used to manage common pool resources such as water. Further, Esigodini Village is a mixed agricultural area characterised by both commercial and small-scale farming activities. Although, this study focuses on subsistence agriculture, which is the dominant livelihood activity in the village, the varied nature of livelihood projects makes it possible to identify the different dynamics of access to water and participation in decision making. The village is located in Matabeleland South province in Zimbabwe, which is predominately occupied by the Ndebele people, and it is in this area that this group and its ways can be studied. Esigodini Village is also close to one of the major cities in the country, Bulawayo. There is, therefore, an urban influence in the area, and this allows for the study to analyse how this influence impacts on traditional knowledge.

3.2.2 Rural Livelihoods in Esigodini

Large scale commercial agriculture is mainly carried out on privately owned land, while small-scale agriculture is mostly practiced on communal land²². According to information acquired

²² Communal land is defined in Part II of the Communal Lands Act of Zimbabwe as land that was Tribal Trust Land (Reserves) prior to 1 February 1983. These lands are vested in the President, who permits occupancy and use.

from the Agricultural Technical and Extension Department in Esigodini, cereal crop cultivation is the major form of agriculture, and the main crops cultivated include maize, sorghum and pearl millet. Vegetable gardens are another important component of livelihoods in Esigodini, with leafy green vegetables, tomatoes, onions, and sweet potatoes being the major vegetables grown (Nyoni, N, Agricultural extension officer, pers. comm 30 May 2018). There are individual gardens which belong to specific households, and there are also community gardens where selected households carry out market gardening activities. The latter are mainly funded by non-profit organisations. According to the agricultural extension officer, livestock production is another livelihood method practiced in the village. The villagers have small herds, normally numbering less than 20 cattle per household. With increased unemployment in the village, illegal alluvial gold mining has also become another water dependant livelihood. This livelihood strategy became very popular about three years ago when factories shut down in Bulawayo, which is the industrial hub of the country. After these shutdowns, a lot of young people found themselves unemployed.

Rainwater, boreholes, dams, deep and shallow wells, rivers and streams are the main sources of water for livelihoods in Esigodini. These are, however, unreliable, and it is also difficult to access water from sources such as dams without the relevant infrastructure. This has left villagers living on communal lands perennially dependant on donor aid to meet their food requirements and other needs in the village (Nyoni, N, Agricultural extension officer, pers. comms, May 30, 2018).

3.3 Data Collection

According to Mackenzie and Knipe (2006), methodology is the set of data collection tools and rules that underpin a particular approach to research. This study employs a qualitative research methodology which, according to Mackenzie and Knipe (2006), supports in-depth descriptions of how people experience a given issue. The study utilised three data collection methods. The first method was individual semi-structured interviews, which are effective for collecting data on individuals' experiences, their histories, and their perspectives (Gibson & Brown, 2009). The second method used for data collection was focus group discussions which, according to Gibson and Brown (2009), are effective for collecting data on the cultural norms of a group and establishing a broad overview of issues within the group. Participant observations are the third data collection technique that was used for this study, and these are effective for collecting data on the behaviour of participants in their usual, day-to-day context (Gibson and Brown, 2009). The field study for this research was conducted from 21 May to 15 July 2018, and the next three sections will discuss the data collection methods used for the study.

3.3.1 Semi-Structured Interviews

Thirteen semi structured interviews were conducted, comprising nine interviews with local level participants and four with key government officials. The local level participants were mainly communal farmers and village leaders (figure 3.2 below is a photo of one of the semi-structured interviews), and government participants were selected from key departments with an interest in water issues. The interviews were conducted between 28 May and 22 June 2018 using open ended questions. The semi-structured questions used for this type of interview allowed the researcher to ask participants questions that prompted an in-depth discussion about themes that are relevant to the study. It also allowed the researcher to probe the participants further if an issue was unclear or required further clarification.



**Figure 3.2: An interview with a local level female participant (Annie Dube)
Venue: Senior Village Head's Office (Emsehleni Area, Esigodini)
Source: Mkandla (2018)**

To limit the distances participants walked to attend the interviews, the villagers chose the venues, and these are already established central meeting places. On first contact with the senior village head for Emsehleni Area, he indicated that the meeting venue for a small group is under a tree at his homestead. The researcher interviewed nine local level participants for this study, with between three to four interviews per day, therefore the meeting place was the senior village head's homestead. To ensure that the interviews were private, the senior village head made his office available to the researcher and research assistant. The interviews were conducted in the local language (IsiNdebele) with the assistance of an interpreter, for the local village-level participants. The four interviews with key government participants were

conducted at their offices located in Esigodini centre and Bulawayo during normal working hours. Although government officials were asked questions in English, they responded in both the local language and in English, which is very common in Zimbabwe. The interviews were of a duration of between 25 and 60 minutes.

3.3.2 Focus Group Discussions

Two focus group discussions were conducted on 22 June 2018, taking a little over two hours each. The first focus group discussion was comprised of ten women (figure 3.3 below) aged 20-65 years. Only two of the female participants could be classified as youths (between the ages of 18 and 35 years).



Figure 3.3: Female focus group discussion
Location: Emsehleni Vegetable Market
Source: Mkandla (2018)

The second focus group discussion was made up of nine male participants (figure 3.4 below) between the ages of 39 and 68 years, and no male youths.



Figure 3.4: Male participant focus group discussion
Location: Emsehleni Vegetable Market
Source: Mkandla (2018)

It is common within mixed groups (of men and women) in rural communities for men to be more dominant in discussions, therefore separating the group by gender may allow for women to participate more meaningfully. Another reason for the separation by gender is that in rural communities of Zimbabwe, gender roles are strongly defined, with women being the primary caregivers and their use for water being limited to household level needs such as rearing of small livestock and use in vegetable gardens. Men are considered the providers and their water use is mainly for brick moulding (for construction), watering livestock (cattle), and irrigation. With differing water needs among these two groups, changes in water governance will have different implications for their access to and use of water for livelihood purposes.

During the initial meeting with the senior village head, he indicated that for larger groups, the villagers do not meet at his homestead but at a thatched structure that is used by residents as a vegetable market. On the day of the focus group discussions, the market only had one woman selling her vegetables, and there was therefore minimum disturbance. With the assistance of an interpreter, the researcher facilitated the discussions using questions that prompted discussion among the participants. Although, there were those who dominated the conversation in both groups, the participants were respectful of each other, generating a good level of discussion and debate.

3.3.3 Participant Observations

Households who participated in the individual interviews were invited to volunteer for the participant observation component of the study. Two households volunteered to participate. The observations were conducted over a period of three days each, during the daytime (between 9am and 2pm). The research team met with participants on a daily basis and the observations were carried out at water collection points including boreholes, at vegetable gardens, and during watering of livestock. For this part of the study, the research team took turns in undertaking the roles of silent observer (quietly observing and taking notes) and participant observer (engaging in activities and relevant conversation with participants). At the suggestion of some research participants, the research team walked the furthest distance the villagers walk on a daily basis to collect water, and also visited a sacred water body in Diana's Area. The visit to the sacred water body was carried out after permission was granted by the village leadership, and a guide accompanied the researcher and research assistant.

3.4 Participant Selection

Sampling of participants for the study was purposive, aiming to cover a number of village level water users, custodians of traditional knowledge, and officials responsible for water management in the study area. Table 3.1 below gives a breakdown of participants who took part in the study.

	Number of Participants	Role/Position
Individual Interviews		
Women	3	<ul style="list-style-type: none"> Communal farmers
Men	3	<ul style="list-style-type: none"> Communal farmers
Government stakeholders	4	<ul style="list-style-type: none"> Former Minister of Water Resources Development and Management Assistant Manager for Water and Sanitation (Umzingwane Rural District Council) DDF Officer Agricultural extension officer (Agritex Department)
Focus Group Discussions		
Female FGD	10	<ul style="list-style-type: none"> Communal Farmers
Male FGD	9	<ul style="list-style-type: none"> Communal Farmers
Participant Observations		
Female-headed household	1	<ul style="list-style-type: none"> Communal Farmer
Male-headed household	1	<ul style="list-style-type: none"> Communal Farmer

Table 3.1: A breakdown of research participants
Source: Author (2019)

The senior village head for Emsehleni area was the initial contact at the local level. After discussions about the project and the selection criteria, he met with village heads to identify participants. Six household-level interviews were conducted, with one representative from each household. An equal number (3 each) of female and male participants were interviewed at this level. A deliberate effort was made to identify an equal number of female and male participants, as most rural societies ascribe different uses for water to men and women, this has an impact on the traditional practices implemented by the different groups. For example, women may use traditional plants for water purification and men may use traditional water harvesting techniques for irrigation. Application of traditional methods may also differ due to differing degrees of exposure to modern technology and knowledge, and this can be influenced by the ages of community members. Therefore, there was an effort to select participants from different age groups: youths (between the ages of 18 and 35, those between the ages of 36 and 60, and those above 60). However, it was difficult to get youth to participate in the research, no youths were interviewed for the individual interviews.

Three traditional leaders were interviewed, including a senior village head and two village heads (one male and one female). They were selected because of their role in customary law, as custodians of Indigenous knowledge and stewards of water resources. Traditional leaders have in-depth knowledge about traditional water governance systems, and some of them represent their communities on sub-catchment councils. Traditional leaders are able to shed light on how they are engaged by Western-based institutions as well as the role of traditional governance systems in decision making in sub-catchment councils. Four government officials were selected for individual interviews. These included an agricultural extension officer, who was interviewed because of his exposure to rural communities, farmers, water resources and rural livelihoods. Agricultural extension workers are also exposed to challenges and opportunities of introducing Western-based water management methods and technologies in rural Zimbabwe. The second government official interviewed was the assistant manager for water and sanitation at the Umzingwane Rural District Council (RDC). An employee of the RDC was selected because they have representation on the sub-catchment committee and are responsible for the management of local water sources. Traditional water management methods are mainly used in the management of these types of water resources. The District Development Fund department (DDF) was not initially considered as one of the government departments to be interviewed for this study, however, on the recommendation of the CEO of the RDC, an interview was conducted with the DDF Officer. The DDF is a relevant department for this research as it has the mandate to drill, maintain and manage boreholes in rural communities. The former Minister of Water Resources Development and Management (2009-2013), who is also an academic and a farmer in a rural community, was selected for an

individual interview. Having executed ministerial duties (under section 6 of the Water Act, 1998), he was well placed to accurately articulate water governance issues and their implications for rural communities.

Focus group discussion participants were also identified through traditional leadership and comprised 10 females and 9 males from varying age groups. The number of participants in each focus group discussion was small enough to allow all participants an opportunity to make a contribution during the allocated time. The small number also allowed the researcher to avoid multiple participants speaking at the same time, therefore, making transcribing the audio recordings more accurate. Participation in the participant observation component of the research was voluntary, with two households, one female headed, and one male headed, taking part. For the participant observations, a female and a male participant were selected because in rural Zimbabwe there are distinct differences in the use of water among male and female residents.

3.5 Data Handling and Analysis

The interviews and focus group discussions were recorded using an audio recorder and were transcribed in isiNdebele and translated into English by the research assistant for local level interviews. Transcriptions for government level interviews were done in English. The researcher and research assistant made another trip back to Esigodini to return the transcribed interviews to participants for confirmation of accuracy. Three local level participants were accompanied by family members to read the transcripts back to them. All three were elderly participants, two who could not read, and one who had a problem with his sight. After confirmation, hard copy research documents were kept in a locked cabinet when not in use, both in Zimbabwe and New Zealand in accordance with the policy of the researcher's home institution. Furthermore, soft copies of interviews and other research documents were kept on password protected computers and only the research team had access to them. At the end of the data transcription and translation period, the research assistant was requested to surrender all research documents to the researcher and to delete all copies from their computer.

Data analysis was done manually by the researcher, initially through the careful examination of hardcopies of all interview transcripts. The questions for the interviews were organised into four themes which later formed the basis for analysis of the data collected from the field study. The themes are as follows: the Ndebele Group's traditional knowledge systems; Indigenous knowledge and water sustainability; opportunities and challenges of an integrated water governance system; and implications of an integrated water governance system for rural livelihoods. Working with electronic copies of interview transcripts, relevant sections from the

transcripts were grouped under the relevant themes. Similarities and differences in perceptions, beliefs and understandings of each theme were identified. The results chapters (Chapters four, five and six) are built on a foundation of these findings.

3.6 Human Ethics and Confidentiality Considerations

Human ethics are defined by Mackenzie and Knipe (2006) as a set of rules that govern the standard of conduct towards human subjects for the purpose of research. Prior to undertaking the field study for this research, a human ethics application was submitted to the University of Canterbury Human Ethics Committee. The human ethics application was approved on 14 May 2018 ([Appendix A](#)). In adherence with the conditions of the approval, the research team followed the district and cultural norms of the study area, which included visiting the District Administrator's office of the Umzingwane rural council as the first point of contact. The team produced a letter of introduction provided by the primary supervisor of the project, which gave a summary of the research as well as contact details of the supervisor for any queries. The District Administrator granted permission for the team to conduct the research during the initial meeting.

A project information sheet was produced with a summary of the research and this was shared with participants. Each government level official who participated in the study received an English version of the project information sheet and local level participants received a version in the local language. Before any interviews commenced, the participants were required to read the project information sheet and give informed consent. Two consent forms were produced one for those who can read, which was shared with government level participants in English, and was translated into Ndebele for local level participants. A consent form for low literacy participants was produced and translated into IsiNdebele. Participants were given the opportunity to request clarification where necessary, and their right to withdraw from the study was emphasised before any interview activities began. Research participants were requested to sign the consent form after it was explained to local participants in the local language (IsiNdebele) and to government officials in English. Two interview guides were developed, the first was used to guide individual interviews and the focus group discussions for local level participants ([Appendix B](#)). The second was a guide for government level interviews ([Appendix C](#)). The interviews, focus group discussions, and all communication during observations at the community level were conducted in the local language to ensure that all communication was understood by the participants and research team.

Participants' consent to be audio recorded and photographed was requested before any of the data collection activities were carried out. Recorded interviews and focus group discussions were transcribed verbatim. The transcripts were shared with participants to

validate their accuracy, and a family member was requested to read the transcripts out for participants who are not able to read. A research assistant was engaged for the interviews, observations, focus group discussions and the transcription of collected data. The assistant was requested to sign a research assistant/transcriber confidentiality agreement to protect the data of the research participants. Participants consented to having quotations attributed to them and to have photographs published only for the purpose of this thesis, therefore job titles and names are utilised within the thesis. A summary of results ([Appendix D](#)) has been produced and will be shared with participants. It will be translated into the local language for local level participants.

3.7 Field Work Challenges

The field study was conducted between the months of May and July 2018, and this was the period leading up to the Zimbabwe General Election, which was held on 31 July 2018. This period was characterised by high levels of campaign activity, especially in rural Zimbabwe where a large proportion of the population resides. The research team had to schedule interviews, focus group discussions, and participant observations around these campaigns for safety reasons and also because some participants were actively involved in these activities. The study offered no inducements for research participants. The election campaigns, on the other hand, would distribute t-shirts and other publicity materials, and participants would request to reschedule meetings as they preferred to attend these events. The research team, therefore, had to reschedule interviews to accommodate such participants. The campaign activities also reduced the attendance of the villagers in the focus group discussions, as instead of the planned 15 participants per discussion, there were 10 female and 9 male participants. However, the number of participants in each study was still sufficient to generate a vibrant discussion around the issues of the research.

The study had planned to involve a mix of younger and older age groups, however there were mainly older participants for all parts of the field study. The participation of youths who did attend the research activities was minimal and therefore their opinions were not fully captured in this study. The perspectives about traditional knowledge and attitudes of youths documented in this thesis are mainly drawn from the older participants, and they might not have been able to fully communicate the thoughts, beliefs and perceptions of the younger generation.

The agricultural season in Zimbabwe is between the months of October and April. It is during this period that the country receives rains, and rain-fed agriculture is practiced in communal areas. The collection of data was conducted outside this period and therefore there were no farming activities underway in the village during the study months. Gardening activities were

also limited by the low availability of water at this time of the year, especially in individual gardens. The study had anticipated participant observations for 5 days for each participating household, however, the time was cut to 3 days each as the main agricultural activity (cereal crop cultivation) could not be observed at the time of the field work. However, it was easier to get the villagers to participate in the study as they were not pre-occupied with agricultural activities.

3.8 Reflections on the Field Study

The researcher found that some the planned activities for the field study did not go according to plan, and changes had to be made once in the field. Firstly, the researcher had planned to interview local level participants first, and have the information obtained from this group inform additional questions and areas for clarification for government level interviews. However, under the advice of the CEO of the RDC, the government stakeholder interviews were conducted first, as it was indicated that their workload would increase towards the elections. To overcome this change in the initial plan, the researcher asked each government official for their contact information and follow up calls were made after all data collection activities were completed. The CEO also recommended one additional interview with personnel from the DDF, as this department is responsible for borehole drilling and maintenance in rural areas. This increased the number of individual interviews from twelve to thirteen. The additional interview made a significant contribution to the quality of data collected on access to water from boreholes, and the barriers faced by the department in water service delivery.

The interviews with government officials were conducted at their offices, which are open plan shared spaces. The layout of the offices also do not require one to go through reception, and this meant that visitors were walking in and out of the offices for both personal and business purposes. The recordings for the government level interviews, therefore, captured non-interview data such as other employees talking on the phone, or visitors making enquiries about services provided by the departments. This decreased the quality of the data and made transcribing these interviews more challenging. For future interviews in similar setups, the researcher will request for the use of a quiet space such as a meeting or boardroom if one is available.

The researcher also found that during individual interviews, some participants were reluctant to share information, despite being reassured that they were the experts on the subject of traditional knowledge. This reluctance could be attributed to a perception that the study was academic and required highly technical discussions. Participants were more relaxed within the focus group setting, and freely discussed issues with a good amount of friendly debate about water related issues. It was difficult to attract the youth to participate in the study. Other

participants indicated that youth are never eager to engage in activities with no remunerations. The two young females who attended the focus group discussion sat at the back and did not contribute. This could have been because they had opposing views to those of the older participants²³ and did not want to debate with their elders in public, or because they felt uncomfortable among women of an older age group. Having a third focus group discussion for youths and offering incentives to participate could be an approach to encourage their participation. The team also found that local level participants would divert the conversation to the water challenges they are currently facing at every given opportunity during the interviews and would take a long time elaborating on issues. This saw the two focus group discussions running into a little over two hours instead of the planned one to one and a half hours. At the end of the interviews and focus group discussions, participants were keen to discuss some research issues further in a more informal environment over a cup of tea. Information travels fast within the village, and a number of villagers who did not participate in the data collection process knew about the team's presence in the village and were keen to chat with the team. Some of these conversations brought out issues that were not shared by research participants, and this was another unexpected means of gathering information.

Although the main purpose for this research was to contribute to the body of knowledge of traditional ways of knowing and traditional approaches to water management, as an Indigenous woman raised in an urban centre, it became a personal journey. Over the past year of conducting this research, I learnt more about my own cultural heritage than I have in my entire life. For the first time since I was born, I had an intentional conversation with my mother about our traditional ways, including those related to water. I was really surprised by how much she knows and how little she has passed on to my sister and me. The society we have been raised in assumes that we no longer have use for such knowledge. I was educated in a school system that is based on such beliefs, and as I conducted the interviews and participants shared their traditional ways, at the back of my mind I already had Western science-based explanations. I was tempted to request water quality data from the Environmental Management Agency (EMA) and the Department of Environmental Health to verify the condition of those water resources that were deemed healthy by the villagers. This, however, would have defeated the purpose of this research which is meant to be informed mainly by non-scientific actors and perspectives. As the participants spoke about the spiritual aspect of traditional knowledge, in my mind I was comparing it to my Christian beliefs. I realised that the education system in my country and in the region did not equip me to

²³ Culturally, children in African households are taught not to sit among the elders or talk when the elders are having a serious conversation. Young women are also taught not to take part in conversations where their in-laws are making major family decisions as these women are considered children within this family. Joining in on such conversation is a sign of disrespect.

understand my cultural heritage using the lens of an Indigenous person, but it taught me to understand the world from a perspective that is foreign to my people. It is this realisation that made me question whether non-Indigenous people can ever be in a position to carry out research on Indigenous people and traditional knowledge.

I have had experience working with rural communities and I always go into their communities with a respect for their ways of doing things. However, I can never get used to the gender disparities that still exist in these areas. In rural Zimbabwe there are so many rules around acceptable dress for women. For example, women cannot wear pants as this is considered disrespectful. I had to follow these rules and wear a dress or skirt during the field visits, however, there were no rules about dress for my male research assistant. In most rural communities men are still considered superior to women. I found that at the local level, if there was one chair, it would be offered to the research assistant who was younger than I am, but because he is male, he was given priority over me. Having been raised in the city where I was taught that I could achieve and exceed anything my male counterparts could, it is difficult not to challenge cultural norms that discriminate against women. However, through previous work with rural communities, I have grown to understand that challenging the status quo in an unorganised manner in such communities can do more harm than good especially for women in the village.

3.9 Chapter Summary

This chapter has outlined the research methods used for this study. The study is qualitative in nature and used three methods to collect data. These are individual semi-structured interviews, focus group discussions, and participant observations. Sampling of study participants was purposive, and the senior village heads and other traditional leaders played a major role in identifying willing participants whose perspectives would offer insights into the research questions. Measures were taken to ensure that the conditions of the human ethics application were met, and these included providing participants with all the relevant information to make informed decisions about their participation in the research. The participants were provided with copies of their transcribed interviews for verification and they will also be provided with a summary of research findings in their own language. The data collection schedule had to be changed to suit the availability of both local and government level participants. Although the study provided for such flexibility, the participation of youths in all aspects of the data collection process was limited. Local level participants were more open to discuss research issues within the focus group discussion and informal contexts as compared to in the individual interview setting. The changes in the research plan, including additional interviews and unplanned sources of information provide some points for

consideration for those embarking on similar studies in the future. The chapter that follows is the first of three results chapters, and it will discuss the traditional water management systems that are specific to the Ndebele people of Esigodini Village.

Chapter Four Research Results The Ndebele People's Traditional Knowledge

4.1 Introduction

This section (Chapters four to six) of the thesis presents the results and analysis of data collected using semi-structured interviews, focus group discussions, and participant observations. This chapter, the first of three results chapters, presents traditional knowledge specific to the Ndebele people under four sections using the knowledge-practice-belief framework for analysis adapted from Berkes (1999). The first section focuses on the group's knowledge of land, water and animals, and how they use this knowledge to determine water quality and quantity and to predict weather conditions. The second section looks at how amaNdebele use their knowledge of the environment to manage water resources and to craft water rules in the village of Esigodini. The third section of this chapter highlights the roles of social institutions in the management of water resources at the local scale and in the enforcement of community water rules. The final section gives an overview of how the Ndebele people view the world and how this influences their perception of water. This section also looks at the traditional water ceremonies that are conducted by the Esigodini villagers based on their belief in the existence of more than one realm (the spiritual and the natural worlds).

4.2 Local Knowledge of Land, Water and Animals

4.2.1 Environmental Monitoring

Local level participants believe that they have comprehensive, accurate, and up to date knowledge of the environment compared to government employees who visit specific parts of the village infrequently to collect data using sophisticated data collection tools. According to, Ndlovu, the District Development Fund (DDF) officer, the monitoring activities of government departments are limited by the scarcity of resources including funds, motor vehicles, fuel and human capital. He confirms that the villagers usually provide accurate information about environmental conditions, and over the years government departments have become reliant on the villagers to report any significant changes in water resources and outbreaks of waterborne disease.

Women who participated in the focus group discussion believe that the long distances they walk to collect water familiarises them with their surroundings. They walk these routes several times a day, making it easy to identify the slightest changes in the surrounding environment. The women observe that when they collect water in the morning the water in the river is usually very clear, and they associate this with clean water. However, when they collect water later in the day it is less clear and sometimes murky, and they associate this with contamination which occurs throughout the day. They are always on the lookout for *ingubo zamaxoxo* (algae) as

they believe that these indicate a serious decline in the quality of water that can cause diseases if consumed. Those women who collect water from boreholes also prefer collecting water early in the morning, as they believe that groundwater recharges overnight when it is not in use, and they can get the best quality and quantity of water in the morning compared to later in the day.

Watering of livestock is the responsibility of men and boys and this is done at the lower reaches of rivers and streams. Male participants attest that water at these parts of water bodies is murky throughout the day, and they believe that it is more contaminated than water upstream, because all contamination that enters water upstream finds its way downstream. They believe that the illegal alluvial gold mining activities are causing most of this contamination, however, the miners come from all parts of the country and are therefore difficult to manage under the local water rules.

The Esigodini Villagers believe that a healthy water body is one with a wide variety of live aquatic organisms. They do not randomly kill aquatic organisms, and regard dead organisms in water as a sign of contamination. Participants believe that *amadlamedlu* (bull frogs) are sensitive organisms and are a good indicator of water quality, and that changes in the behaviour of frogs, such as migration, mean there has been a decline in water quality or quantity. Monitoring of water quality and quantity in the village is mainly through sensory means of sight and smell. Word of mouth is used among the villagers to warn each other about potentially hazardous water conditions including contamination and flooding in different parts of the village.

4.2.2 Drought Early Warning

In order to get accurate early warning drought information, the Esigodini villagers use a combination of traditional indicators from the surrounding environment, and these include plants, trees, animals and birds as well as the moon, sun, stars and wind. Participants have been taught about how to read signs in the environment and to detect changes in the behaviour of animals, birds, and insects at an early age by grandparents, parents and other older residents. One example of a plant that is used for drought detection is the *umevha* (thorny bush), the villagers believe that when the tree is green and has too many leaves in the months of November and December, low rainfall and subsequent drought conditions are expected. The *xakuxaku* (snot apple) is another example of a plant used by the villagers, and according to participants, if it has a lot of leaves in November and sheds the bulk of them in December, this signals a dry season.

Animals, birds and insects used for drought warning include domestic animals that the villagers have easy access to on a daily basis. These animals include *inkomo*, (cattle), which they believe breed less, and lose their young before birth at a higher rate than usual, when below average rains are expected. Male participants speculate that animals prefer to breed when they know that the conditions will allow them to provide food and water for their young, therefore rates of breeding decrease when conditions are not favourable. The *macimbi* (mopane worms) are also used for drought detection, and when they are low in number in the month of April, drought conditions are certain.

Participants also believe that when there is too much *umoya* (southerly winds) between the months of September and October, then dry conditions are to be expected. If in the months of June and July there is no *ungqwaqwani* (frost) in the early hours of the morning, drought and poor harvests are expected that coming agricultural season. Older participants stated that by using more than one indicator they can usually make accurate predictions and can prepare for unfavourable conditions. However, there is a concern that over the years, some plants and animals have disappeared, with some becoming extinct. Participants have witnessed changes in the behaviour of some animals, birds and aquatic organisms, with some migrating to areas where weather conditions are more favourable. Participants are of the opinion that these changes are making it difficult to accurately predict weather conditions and to pass on this knowledge to the next generation.

4.2.3 Signs of Good Rains

According to an agricultural extension officer interviewed for this study, agriculture is mainly rain-fed for smallholder farmers in this area, and it is the main source of food, livelihoods and employment, and therefore low-cost indicators of good rains are used by these farmers who have little disposable income. Discussions at water points and social meetings are mainly centred around rainfall expectations for that season, and it is a common topic for all groups in the village. As in drought prediction, mixed indicators for predicting abundant rains are utilised, and these include the use of the *mukakate* (star-chestnut) tree. When this tree has too many seeds during the months of August and September the residents expect above normal rains. The *umganu* (marula) tree is also used by the villagers. When it bears a lot of fruit during the months of May and July, they expect abundant rainfall.

When the *inkanku* (Jacobin cuckoo) sings more than usual towards the month of October (beginning of the rainfall season), higher than normal rains are expected for that season. A large number of *intethe* (locusts), between the months of September and November are also believed to be reflective of good rains. The participants also highlighted that they were taught at a young age that “there is no rain without heat”, therefore, *ukutshisa* (heat waves) between

the months of August and October are indicative of the onset of the rainfall season. They also believe that if a big circle is witnessed around *inyanga* (the moon) between the months of July and September, then above normal rainfall is expected.

A male village leader who participated in the focus group discussion reminisced on how the eMangweni mountain would produce smoke just before the onset of the rains, and he attests that not long after witnessing the phenomenon, they would receive higher than normal rains and a bountiful harvest. In the past, it was taboo to point at the eMangweni mountain, and it was believed that one would disappear after such an act. However, the younger members of the village break this rule often. The mountain does not smoke anymore, and village elders are of the opinion that this disrespect of cultural beliefs is the cause of uncertain rainfall conditions, which have caused devastating crop failure over the years.

4.3 Water Management Systems

4.3.1 Community Water Rules

The villagers' intimate knowledge of the surrounding environment and animals aids them in crafting community rules around the collection and use of water. The rules are not documented, but are shared by word of mouth. According to the traditional leadership, they are usually not tabled for debate, but are generally accepted within the social group. Annie, a female village head, shed light on the process of crafting community rules. The traditional leadership of the village meets to discuss, debate, and formulate water management rules when changes need to be effected. Following this, a village meeting is called and chaired by the senior traditional leader who shares the outcome of the traditional leadership meeting with the rest of the villagers. Water management rules are spread by the villagers by word of mouth to those who were not present at the meeting, as well as to children.

According to participants, traditional water sources²⁴ are demarcated into sections. Upstream sections of rivers and streams are used for the collection of water for domestic purposes, including drinking and cooking. It is believed that water in these parts of water sources is less contaminated. The lower reaches of these water sources are utilised for watering livestock, and collecting water for laundry and bathing purposes. There are also rules around the types of vessels that are used for collecting water. The villagers cannot collect water using black vessels, as they believe that these conceal potential contaminants. Residents are also not allowed to use metal containers as these are prone to rusting when exposed to water and can make them sick, especially young children. Villagers are prohibited from cultivating crops near water bodies and from using wetlands for agricultural purposes. Bathing and the use of soap

²⁴ The villagers use this term when referring to water sources such as rivers and streams

in pools, rivers or streams is also forbidden. Some households have their own deep wells, and although there are no rules that force them to share this water, they allow neighbours to fetch water. It is believed that if one withholds water, their water source will dry up and they will be plagued by bad luck.

Traditional leadership also sets rules for the collection of water at communal boreholes and enforcement is stricter during drought periods or at times when water levels are low. Enforcement of firmer rules can begin when the residents have read signs in the environment and are agreeable that dry conditions are to be expected. During these periods, villagers are not allowed to water livestock using water from boreholes, they have to walk longer distances to other water sources such as rivers and streams to access water. According to a village leader, water for human consumption is of high priority at this time, and no one is denied access to water for this purpose. The assistant manager for water and sanitation for the Rural District Council (RDC), confirmed that men and boys can walk up to 5kms to access water for livestock during times of water shortages.

Women usually collect water using single buckets from boreholes, which are carried on the head, whereas men can transport a number of containers using wheelbarrows and scotch carts (figures 4.1 and 4.2 below).



Figure 4.1: Tholakele walking home from the borehole
Source: Author (2018)



Figure 4.2: Richard pushing a wheelbarrow to the borehole
Source: Mkandla (2018)

If an individual has several water buckets, they are only allowed to fill a few and return to the end of the queue so that those with single buckets get an opportunity to fill their buckets. This rule was not crafted by the traditional leadership, but villagers identified this area of conflict and put in place measures for its resolution.

4.3.2 Folklore, Mythical Creatures, Totemism and Taboos

Traditional knowledge is characterised by the use of taboos, folklore, totemism and mythical creatures. Such information is mostly passed on orally within the family setting. The participants recalled how after supper, when the dishes had been cleared, the children would sit on the floor around the fire and their grandmother, who was viewed as the matriarch of the family, would tell them *inganekwane* (folktales). Participants believe that the folktales were meant to teach them life lessons and inculcate strong cultural values. Some of the stories were centred around water and the behaviour that was expected when collecting and using water. A female participant, Thando, tells of a story her grandmother told her when she was young (box 1 below):

Box 4.1: Thando's story about the mythical dolls

When I was young, I was told of my aunt Ntokozo, who as a child went to fetch water at Emsehleni River. As children, they were not allowed to spend time playing at the river, but, were supposed to collect water and head straight back home. However, on this day my aunt and her friends could not resist the urge to play a game of *umatshayana* (a ball game played by little girls in rural areas) on the river's sandy banks. After a few minutes of play, a doll appeared and would pop in and out of the water while the children watched in a trance like state for hours and could not move. After realising that the children had been gone for too long, my grandmother went after them, the doll disappeared, and the children were taken back home. The story spread across the village and to other villages, and from that day my aunt and all the children from the village who heard about their experience went straight home after collecting water from the river.

Figure 4.3: Thando's story about the mythical dolls

Older participants highlighted that such a story would be told to children for two reasons. Firstly, this would help to prevent contamination of water bodies, especially with soil, as they can cause the collapse of the river bank while at play. They also believe that children can introduce foreign items such as plastic, paper, and bottles into water bodies. The second reason is safety, as children in rural areas are not taught how to swim and are at risk of drowning if allowed to play for long periods by the river. Children playing alone, far from home are also easy targets for paedophiles and therefore playing at rivers is discouraged.

Although *injuzu* (mermaids) are foreign to the African culture, they are mythical creatures that are used widely in Indigenous circles to instil fear in community members, and prevent them from contaminating water sources. A village leader believes that tales about mermaids were introduced by the British who travelled to Rhodesia (Zimbabwe) by sea and told of their encounters with these mythical creatures. He also added that the use of foreign creatures by the elders was strategic, as it instils fear of the unknown and makes the villagers follow water rules. In Esigodini, it is believed that sacred water sources or parts of rivers, streams, and pools have mermaids residing in them and they protect the water source. The villagers believe that if one defiles these sacred water sources, they disappear and will only be seen again after traditional cleansing ceremonies have been performed, and sacrifices in the form that the ancestors communicate to the traditional healer or spirit medium have been made.

All Ndebele surnames have a totem associated with them, which is usually an animal. It is taboo in the Ndebele custom to eat the animal that is linked to one's totem. A traditional leader stated that if one's surname is Nhlanzi, their totem is fish and they cannot eat fish. This, he believes, is a way of rationing the consumption and depletion of animals by a growing human population. He adds that if fish are depleted, or some species become extinct, the villagers will not be able to effectively monitor water quality. If one goes against the totemism rule, their clan is plagued by bad luck until a ceremony is carried out where they have to sacrifice a number of animals from their herd. For a Ndebele family, this is the ultimate punishment as cattle are a sign of wealth and social standing, which commands respect for the clan in the village.

Defying taboos in the Ndebele culture is usually linked to consequences such as the drying up of water sources. A village leader gave an example of how breaking the rules around the use of wetlands can cause water sources in the village to dry up and an entire village to suffer the consequences. The village leader argued that if punishment is not directed at an individual, but at the entire village, the residents will be more vigilant about protecting and conserving water and are willing to "name and shame" offenders.

4.3.3 Water Harvesting and Purification

Some households have keyhole/kitchen gardens and water used for domestic purposes is reused for watering gardens. Most households have individual gardens, which are usually located close to water sources, and water is collected directly from the water source using buckets. The villagers have over the years developed methods of harvesting and conserving water based on their knowledge of periods when water is scarce. Furrows are used in gardens to reduce water loss and small amounts of water are stored in planting stations and are released slowly throughout the day. Rainfall in Esigodini is usually experienced in short intense bursts, and canals are used to divert water from cropping fields into small ponds. This water is then used to water crops when rain ceases, and the fields start getting dry. Mulch made up of grass and crop remains from the previous agricultural season is also widely used to reduce water loss from cropping fields.

When all conditions are normal, participants do not purify water, including water collected from rivers and streams. However, when there are disease outbreaks, or they observe changes in the quality of water, low cost water purification methods are used. Female participants as primary caregivers are responsible for water purification and they all mentioned obtaining this knowledge from female family members including their grandmothers, mothers and aunts. Water purification methods used include boiling, use of a kitchen cloth as a sieve to filter

sediments, and the use of the moringa oleifera plant as a natural coagulant has become popular in the village in recent years.

4.4 Social Institutions

4.4.1 The Community Members

The Esigodini villagers have water rules in place and social institutions to ensure that these rules are followed and enforced. An Agritex officer stated that, although there are traditional leaders in the village, water management begins at the lowest level – that is at community²⁵ level. The African principle of *ubuntu*²⁶ is practiced within the community, and it is everyone's responsibility to ensure that all members of the community have access to water, including those who do not have the ability to collect their own water. Women in the community explained how they take turns to fetch water for older members of the community and anyone who is unwell, and these community members are also exempt from contributing towards the repair of boreholes. When there are traditional ceremonies within the village, men and boys from the different communities ensure that there is adequate water, and use scotch carts²⁷ to ferry water from water collection points to the venue of the ceremony. The women ensure that the water collected is utilised to meet the requirements of the ceremony.

Community members also have the duty of monitoring water bodies and reporting negative changes to village leaders. Residents spoke of how they share information about water management rules with each other, and how they have resolved minor water disputes among themselves. Residents also identify those who break water rules, and for minor offences such as jumping the queue at water collection points, the offender is reminded of the rules and given a warning. Major offences and repeat offenders are referred to the traditional leadership.

4.4.2 Water Committees

Although water committees are an externally introduced concept, and are not part of the traditional water governance structure, they were mentioned by over 90% of participants and it is evident that they have become an integral part of water management in the village. Water committees were introduced as a means of overcoming government resource constraints by decentralising some of the duties of the DDF. The government, in collaboration with traditional leaders, identified villagers whom they trained in the repair and maintenance of boreholes. They are not recognised in the Water and ZINWA Acts, nor are they formally employed by the government, but they do the work on a voluntary basis. Their role is to troubleshoot borehole

²⁵ The village is made up of a number of small communities.

²⁶ An African ethic which can be likened to the concept of "I am my brother's keeper". It is underpinned by giving a helping hand without expecting anything in return.

²⁷ A scotch cart is a four wheeled cart, drawn mainly using donkeys or cattle. It is a major asset in Zimbabwe, and in most cases, it belongs to men within a household.

problems and identify the required parts and costs of repairs. Once they have this information at hand, they present it to the senior village head, who makes arrangements for the collection of contributions from the residents. If the committee fails to identify the problem or cannot repair the borehole, they refer the issue to the DDF's technical department.

Water committees can engage the villagers in conflict resolution around the use of boreholes, however, participants showed a lack of confidence in their ability to effectively manage conflict. Participants had more confidence in the traditional leadership structure in this regard, with one participant stating that they trust village leaders because they are figures of authority and have experience with dealing with conflict. Water committees, on the other hand, are made up of ordinary villagers who have little experience in the area of managing water disputes.

4.4.3 Village Heads

Village heads fall under the leadership of the senior village head and are responsible for a small number of households in their *bhuku* (area). Although village heads are predominately male, over recent years, there has been an increase in female village heads. Traditional leaders at this level are responsible for resolving minor conflicts associated with water resources and some offences. However, they do not have the authority to preside over issues where the offender will need to be fined. The village heads are also responsible for gathering information on water issues faced by the households they represent, and taking them to the senior village head for consideration and resolution.

The senior village head usually calls for a meeting with village heads before he attends high level meetings with the Chief. These pre-meetings give the village heads an opportunity to give input into water issues that are tabled for the agenda of the high-level meeting. It is the duty of these traditional leaders to attend feedback meetings upon the return of the senior village head. They in turn share the information with the residents under their *bhuku*, including information on water boundary demarcations, allocation of water, and changes in water rules and fines.

4.4.4 Senior Village Head

The villagers do not have direct access to the Chief, and therefore the senior village head is the link between the people and the top-ranking leader. The senior village head interviewed for this study stated that his key duty is to ensure that the villagers have adequate resources, including water, to meet their daily requirements. He receives information about water issues in his area from the village heads whom he meets with on a regular basis. Water problems are relayed to the Chief during scheduled meetings, and for urgent issues, he can request an

audience with the Chief. High level decisions are made about water at these meetings and these decisions usually have implications for the entire village.

The senior village head also presides over cases where villagers have broken water management rules and the offence is deemed too big to be handled by the village heads, but too minor to be referred to the Chief. He has the authority to hand out fines usually in the form of small livestock such as chickens and goats. Should the senior village head fail to solve a case, it is taken up to the Chief's court for resolution.

4.4.5 Spirit Mediums

The Ndebele group believes that those relatives who have departed (ancestors) reside in a space between the earth and the heavens, and that they watch over and guide them. Spirit mediums are an integral part of traditional leadership and are the Chief's main advisors. It is believed that they have the ability to communicate with the ancestors and spirits, including the water spirit. According to focus group participants, the Chief is the custodian of resources on behalf of the ancestors, however, he cannot communicate directly with them and, therefore, he needs a spirit medium to relay messages between the two worlds.

Spirit mediums take the villagers' requests (for rain during droughts, or for the rain to cease during floods) to the ancestors, who in turn take the requests to *uNgwali* (God). Instructions for the actions to be taken by the villagers are communicated back from *uNgwali* through the spirit mediums. They are responsible for relaying these messages to the Chief and traditional leadership, who in turn action the instructions. The spirit mediums preside over traditional ceremonies and sometimes ancestral spirits channel themselves (possession) through the bodies of spirit mediums to deliver messages to the villagers.

4.4.6 The Chief

The *induna* (Chief) is highest ranking in the traditional leadership hierarchy and is treated with high esteem in the village. The former Minister of Water Resource Development and Management shed light on the role of *izinduna* in contemporary water governance. It is the duty of the Chief to meet with senior village heads on a regular basis, and have current information about water issues in the village to enable him to fully represent his people at fora such as Rural District Council meetings. The Chiefs hold the post for their entire lifetime, and are ex-officio members of RDCs and can speak about development challenges including water issues, but they do not have a vote. Therefore, they can only influence decisions but cannot be a part of final decision making processes. The Chief represents his village at sub-catchment council meetings, however the former Minister highlighted that resource constraints have left most sub-catchment councils defunct, and therefore this platform is no longer available for

discussion of local level water issues. The senior village head stated that when the sub-catchment councils were functioning, the participation of the Chief was limited as issues that are of concern to communal farmers were not discussed at these meetings.

The *izinduna* chair meetings where there is conflict among village leaders over the use of water resources, especially those resources that are shared by the community. Decisions made at this level are often final and cannot be appealed. The *induna* also presides over village courts and passes judgement over major offences such as knowingly polluting water sources. This level of traditional leadership has the authority to pass judgement and issue hefty fines. They also have the authority to banish people from the village for water offences, however, no one is ever denied water as the result of an offence.

Under the advice of the spirit medium, the Chief sanctions traditional water ceremonies and mobilises the required resources. It is also their duty to ensure that all instructions from the ancestors are followed, and any sacrifices required to appease them during times of drought and flooding are made.

4.5 The Worldview of amaNdebele

The Ndebele people are a very spiritual group, believing in a supreme being, and other realms beyond this earth. The research participants at both local and government level concurred that the Esigodini villagers believe that rain is a gift from God, and no one can lay claim to water. AmaNdebele also believe that water is a common property resource that should not be denied to anyone, and this is evident in the way they demarcate boundaries and allocate water in the village. They view themselves as stewards rather than owners of natural resources. The villagers also believe that all elements of the environment have a spirit and a soul and should be treated with the respect of living beings. The Ndebele people view all aspects of the environment including air, water, and land as one entity whose management should not be separated. A village leader spoke about how they look after the environment, including water, and it looks after them in return.

Although the Ndebele people are very spiritual and believe in *uNgwali* being a superpower who provides for them, they do not have direct access to God, and traditional water ceremonies are conducted to bridge the gap between the two realms. The sections that follow will discuss the traditional ceremonies held by the Esigodini villagers to pray for rain, appease the ancestors and spirits, and to celebrate the onset of the rains.

4.5.1 Traditional Water Ceremonies (INjelele)

The Njelele Shrine (figure 4.4 below) is a national water shrine where the nation's 13 Indigenous groups conduct traditional water ceremonies to request rain. Under the instruction

and approval of the Chief, a Ndebele delegation consisting of women who have reached menopause and young virgin women dressed in black²⁸ traditional clothing walk barefoot to the Njelele Shrine. Men accompany the women for protection and to help them carry the traditional materials to be used at the site.



Figure 4.4: The Njelele Shrine where the rain spirit is believed to reside
Source: Bulawayo24, 2011

The ceremonies are performed in August and rains are expected to start in October. According to the senior village head, the rain spirit resides in the rocks at the shrine. A party which consists of women who are deemed pure take the supplications of the villagers to the site on the instruction of the village leaders.

The Ndebele delegation carries with it livestock, including goats and chickens, clay artefacts, and red millet collected from the villagers. These items are carried as a sacrifice to the water spirit who is believed to be female. According to local level participants, in the past she would speak to the visitors giving them instructions for ceremonies to be held in the village. However, over the years the traditional shrine has been defiled, and the villagers believe that this has angered the spirit and she has stopped speaking to the visitors.

The villagers believe that, after offering their sacrifices and performing rituals that a select few are privy to, and none of the study participants could share, the rain spirit takes their requests to *uNgwali*. The village then receives rains in October. On the party's return to the village, they

²⁸ Black is believed to be symbolic of rain clouds.

report back to the Chief and a traditional ceremony is carried out to thank *uNgwali* and to celebrate the anticipated rains. A traditional leader had the following to say:

“Growing up we knew that if we experienced a drought, people would be sent to the shrine to get instruction from the water spirit, and after performing water ceremonies, it would surely rain”. Annie (village head)

Some participants felt that the changes in climatic conditions currently being experienced, especially droughts, are because these ceremonies are no longer being performed, and if they are, traditional protocol is not being fully followed.

“In the olden days we would experience dry spells, however, they have now become more frequent and their impact on our people has become more severe.” Moyo (communal farmer)

Others believe that uncertain climatic conditions are due to the shrine being defiled, with people coming from all over the world to visit the shrine as a tourist attraction, and some locals hosting parties. The shrine has a caretaker and all visitors are supposed to go through him, however, this is no longer happening. It is believed that this has angered the rain spirit into silence, and a ceremony needs to be conducted to appease her, and cleanse the shrine. However, this is a national water shrine where people from all parts of the country, and from different groups, perform water ceremonies. A cleansing ceremony would require the coordinated effort of several stakeholders.

4.5.2 Village Level Water Ceremonies

Once the Njelele delegation has made their report to the Chief, he organises a village level traditional water ceremony to celebrate the coming rains. Other water ceremonies are carried out at different times of the year on the advice of spirit mediums who receive specific instructions from the ancestors. These ceremonies can be carried out to show appreciation to the ancestors and the rain spirit when the village has received rain. They are also conducted to appease the ancestors if a dry spell is being experienced, or to ask for advice about cures when there is an outbreak of waterborne diseases.

During focus group discussions, older participants spoke of the conduct that is expected during traditional ceremonies. All people are expected to be barefoot, as shoes are a sign of disrespect to the ancestors, and they can refuse to be a part of that particular ceremony. Women are expected to wear traditional cloth over their heads and tie some of the material around their waists, and men cannot be in shorts. The spirit mediums are expected to wear the red, black and white traditional cloth and they are expected to lead the group in traditional

song and dance. *Igwayi lamakhala*²⁹ (snuff) and *umqombothi*³⁰ (traditional beer) are scattered on the ground and it is believed that ancestors sniff the snuff and drink the beer from the ground. As the ancestors indulge themselves with the offerings, the crowd claps its hands as the spirit medium, and sings praises to the ancestors using *izitemo* (praise names). Once satisfied, the ancestors possess the spirit medium, and sometimes female spirit mediums can have male ancestors channel themselves through them, and communicate to the people using a male voice.

The villagers believe that ancestors give instructions to them, declaring some water bodies sacred, or ordering sacrifices that need to be made to appease *uNgwali*. Instructions can be extremely detailed, giving names of persons to lead sacrificial ceremonies, places, and times. It is the responsibility of the Chief and the traditional leadership to ensure that all instructions are followed, as failure to do so can mean punishment for the entire village, which can be in the form of droughts, consecutive years of crop failure, and hunger.

4.6 Chapter Summary

Through local level environmental monitoring, the Ndebele group has in depth knowledge about land, water, animals and plants, and this is evidenced by their ability to utilise them as indicators of drought and good rains. AmaNdebele use this knowledge to manage water resources, including rationing water use when drought conditions are expected, conserving water in gardens and cropping fields, and crafting water collection rules. The community plays a major role in ensuring that water rules are adhered to at the lowest level, and there are traditional leadership structures including village heads, senior village heads, spirit mediums, and the Chief who ensure efficient water management in the village. Although roles of traditional social institutions and water management rules are not documented, they are passed on orally within the village, and are generally accepted.

The villagers believe that rain is a gift and they are merely stewards of the resource. It is this worldview that has led to a reciprocal relationship between the villagers and water, with the people looking after water, and it in turn looking after them. The Ndebele believe that water should be made available to everyone in the village in a non-discriminatory manner, and evidence of this is seen where punishment for offences never includes exclusion from the use of water. Although traditional knowledge is still being used in Esigodini, it is evident that it has evolved due to exposure to other ways of knowing. Evidence of this is seen in the introduction of water committees. The chapter which follows will use examples from two areas in Esigodini

²⁹ A powdered tobacco by-product which is believed to be a favourite of the ancestors.

³⁰ A beer brewed by select members of the community, it is made from sorghum and is left to ferment for several days in traditional clay pots.

to show aspects of traditional knowledge that still exist and those that have changed, and how the use of this knowledge impacts the sustainability of water resources.

Chapter Five

Indigenous Knowledge and Water Sustainability in Esigodini

5.1 Introduction

This chapter uses two areas in Esigodini as examples, to assess how the utilisation of Indigenous knowledge can encourage sustainable water use, and how its disintegration can contribute to challenges of accessing water. Linking traditional knowledge and practice to the sustainable use of water is a vital component for this study. It would be counter-productive to integrate Indigenous and Western-based water management systems if these practices are currently yielding negative results for water resources and livelihoods in the village. Esigodini has a small population of 2,228 (Zimstat, 2012), with senior village heads responsible for a specific area within the village. Due to its population size, it is easy to assume that the application of Indigenous knowledge is uniform across the village. However, factors such as distances from the main centre, and access to electricity and modern technologies, influence the utilisation of traditional knowledge in the different areas.

The first area this chapter will look at is called Diana's Area. The community here is still rooted in its cultural beliefs, and uses traditional knowledge on a daily basis to manage water resources. There has, however, been an infiltration of other ways of knowing to overcome some water challenges faced by the community in this area. The second area is the Emsehleni Area, which is very close to Esigodini Centre and the main road, with access to electricity and some modern technologies. Although some aspects of traditional knowledge still exist and are still being utilised at Emsehleni, this knowledge has been highly eroded and is at risk of being completely lost to future generations.

5.2 Diana's Area

Diana's Area is located 32km from Esigodini's main centre, and according to senior village head Mpfu, it does not have an Indigenous name because it was named after the first District Commissioner's³¹ spouse. Although the area is not very far from the main centre, it has no access to electricity and there is very little access to modern technologies such as television and internet services. Some households own solar or battery powered radio sets, but the purchase of daily newspapers is not high on their list of priorities. According to participants, the community in this area is still highly dependent on traditional knowledge for the management of water resources. However, the residents have an awareness of changes in weather patterns and the high demand for water associated with population increases. It is with this understanding that the community, including its traditional leadership, is open to new ways of learning and knowing. The section that follows will discuss traditional water

³¹ Upon arrival to Rhodesia, British settlers changed names of places from indigenous to Western names.

management practices that are currently being implemented in Diana’s Area and how these practices are impacting water resources. The section will also highlight how the community has integrated other ways of knowing to improve access to water for livelihood projects.

5.3 Traditional Knowledge and Water Resources

5.3.1 Conservation and Protection of Water Resources

According to research participants, traditional leadership structures are still firmly in place in Diana’s Area, with clearly defined roles and responsibilities in the community. Community rules are still being utilised to govern the collection and use of water, and they continue to be shared among community members of all age groups. Traditional water ceremonies continue to be performed at specific times of the year and protocol for these ceremonies is still being followed. Senior village head, Mpofu, is responsible for this area and he identified the Embizeni Pools (figure 5.1 below) as a water body where traditional rules and practices are still being fully implemented.



Figure 5.1: Embizeni Pools
Source: Author (2018)

The pools are located upstream of the village and are set on a bed of granite rock where depressions have formed over the years due to the wearing down of rock during rainfall and other weather events. Several water pockets (figure 5.2 below) have formed over the granite rock hence the Indigenous name Embizeni meaning “place of pots”.



Figure 5.2: A “pot” at Embizeni Pools
Source: Author (2018)

Pre-colonisation, the site was considered sacred by traditional leadership, and rules were put in place to protect the pools from exploitation. However, during the colonial era, the first British District Commissioner renamed the pools in 1962, and they became known as “Diana’s Pools”. The Commissioner had a vision for tourism development for the site, and two chalets were constructed and widely advertised for this purpose. However, these are currently idle, and community members believe that the ancestors were displeased with the plans to open up the site for tourism. They have since reverted to calling the site Embizeni Pools, and community rules have been reinstated. A village leader suggested that it is important to revert to Indigenous names because the aggrieved land and water³² receive healing, and the community can also be healed of past hurts and move forward.

The use of the pools for purposes other than traditional ceremonies is prohibited. The site is used for cleansing ceremonies, animal sacrifice, and water dance ceremonies. Vegetation is allowed to grow naturally around the water body without interference from humans or grazing domestic animals. The community is not allowed to fetch water, bathe, or water animals at the site, and it is believed that those who defile the pools face the wrath of the spirits that reside in the water body. Visitors are allowed at the pools, but only under the guidance of the site’s caretaker, Nxumalo. The caretaker escorts visitors through the pools and ensures that all

³² Land and water are viewed as living beings and therefore have human emotions.

protocol is followed, including introducing the visitors to the spirits and stating the purpose of their visit to the site. The researcher and research assistant for this study visited the site under the watchful eye and guidance of the caretaker. Nxumalo made sure that the visitors did not collect any water samples or place any foreign objects in the pools. Although there are homesteads located about 500m from the site, at the time of the visit, they were deserted with no sign of people or domestic animals.

The Embizeni Pools are a source of recharge for the Mbilambowe River (figure 5.3 below). Here, the community is allowed to fetch and use water for different purposes, however, community rules apply.

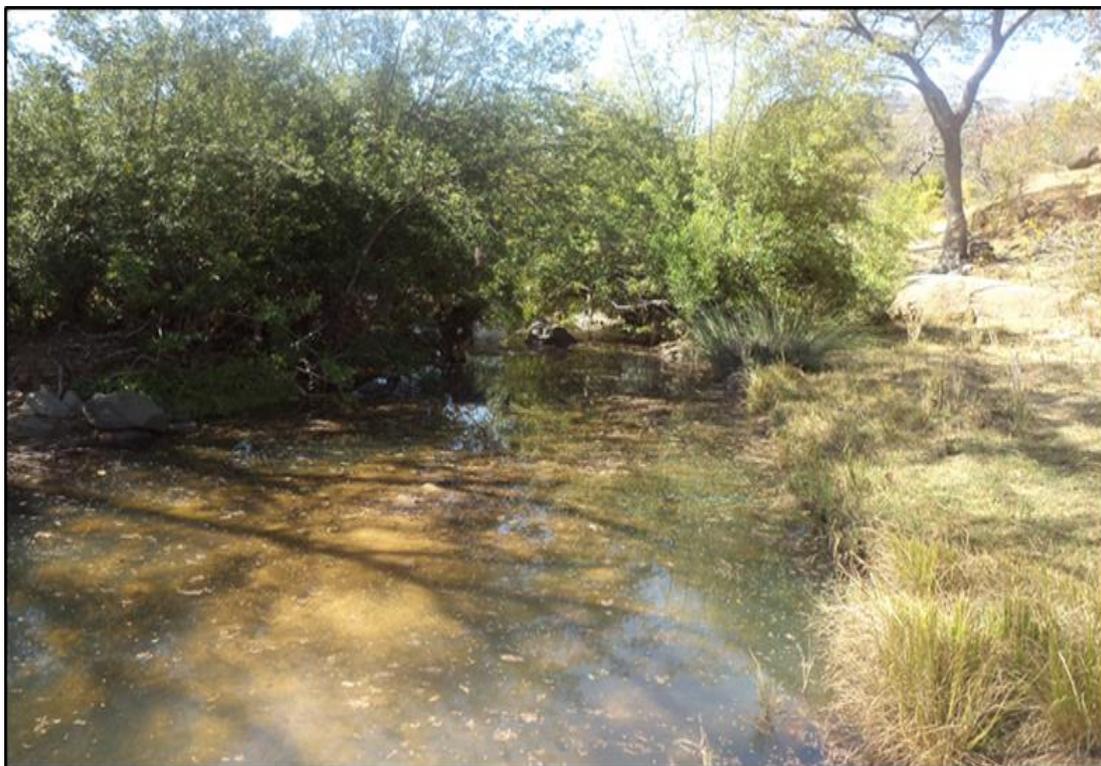


Figure 5.3: Mbilambowe River
Source: Author (2018)

A community member who took part in the participant observations component of the study indicated that no one is allowed to clear vegetation from the river bank, including riparian plants and trees (e.g. Indigenous acacia trees). It is believed that spirits reside in some trees and it is taboo to cut them down. Water cannot be collected after dark, and there are rules around the type of vessels to be used when fetching water. Female participants spoke of how a few years ago they could only use *inkezo*³³ to fetch water from the river and pour into buckets. This rule has been relaxed as traditional leadership grew to appreciate that it was making the task of water collection, energy and time consuming.

³³ A small wooden vessel carved into the shape of a cup with a long handle

Other rules around the use of water at the Mbilambowe River prohibit spitting, urinating, and dumping of foreign objects in the water body. A general rule among community members is “do not kill what you will not eat”, the community is only allowed to catch enough to meet their needs³⁴. It is believed that if any of these rules are broken the river will dry up, and if one is caught on the wrong side of customary law, they must stand before the village court. Depending on the severity of the offence, the offender is fined chickens, goats, or cattle. The livestock collected from such fines are used in sacrifice during traditional ceremonies.

5.3.2 Integrating Other Ways of Knowing

Participants mentioned on different occasions that the population in their area is growing, and they worry that traditional water sources will no longer be able to adequately support the growing population. They also fear that changes in weather patterns will make traditional water sources less reliable. Traditional leadership is, therefore, looking into establishing alternative sources of water to meet the increased demand for water for domestic purposes and livelihoods. The DDF officer highlighted how they collaborated with the community in the siting and construction of the Mbilambowe Dam, which is located downstream of the village:

“We cannot choose the location of a water source, the local communities lead the process and can deny us access to certain areas which may be the most suitable location.”

Before any work could begin at the site, traditional ceremonies led by community leaders had to be conducted to request the blessings of the ancestors for the construction of a foreign structure on their land. According to the assistant manager for water and sanitation:

“If we construct infrastructure such as dams without the community conducting traditional ceremonies, they may boycott using them out of fear of angering the ancestors.”

The government provided the financial and technical capital, while the community provided the labour for the project. However, after the dam was built, there was no investment in infrastructure to supply water to individual households. The community mainly uses gravity-fed irrigation systems whereby polyvinyl chloride pipes divert water from the dam to community gardens close by. Some gardens have drip irrigation systems, however these are expensive, and beyond the reach of most community gardens. Commercial farmers also have access to the dam under the permit system, and draw large volumes of water for irrigation. This group

³⁴ Most community members have no electricity and therefore do not own refrigerators. If they catch more than they can immediately consume, the excess goes to waste.

of farmers can afford to set up large sophisticated irrigation systems such as centre pivots, and they also pay rates for their water takes. The focus for ZINWA is currently on collecting this revenue from commercial farmers, rather than on improving water service delivery for communal farmers.

According to the Agritex officer, rooftop rainwater harvesting is starting to gain popularity with the few households that have zinc roofing. However, the tanks are currently too expensive for most households and the technology is not an option for many households that still have thatched huts. Water harvested from rooftops is used for domestic purposes, as well as for watering kitchen gardens, and small livestock. This technology, therefore, reduces distances travelled by household members to communal water collection points.

5.3.3 Agricultural Water Conservation

Sibambene Community Garden in Diana's Area (figure 5.4 below) was established soon after the construction of the Mbilambowe Dam, with the financial aid from a local non-profit organisation. The garden currently has twenty five members, and vegetables cultivated at Sibambene Community Garden include tomatoes, leafy green vegetables and carrots. The vegetable produce harvested from the community garden is used for household consumption and the excess is sold to other areas with most of it being ferried to Bulawayo³⁵ markets where the produce fetches a higher price compared to the local market.

The Agritex Officer stated that due to the community's awareness of changes in weather patterns, they have over the years developed methods of conserving water in cropping fields and gardens. Some of the traditional water conservation methods used include the construction of furrows using soil within the gardens (as captured in figure 5.4 above). In gardens where the community still uses deep wells as a source of water, the wells are covered with tree branches to avoid contamination and to reduce evaporation. The branches are also used to signal the location of a deep well for safety purposes. Where the bucket system is still being used to water vegetables, watering activities are carried out later in the day when temperatures are cooler. This is another method of reducing water loss through evaporation. Traditional herbs are planted around vegetable beds, and are used as a low cost means of pest control, which reduces the need for synthetic pesticides.

³⁵ Zimbabwe's second largest city



Figure 5.4: Sibambene Community Garden (With a Drip Irrigation System)
Source: Mkandla (2018)

The Agritex extension worker indicated that, although the community still uses traditional water management practices, they are integrating low cost modern technologies to make agriculture more efficient. The community is also open to receiving agricultural extension advice on new seed varieties, rainfall predictions, and plant pests and diseases.

5.3.4 The Link Between Indigenous Knowledge and Water Sustainability

According to the former Minister of Water Development and Management, having traditional leadership structures and community rules in place in rural communities, is the starting point to ensuring sustainable use of water resources. The community is familiar with the customary water governance system and it remains relevant to them at local level. Western-based water governance structures sometimes cannot extend their reach to remote areas due to resource limitations. It is, therefore, important that there are means of governing the use of water resources at this level. The former Minister believes that over the years, traditional leadership has become progressive, and is adapting water management rules to solve current water problems.

“The reason why the government has made no effort to render traditional leadership redundant, is that it still works, and is effective at local scale.” Dr Nkomo

Moyo, a traditional leader had the following to say about traditional knowledge and the protection and conservation of water resources:

“The Embizeni Pools are sacred, this is our traditional way of protecting and conserving water upstream.”

The assistant manager for water and sanitation for the RDC affirmed that there are aspects of traditional knowledge that lead to water sustainability. She cited the Embizeni Pools as a good example; declaring the pools sacred is the community’s method of preventing contamination of water upstream. Prohibiting the watering of livestock upstream, as well as other activities such as bathing and cultivation of crops, is a method of preventing the introduction of contaminants such as nutrients and bacteria into water bodies, and generally maintaining hygienic water conditions. Without the aid of science, local communities have for hundreds of years understood the interconnectedness of water resources. Water at the Embizeni Pools is in a pristine state and is a source of recharge of good quality water for water bodies located downstream. One community member from this area had the following to say:

“We work together as a community to look after water upstream, and we all reap the rewards downstream”.

Wetlands are also a highly valued resource in Diana’s Area, and the use of water from wetlands is prohibited. According to the DDF officer, wetlands in this area are not fenced off, but community members follow the rules that have been set for their protection. Wetlands are good sources of recharge for groundwater, and the DDF officer believes that by conserving wetlands, boreholes have a source of recharge, and rarely run dry. Wetlands also provide other services such as water purification, and are a habitat for aquatic flora and fauna. The community at Diana’s Area has been protecting wetlands for as long as the participants can remember, whereas, the Zimbabwean government has only recently made formal moves to conserve wetlands, by making provisions for wetland protection in the Environmental Management Act of 2017.

Good water management does not only apply in the upper reaches of the river, but continues to be applied downstream. The rules that prevent the clearing of vegetation around the Mbilambowe River are the community’s way of preventing erosion and siltation of water bodies. The weight of livestock such as cattle on the edge of the river can cause the collapse of banks, and this can contribute to siltation of water bodies. According to the assistant manager for water and sanitation, siltation is currently one of the biggest challenges faced by local authorities across the nation whose budgets do not have provisions for desiltation

activities. Trees also provide shade for the river and reduce loss of water through the process of evaporation.

Setting rules that limit the killing of aquatic organisms is not only the community's way of monitoring water quality and quantity, but is evidence of the community's understanding of the role of different organisms in the maintenance of aquatic ecosystems. The assistant manager for water and sanitation also elaborated on how fines for water offences are the community's method of executing the "polluter pays principle", which the Environmental Management Agency (EMA)³⁶ is currently failing to enforce due to shortages of resources.

The methods that are used by the community to conserve water on cropping fields and gardens ensure the efficient use of water with minimum wastage. The use of drip irrigation systems targets water to specific planting stations, and furrows retain moisture. Soil moisture retention, according to the Agritex officer, is crucial for areas that are located in Zimbabwe's agro-ecological region iv, which is characterised by low, erratic rainfall. Although the limited use of fertilisers and pesticides may be in part due to their high costs, the use of alternatives, such as herbs, is environmentally friendly and reduces the run-off of chemicals into water bodies. According to the Agritex officer, herbs such as lemon grass have dual uses as they can serve as insecticides and fulfil medicinal purposes as well.

In Diana's Area, water from dams is mainly used for irrigation, while water collected from boreholes is used for domestic purposes, including drinking and cooking. Water for watering animals, laundry, and bathing purposes is sourced from traditional water bodies. The use of multiple water sources reduces the burden on these resources, and the community has access to water throughout the year. Boreholes in this area, according to the DDF officer, break down infrequently compared to areas where the choice of water sources is limited.

5.4 Emsehleni Area

Emsehleni Area is situated 8km from Esigodini Centre, and is close to the main road, with access to electricity and modern technologies. It is home mainly to those who have been employed in Bulawayo and Esigodini Centre and are either retired or unemployed due to the current economic conditions in the country. Community members in this area have been exposed to, and have adopted, other ways of knowing. Some youths have access to smart phones and internet services. Households in this area have access to electricity and solar power, they own television sets, and they are exposed to modern ways. Senior village head, Ndlovu, is responsible for this area and sends for the newspaper on a daily basis from

³⁶ A parastatal mandated to manage water quality and implement the polluter pays principle nationally.

Esigodini Centre. Although this area has been highly influenced by urban ways, it still faces water challenges experienced by other rural communities in Zimbabwe. Traditional knowledge in this area has been highly eroded and is seldom passed on to younger generations, placing it at risk of being lost forever. The section that follows will discuss the state of traditional knowledge in Emsehleni, and how this has contributed to the current state of water resources and livelihoods.

5.5 Traditional Knowledge and Water Resources

5.5.1 The State of Traditional Knowledge

Traditional leadership is still in place in Emsehleni Area, however, the youth in the area have less respect for the structure as compared to the older age groups. For this study, the senior village head sent requests through village heads for youths to attend interviews and focus group discussions. No youths attended the interviews, and only two attended the female focus group discussion. According to the senior village head:

“The youth will not participate in community activities if they are not getting something in return.”

A female participant, Agnes, highlighted how they can no longer pass on traditional knowledge to their children, who are now literate and can “use information on their phones” to challenge them. Agnes and other participants believe that children as young as those at primary school level have more information about the world around them, the environment, and current affairs, than most adults in the area. She also spoke of how she was raised in an era where educating a girl was not a priority, and she attended school only until she was twelve years old (grade 7). According to Agnes, women can now attain education at tertiary level, and it is difficult to share cultural beliefs with them, as they believe that some of these practices were created by a patriarchal society to oppress women. She recalls that growing up she would never question her elders about the traditional ways. Even if there were aspects she did not understand, she would do as she was told.

Sizani is a pastor at a local Pentecostal Church, and believes that the growing popularity of Christianity has played a major role in the disintegration of traditional knowledge in this part of Esigodini. Christians believe that they can pray directly to God, there is no need for a mediator, and they do not believe in the existence of ancestors. Some traditional leaders have also become Christian and this limits their ability to initiate traditional ceremonies as the two belief systems are seen to be contradictory. According to Sizani:

“There is no way one can be Christian and still entertain the notion of ancestors interceding on their behalf. They have to pick one belief system.”

The pastor also believes that the youth prefer not to be associated with traditional ways, as they would be considered “uncool” by their peers and young people always want to fit in. Christianity for them is modern and by attending church, they feel they belong to an enlightened social group.

Emsehleni Area is known for having gold deposits and is, therefore, a hotspot for illegal alluvial gold mining. Unemployed people from across Zimbabwe, including the big cities, are migrating to the area because of its mining prospects. The police department and EMA are currently failing to deal with illegal miners via law and policy. The traditional leadership is having difficulty in enforcing community rules because they are foreign to the miners. The migration of the illegal miners to the area also brings an increased demand for housing, which involves clearing of vegetation for construction in some areas where such activities are prohibited. These activities have a negative impact on water resources in the area due to increased demand for water. Illegal gold mining activities also introduce contaminants into water bodies. Clearing of natural barriers such as trees, for the purpose of building houses, increases the amount of run-off introduced into water sources.

5.5.2 Effects of the Erosion of Traditional Knowledge

Participants highlighted that they can no longer use traditional water resources because they have become unhygienic; people spit, urinate and throw litter in waterways, and alluvial gold panners contaminate these water sources with mercury and cyanide. Sizani recalls that in the days when he was a teenager herding cattle, when he became thirsty, he would cup his hand and use it to collect water to drink from the river or stream. He laments how today he would probably fall sick with diarrhoea if he drank from the same sources.

Some water sources have dried up, including the Emsehleni Stream (figure 5.5 below). Two local participants mentioned climate change as the reason for the drying up of the stream, while all other local participants believe that it dried up because the people have neglected their traditional duties of protecting and conserving water resources.

One participant said:

“Growing up we knew that the Emsehleni Stream never dried up and we were told by the elders that if we break the rules around its use it would dry up. We have broken the rules and the stream flows no more”.



Figure 5.5: Emsehleni Stream dried up and contaminated with litter
Source: Author (2018)

With the current state of traditional water resources, the community at Emsehleni Area has become highly dependent on boreholes (figure 5.6 below) as the main sources of water. According to the senior village head, about 500 people share the four boreholes in this area. Boreholes are overburdened and break down on a regular basis, frequently requiring repair, and often going for long periods without being fixed, as some households do not have the money to contribute towards repairs. The DDF has the mandate to drill boreholes in rural communities, and the DDF officer is of the opinion that the Department has been performing its duties and has reduced distances to watering points. However, participants at Emsehleni believe that the Department has not been fulfilling its duties due to resource limitations.

Community members currently walk between 1 and 2km to boreholes, and when they break down and are not repaired, residents have to walk longer distances to access water from other boreholes in the area. Over the weekends the queue at boreholes is usually long, as most family members are home and the household requires more water. Tholakele and Agnes are of the opinion that women and children bear the brunt of long distances to water sources. Agnes had the following to say:

“Our sons marry beautiful women from the city and send them here to help us with chores. Within a few months one can barely recognise them. This is due to the distances they walk on a daily basis to collect water”.



Figure 5.6: Agnes collecting water from a communal borehole
Source: Mkandla (2018)

Tholakele, pictured in figure 4.1 (Chapter 4), makes up to three trips a day to collect water, walking on rough terrain, and sometimes under harsh weather conditions. She collects water for household requirements, including water to drink and bathe, for a family of six, and also provides water for the small livestock she keeps at home. Richard, pictured in figure 4.2 (Chapter 4), rarely collects water, and when he does, he uses a wheel barrow. His mother and older sisters collect water to meet the family's daily requirements. Children of school going age have to fetch their own bath water for use the next day, and female participants highlighted that this is one of the chores that makes children delay coming home from school.

The boreholes in this area are not only used to collect water for household consumption, but are also used to water vegetable gardens (figure 5.7 below) and livestock (figure 5.9 below).



Figure 5.7: Agnes in her individual garden
Source: Mkandla (2018)

Multiple uses of boreholes are negatively affecting livelihoods and an example of this is Agnes's individual garden in figure 5.7. The garden is located about 200m away from the borehole, however, her leafy green vegetables are in a poor state, as most of her productive time is spent collecting water for domestic use, and doing household chores. She uses the bucket system to water her garden, flooding the vegetable bed with water, and does not use any of the water conservation practices used at Sibambene Community Garden. Moisture in Agnes' garden is lost at a faster rate and her garden is usually dry, and her vegetables suffer from moisture stress. Although Agnes has a vegetable garden, she usually buys vegetables from other areas such as Diana's Area.

To overcome challenges of distances to watering points, Sizani, in figure 5.8 below, has constructed a water storage tank and livestock watering trough close to his homestead.



Figure 5.8: A livestock water storage tank
Source: Mkandla (2018)



Figure 5.9: A livestock watering trough
Source: Mkandla (2018)

Sizani collects water from the borehole in buckets using a wheelbarrow and makes several trips to fill up the tank. He uses a pipe system to transfer water from the tank to the watering trough where his livestock drink from. To reduce the rate of evaporation, he covers the tank

using old asbestos and zinc roofing sheets. By using such material, he risks introducing trace elements into the tank which can affect the health of his livestock. The process is energy and time consuming, but he considers himself better positioned compared to his neighbours who cannot afford to build such structures. With traditional sources close to the area having dried up, his neighbours have to walk up to 5km to access alternative sources of water for livestock during times of water shortage.

Older participants expressed their desire for the community to go back to the way they used to conserve water traditionally. These participants also showed great concern over the way in which Indigenous knowledge is no longer being shared, with one participant quoting an old African proverb:

“When an old man dies, a library burns”.

5.6 Chapter Summary

The two examples in this chapter provide insight into how traditional knowledge is used to encourage sustainable water use, and how its erosion has contributed to a decline in water quality and quantity. Through the utilisation of traditional knowledge to conserve and protect water, the community at Diana’s Area has access to a wider range of water resources and has adequate water throughout the year. The ability to change and evolve to overcome current water challenges is one of the biggest strengths of Indigenous knowledge, and in Diana’s Area evidence of this is seen in the community’s collaboration with the government in the construction of the Mbilambowe Dam and the traditional leadership relaxing the rule around *“inkezo”*. Through integrating traditional knowledge and other ways of knowing, this community’s access to water for some livelihoods has improved as evidenced by the Sibambene Community Garden. Lack of investment in water infrastructure such as irrigation systems and piped water is still a challenge as community members still have to walk long distances to access water.

In Emsehleni, the use of traditional knowledge has declined significantly, with the community blaming exposure to Western ways, modern technology, Christianity, and education for this. Participants believe that the loss of Indigenous knowledge has contributed to a decline in the quality of water resources and livelihoods. A heavy dependency on boreholes as the main source of water has led to water shortages as well as conflict over water use and payment for borehole repairs. Traditional ways are community centered, and this is evidenced by the community gardens at Diana’s Area. However, in Emsehleni livelihoods have become individualised. Evidence of this is seen in individual gardens, livestock tanks and watering troughs. Intergenerational transmission of information is the cornerstone of Indigenous knowledge and in Emsehleni, this knowledge is no longer being passed on to younger

generations. The youth in this area are at risk of losing traditional knowledge, and its benefits for water resources and livelihoods, forever. The Chapter that follows explores the opportunities and challenges of a system that integrates traditional knowledge and Western-based water management in water governance. It also documents the anticipated implications of such an integrated system for rural livelihoods in Esigodini.

Chapter Six

Opportunities and Challenges for Integration of Traditional and Western-Based Knowledge Systems and Implications for Rural Livelihoods

6.1 Introduction

This chapter documents the opportunities and challenges of integrating Indigenous and Western knowledge into water governance, as identified by research participants. It also discusses some of the outcomes for rural livelihoods that might result from an integrated water governance system. The two preceding chapters (chapters four and five) have highlighted the Ndebele Group's Indigenous knowledge and its contribution towards water sustainability, and also brought to light some of the water management problems faced by villagers in Esigodini. The two chapters also identified some of the challenges faced by government departments in the provision of water services. Zimbabwe has a Western-based water governance system in place, which includes relevant legislation, policy, and institutions, but this system is currently unable to deal with challenges of equitable supply and access to water. The country's ailing economy has left government departments with limited capacity to execute their mandate of water service delivery.

Some rural areas have established effective water conservation practices with the aid of Indigenous knowledge, however, in light of changing climatic conditions and limited investment in water infrastructure, there are growing concerns over their ability to sustain livelihoods. A water governance system that integrates traditional and Western knowledge potentially offers a platform to formalise Indigenous water management systems that are currently yielding positive results for water resources and livelihoods in rural communities. Most participants believed that opportunities for integration can be found by identifying best practice from science and traditional water management systems. However, the two ways of knowing are founded on different principles and beliefs, and this is a challenge for the concept of integration. The problems of combining the two ways of knowing emanate from the history of science-based knowledge being regarded as the more reliable of the two ways of knowing. Western science has in the past dictated the terms for integration of the two ways of knowing. An integrated water governance system is likely to have a direct bearing on rural livelihoods in Esigodini. and will also have social implications, and these will be discussed in this chapter.

6.2 Opportunities for Integration

6.2.1 Low Cost Data Collection and Monitoring

Government staff interviewed for this study cited resource constraints, especially in financial resources, as the main limiting factor for their performance in the water sector. Government offices are either located at Esigodini Centre or in Bulawayo, and are currently facing

shortages in vehicles, personnel, and data collection instruments. Repair and maintenance of boreholes has been decentralised through the creation of water committees, and the DDF officer believes that data collection can also be decentralised. It has been established that government departments are currently relying on villagers to fill the information gap, and provide data on water quality and quantity. According to the DDF officer, the residents in Esigodini are already collecting data using traditional methods and reporting notable changes to the traditional leadership, who in turn report these changes to relevant government offices. However, this data is not documented and the arrangement between the government and the villagers has not been formalised.

The DDF Officer suggested that such collaborative arrangements should be regularised to avoid the existence of parallel systems. Government agencies can work together with traditional leadership in the selection of individuals who can be trained to utilise both traditional and science-based data collection methods. The government will be responsible for the analysis and documentation of the data collected. Such a system would be low cost because the selected individuals are already located within the village and there are no financial implications related to transport costs. Human capital is also a constraint facing government departments, and volunteers could be located in all the areas in Esigodini, and each one can be responsible for data collection for specific water sources at set intervals. Volunteers would be able to cover more ground for data collection than the few staff members that the government departments currently employ.

6.2.2 Cross-Learning (Knowledge Sharing)

When local level participants were asked about what they know about the current Western-based water governance system, it was evident that they have very limited knowledge about the statutory instruments, and structures that are currently being used to govern water resources in the country. Due to this lack of knowledge the villagers have probably forfeited some of their water rights over the years, and the state has gotten away with poor service delivery. During the participatory process of water reform in the late nineties, it was documented that the new Water Act (1998) was established after wide consultation and information sharing with different stakeholders, including communal farmers.

“I remember attending a meeting because we were told that the government was working on addressing our water problems by changing the colonial water laws. It has been over twenty years and the village is still experiencing the same water challenges.” Ndlovu (Senior Village Head).

Participants communicated their concern over the participatory processes they had been engaged in over the years, and their frustration with not receiving feedback from researchers, including government actors. The very few who have returned to provide feedback, have used technical jargon which the villagers cannot understand, and in a form they cannot use to improve their use of water for agriculture, and other livelihood strategies. They have become wary of such exercises, as they believe that they do not benefit from them.

“We do not even know what sort of questions to ask because we do not understand what they are talking about. Most of us have given up on attending feedback meetings.” Annie (Village Head)

One out of the four government level stakeholders interviewed for this study had in-depth understanding about Indigenous knowledge in Esigodini, however, he was born and raised in the village. He attained a diploma in Agriculture from Esigodini Agricultural College and went on to work in agricultural extension in the village, hence his level of understanding of traditional knowledge. The other government level officials had a generalised understanding of local knowledge but became very technical and scientific when explaining how traditional ways impact water resources. The term “technocrats” was used often by government level participants when referring to themselves and those within their fields of expertise. Such an outlook can be a limiting factor for these experts in learning about Indigenous ways, as they can view these ways as lay and simplistic. It is evident that there is a gap in knowledge for both local and government level participants, and an integrated system would allow for the creation of a knowledge sharing environment. If cross-learning is done in good faith, it provides the government with an opportunity to redeem itself, and earn the trust of the villagers in future collaborative processes.

One of the biggest strengths of traditional knowledge is its ability to constantly evolve, and this can only be possible through learning about the environment and from other ways of knowing. The senior village leader for Diana’s Area indicated that for cross-learning to be successful, it would mean a change in mindset for Esigodini residents, who believe that the knowledge brought by government officials, and other outsiders is more sophisticated and superior when compared to local knowledge. A female participant had the following to say during an individual interview:

“Government officials are educated. An integrated system will mean that they will use science knowledge and sophisticated technologies to correct the areas where we have erred in water management.”

Senior village head, Mpofu, added that it would also mean a change in the manner in which government departments execute their duties as they currently visit the villagers with the intention of teaching them instead of learning from them.

“We walk this land and are in contact with water on a daily basis, we know more than the books these young government employees read can ever teach them.” Mpofu
(Senior Village Head)

According to the former Minister of Water Development and Management, the success of both Western and traditional knowledge is based on continual learning and information sharing. With this commonality, all that is required is for the interested stakeholders to create an environment that is conducive to mutual learning.

“It is important for traditional leaders to be equal participants in the creation of an environment for mutual learning, and not just be consulted”.

The former Minister also believes that if the two parties have better insight into both ways of knowing, this will help solve some current water related conflicts between the state and the villagers, and also prevent future conflict.

6.2.3 Co-management of Water Resources

Traditional leaders expressed their desire to be equal partners with the government when it comes to the management of water resources. Village leadership believes that they have an effective local level structure to execute their duties of ensuring water availability, conflict resolution, and representation at relevant water fora. However, they are currently not formally recognised in water legislation and policy. This informal co-management system currently disadvantages the villagers, as without official documentation of such an arrangement, government departments are not legally bound and can provide partial service delivery, or opt not to provide some services. An example of this is discussed in chapter five, where the government worked with the community in the construction of the Mbilambowe Dam, but no further investment was made in irrigation schemes or distribution of water to individual households. The villagers have no grounds to file a complaint or demand better service provision as this co-production arrangement is not legally recognised.

All government officials interviewed referred to the Esigodini Villagers as “owners of natural resources”, however, water statutory instruments clearly state that no one owns water resources, which are actually vested in the state. Using words such as “ownership” loosely gives the villagers a false impression of their legal rights when it comes to water resources. Government departments follow village level rules when working with communal farmers on water projects, and this includes communicating with the senior village head as the point of

entry. Senior village head Ndlovu highlighted that non-profit organisations and private companies also follow relevant local level protocol.

“Some of them might not know the rules when they come to the village. Their first port of call is the District Administrator’s office, and he informs them that they need to liaise with traditional leadership before any work can begin. They need to come to us, they cannot call us to come to them for a meeting”.

This also gives traditional leadership a false perception of the extent of their leadership, because in reality, anyone can enter the village and carry out work on water resources, without consulting them. Legally, the water and the communal land does not belong to them, they have no jurisdiction over natural resources, and their traditional water rules only apply within the village boundaries and among the villagers. A formal co-management system could change power dynamics, as it would mean that government stakeholders will have to take the role of traditional leaders in decision making seriously.

During his time leading the Ministry of Water Development and Management, Dr Nkomo admits that he identified the informal relationship between departments under the Ministry and traditional leadership. This is not a formal arrangement and is not recognised under any water statutory instruments.

“With competent legal counsel, the villagers can cite precedent. This would hold water if conflict between the two parties’ spills into the legal system. It is, therefore, important to make a decision about formalising this arrangement.”

When asked if a formal co-management system was ever an issue tabled for discussion during his tenure, the former Minister explained that he took over the Ministry during a complex period in the country. His tenure began in 2009 after the establishment of a Government of National Unity, inflation rates were high, and there was poor investment in the water sector, and poor service delivery. The former Minister took over the Ministry in the midst of a cholera outbreak that affected almost 100,000 Zimbabweans, and about 5,000 deaths were reported. The priority of the Ministry was to attract funding for infrastructure development, rehabilitation of debilitated infrastructure, and the improvement of service delivery in urban areas to prevent another cholera outbreak. Issues of co-management of water resources, therefore, could not be tackled during his 2009 to 2013 tenure.

Formal recognition from the perspectives of traditional leadership means contributing towards decision making at national level, whereas currently their informal decision making powers only extend within the administrative boundaries of Esigodini. With the sub-catchment councils

currently not functioning, they have no platform to contribute towards decision making when it comes to water resources.

“When we attained independence, we saw a bit of change as boreholes were drilled and dams were built, we were hopeful but now we are the forgotten people again. There is very little investment into water development in communal areas, and platforms to make a meaningful contribution to decision making are limited.”

Senior village head Mpofo argues that pre-colonisation, traditional leadership was the only form of leadership recognised, and they were not faced with the water challenges that are being experienced today. He also expressed his disappointment in how traditional leadership is not being recognised, as Western governance dominates in a country that is predominantly Indigenous.

6.2.4 Documentation of Local Knowledge

The loss of traditional knowledge is one area participants are concerned about and this was highlighted in chapter five, which described how this knowledge is seldom passed on to younger generations in Emsehleni Area. Some participants are of the opinion that integrating Indigenous and Western knowledge allows for its documentation in a form that is acceptable to the youth. A participant added that traditional knowledge is at risk of being lost forever because only the elderly in this area are custodians of this knowledge, and when they pass on, they take it with them. Having the knowledge in written form, may mean that it will be retained, and the youth who are interested in using it to manage water resources will have that option. According to a traditional leader:

“Traditional knowledge is the birth right of Indigenous people, and it is our duty as village leaders to ensure that it is available even for those who are yet to be born.”

Some participants believe that documenting their traditional knowledge also makes it available to other people outside the Ndebele group, and even internationally. This will help people understand the Ndebele people’s water management methods, and if other groups can also share the ways in which they manage water effectively then the Ndebele group can also adopt these practices for better water management.

“We know very little about other groups, even the Shona and the Tonga who are within our nation’s boundaries. We would be interested to know about the similarities and differences we have when it comes to managing water, and to learn from one another”. Senior Village Head Ndlovu

Older participants were however sceptical of the idea of documenting traditional knowledge, and expressed concerns about making their information available to “*abaphandle*” (outsiders). They were also worried about the loss of the oral aspect of the Ndebele culture. These concerns will be discussed in the challenges section that follows.

6.3 Challenges for Integration

6.3.1 Intellectual Property Rights

Dr Nkomo, the former Minister for Water Development and Management, expressed a major concern over the control Indigenous people will have over their knowledge once it is publicly available. Currently, Indigenous knowledge in Zimbabwe is not protected under intellectual property rights law, and is therefore in the public domain. Anyone can use this information for commercial purposes and not be liable to the Ndebele group.

“I know that South Africa amended its Intellectual Property Law to include the protection of traditional knowledge. Now Indigenous groups can take civil action against anyone who misappropriates their knowledge. This may be an option for Zimbabwe.”

It would be important for Indigenous people to be fully aware of their rights when it comes to Indigenous knowledge that has been made available to the public. In the past, rural communities have been very vocal about Indigenous issues outside the Western-based legal system. However, when an issue of conflict is escalated to modern courts, even traditional leaders shy away from taking the lead. This might be due to a lack of knowledge of contemporary law and a lack of access to legal advice. Although legal fees may be out of the reach of many communal farmers, the government and some non-profit organisations offer legal advice pro bono, although residents of rural areas may not be aware of these services.

Local level participants were concerned about the use of their traditional knowledge, and especially their spiritual practices, outside of their group. They, however, did not have an awareness of the legal implications of sharing their information, but were more concerned about angering the ancestors by sharing certain aspects of traditional knowledge with outsiders. One traditional leader had the following to say:

“Outside our village boundary, it would be difficult for us to manage the use of our traditional knowledge. We might not even be able to use our customary law to deal with those who misuse our information.”

6.3.2 Suitability of Traditional Knowledge at National Scale

The former Minister for Water Development and Management was of the opinion that traditional water governance systems do work, however, he emphasised that Zimbabwe

mainly has experience with the use of Indigenous knowledge at the local scale (within village boundaries). Implementing a traditional based water management system at the national level would be a challenge, as there are currently two major groups in Zimbabwe, that is the Shona and the Ndebele groups, and there are also eleven smaller groups including the Xhosa, Tonga and Venda groups. Although these groups' traditional knowledge is based on similar principles, their beliefs, and practices differ. An attempt to integrate Indigenous and Western-based knowledge may cause conflict around the question of which aspects of each group's knowledge should be utilised. The word "aspect" already implies breaking down this knowledge and not using it as a whole. The former Minister, posed the question, "once that happens, can we still refer to it as traditional knowledge?"

"From my understanding, Indigenous knowledge is holistic and once it loses that characteristic it is no longer traditional knowledge." Dr Nkomo

Issues of leadership would be likely to arise during any process of establishing the protocol for an integrated system, as there are currently about 272 Chiefs in the nation. Traditional leadership at national level have a leadership body, the Zimbabwe Council of Chiefs (ZCC), where all Chiefs have a seat. This is an established and organised body, with a President and other structures which would be in a position to work through some of the concerns arising from tribal issues. The ZCC has ensured fair representation of tribal groups at national level in the past, and conflict has been dealt with within the group and has never spilt into the modern legal system.

As discussed in chapter one, the water reform in Zimbabwe laid the foundation for fragmented management of water resources. Currently Rural District Councils (RDCs) are responsible for rural water infrastructure and maintenance of local water resources. ZINWA is responsible for dammed water and revenue collection in rural areas, while EMA is mandated with overseeing water quality in both urban and rural areas. DDF is mandated with drilling and maintaining boreholes, and the Environmental Health Department does water quality testing. According to the assistant manager for water and sanitation, roles and responsibilities of different departments can sometimes overlap and can be duplicated, as co-ordination is not always possible. One of the traditional leaders said the following:

"When we go to government offices to discuss water issues, we are referred from one office to another. It almost feels like they do not know what they are doing, and we end up giving up and going back home without being heard."

Traditional leadership and villagers are already executing all of the roles government departments are responsible for at the local level, and a parallel management system thus

exists. Having traditional leadership work with specific departments, with clearly defined roles and responsibilities, could help address issues of duplication and lead to more effective water management.

6.3.3 Private Aspects of Traditional Knowledge

There are aspects of traditional knowledge that are of a secret nature, especially the spiritual aspects. These are shared among community members, or only a select few such as traditional leadership, spirit mediums, and traditional healers. This can create complications when it comes to integration as this would need to be partially done, carefully preserving the secret aspects. This again brings about the question asked by the former Minister, “can we still refer to it as traditional knowledge?” The spiritual part of traditional knowledge is a vital aspect completing the holistic nature of the knowledge system, which takes into account, knowledge, practice, and belief. The former Minister also mentioned that even if the spiritual aspect of traditional knowledge could be shared, it is immeasurable, making it difficult to include in water legislation and policy. He indicated, however, that he believes it is possible, but it would need to be handled with great sensitivity.

6.3.4 Loss of Oral Tradition

When asked what they understood by the term traditional knowledge, almost all participants mentioned its oral nature.

“It is the knowledge we got from our mothers, aunts and grandmothers.” Lindiwe
(Female Participant)

Some participants, especially older participants, were concerned that by documenting this knowledge, the oral part of traditional knowledge would be lost. Traditional knowledge is usually passed on from the older generation to the younger generation within the family setting. Depending on how sensitive the information is, it is passed on among family members of the same gender. Indigenous knowledge is also transmitted from one person to another within the village and this, according to a female village head, Annie, encourages interaction among the villagers.

“The oral nature of traditional knowledge allows for bonds to be formed, between a mother and daughter, father and son, a grandmother and her grandchildren and among community members.”

Storytime is a special time in many households, with children and the youth making sure they finish their chores early so that they do not miss out on the story for that evening.

“We live in a time when the younger generation does not want to spend quality time with us anymore, they always want to be on their phones, on whatsapp with their friends. Storytime therefore affords us time with our children.” Annie

Participants believe that storytime is a time when family members of all age groups get to interact, share jokes, laugh, get to know more about each other, and teach the young ones life lessons. One participant also mentioned that family time has changed a little as the young ones now ask questions. They will ask:

“Did you hear animals talk when you were growing up? If they used to talk back, then why are they not talking anymore? Do you think they will start talking again in future?”

These are difficult questions to answer and some households have stopped telling stories because of such questions. Storytime has also changed because children now have lessons to teach the older generation, especially about modern technology and social media. Some participants believe that this helps them know about some of the misinformation the young ones get from their peers, and this presents an opportunity to correct them. Most participants believe that once traditional knowledge is documented, they will lose out on the benefits of oral tradition. Although, they appreciate that future generations will have a better chance to access this knowledge if it is documented, they are of the opinion that reading the information becomes individualised instead of group focused. It loses the human interaction aspect, that personal touch, as well as the facial and vocal expressions associated with traditional storytelling. One of the participants suggested recording stories told by villagers both visually and through audio as a solution.

“This would be important for future generations as they are not deprived of their heritage, it should be made available to them and it is up to them what they decide to do with it”.

However, some older participants remained sceptical, and indicated that future generations would miss out on the aspect of human contact. They were also worried about the language the Indigenous knowledge would be documented in, stating that if it is written in English, they will not be able to read the document and ensure that it was documented exactly as they told it.

6.4 Implications of Integration for Rural Livelihoods

One of the objectives of this research is to identify the implications of integrating traditional and Western-based knowledge into water governance on rural livelihoods in Esigodini. Eighty five percent (85%) of participants believe that an integrated system will yield positive results

for rural livelihoods. Responses are depicted in figure 6.1 below, and discussed in the sections that follow.

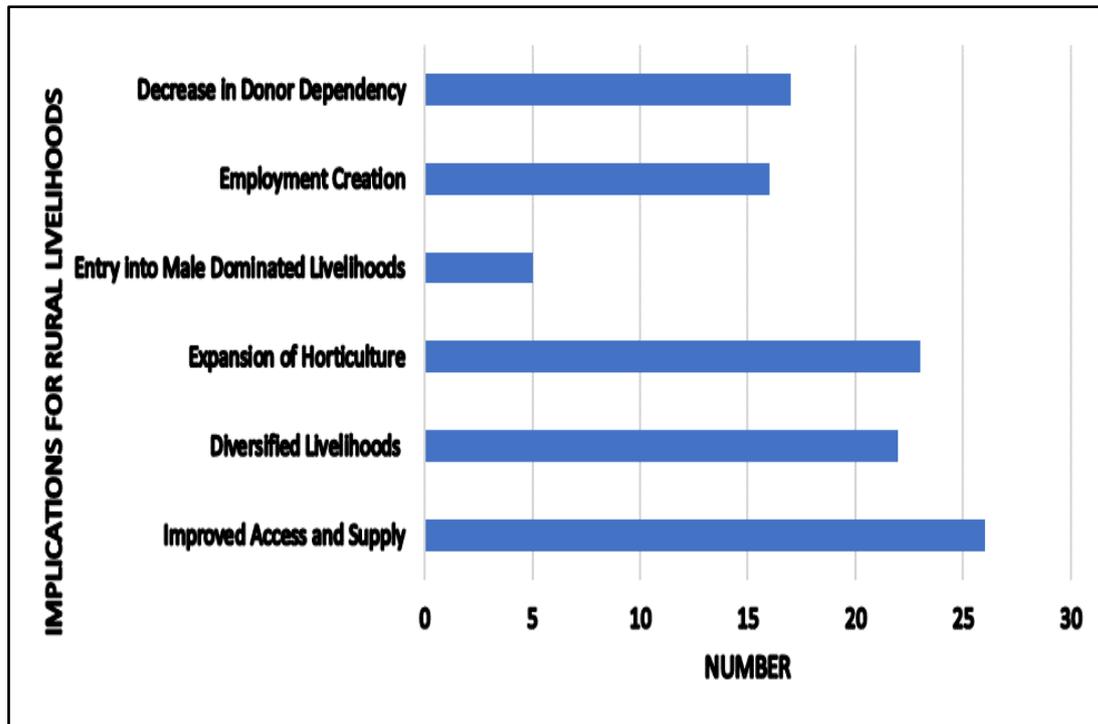


Figure 6.1: Participant Responses on Implications for Rural Livelihoods
Source: Author (2018)

6.4.1 Improved Water Access and Supply

According to the assistant manager for water and sanitation, poor access to water resources for livelihoods is one of the main challenges faced by communal farmers in the village. Traditional leadership in the village believes that if they are formally acknowledged in the current Western-based water governance system, they have better prospects for representing their people and addressing the challenges they have with water. They also believe that they will have a more meaningful role in decision making and push the agenda of improved access to water for rural communities in meetings, and subsequent water legislation and policy. Considering how poor access of water negatively impacts rural livelihoods, the outcome which got the most mention in both individual interviews and focus group discussions is improved water access and supply. Participants indicated that this is currently one of the biggest challenges that the village faces. With long distances to water sources, a lot of productive time is spent on water collection activities. Agriculture is the dominant livelihood in the village and requires a consistent supply of water in order to thrive. Although, their households are labour endowed, access to and availability of water limit the livelihoods that local people can currently engage in. Participants believe that as long as they depend on rainwater, they will always be small-scale farmers, producing just enough for household consumption. It has also become

the norm for the village to be unable to produce enough cereal crops to last them until the next rainfall cycle.

“We receive rainfall in summer. That is between the months of October to April. However, the rainfall season has become erratic and we have been experiencing recurring droughts. We cannot continue to depend on rain-fed agriculture.” Velemu (Male Participant)

Participants also highlighted that agriculture is what they know. It is what they are skilled in, with the skill being passed on from generation to generation. They believe that they are agricultural experts, and reliable water supply will allow them to cultivate their agricultural fields and gardens all year round, allowing them to earn an income from these livelihoods.

6.4.2 Expansion of Horticulture

Participants mentioned expansion of horticulture as another positive outcome for rural livelihoods that they would expect from an integrated system. Walking around the village with participants during participant observations, it was evident that almost all households have vegetable gardens, either within their yard or close to water sources such as rivers and streams. However, most of them were dormant during the data collection period, as it was winter and water supply was low. Participants reflected that horticulture is an activity they would like to undertake all year round and make a living from growing fruit, vegetables and flowers.

“With market gardening, I will be able to pay school fees for my daughters and one day they can also go to university overseas like you. I want them to have all the opportunities and choices that I never had”. Agnes

Some participants are interested in establishing green houses where they can cultivate and produce roses for export, all year round. The agricultural extension officer interviewed for this study mentioned that greenhouse farming is a livelihood the village could engage in, as it is carried out in a controlled environment, which limits negative impacts on the environment.

6.4.3 Diversification of Rural Livelihoods

Participants also indicated that an integrated water governance system would allow them to diversify economically, and to venture into livelihoods they could only dream about because of limited water availability. One such livelihood is fish farming, which is currently an emerging sector in Zimbabwe. Participants who would like to try their hand at fish farming mentioned that they would like to engage in the activity all year round and provide fish to markets outside the village. Some female participants who were part of the focus group discussion highlighted that they would like to venture into large scale poultry production. They believe currently they

can only engage in small-scale poultry production because water collection for household use takes up too much of their time.

6.4.4 Entry into Male Dominated Livelihoods

Some female participants are keen on entering into currently male-dominated livelihoods, and feel they currently cannot do this as most of their productive time is spent walking to and from water sources. During participant observations the research team got to experience the distances that the villagers walk to access water. Although the team did not carry the 20 litre buckets, it was an exhausting activity (figure 6.2 below). After making the trip to and from the water sources, the researcher and research assistant had sore and dusty feet because of the rough terrain, and were extremely thirsty, with slight headaches from the high temperatures even though it was the winter season.



Figure 6.2: Sizani insisted on showing the research team the distances travelled by women to access water on a daily basis

Source: Author (2018)

Female participants described how they are so exhausted at the end of each day, and how every day ends with very little water left within the household. As early as 5:30am the next day, they have to start the water collection cycle again. Some female participants reflected that they now have chronic back and neck pain, but have no choice but provide water for their families on a daily basis.

“With the current water situation in the village, there is no way women can be engaged in labour intensive livelihood projects. We can do what men can do, we just do not have the time.” Annie

Female participants shared their desire to be able to purchase and own cattle, and they believe that if water can be made available close to their households, they would have no problems watering their cattle. Traditional ways are slowly changing, and there have been instances where women have cattle registered under their own names. There is, however, some resistance from most men in the village, who still feel that cattle ownership is a male domain. A female participant mentioned that she would like to venture into brick moulding, which is currently male-dominated, is labour intensive, and requires a good supply of water. She believes that the village is expanding, and when their children reach adulthood, they request a piece of land from traditional leaders to build homes for themselves and their families. In some instances, when their children become gainfully employed, they send money for their parents to replace the thatched huts with structures with zinc roofs.

“I will always have a market for bricks, and I would like to expand the business and employ the youths, as brick making is labour intensive. I have always wanted to be an employer and by producing our own products, cash circulates within our village.”

Sibahle

6.4.5 Employment Creation

Participants believe that not all villagers would be able to establish income generating projects, but such projects will provide employment for those villagers who will be unable to start-up businesses. They are mainly concerned about the number of youths who are currently out of school and are idle, and believe that if livelihoods become more commercialised the young people will be employed and keep out of trouble. In the past, the youth would migrate to the big cities in search of employment, but currently these opportunities have become limited, as factories and companies have been shutting down due to the deteriorating economic situation in the country. Senior village head Mpofo mentioned that:

“By creating employment, we can retain our youth, instead of having them leave for the big cities, they can stay at home and use their skills and labour to develop Esigodini”.

6.4.6 Decrease in Donor Dependency

The focus group discussion with male participants had a lot of discussion around how an integrated system might contribute to their becoming less dependent on donor aid.

“No grown man is proud of standing in line to receive food handouts on behalf of his family, it is publicly acknowledging that I have failed them”. Sizani

There was a general consensus among male participants that improved access to water would mean that they can venture into other livelihoods and be able to provide for their families. They believe that this would also enable them to assist those households that are not labour endowed, such as elderly headed households, so that no one in the village will have to forgo basic needs. A village leader emphasised that, this is what being African is about, it is about the spirit of “*ubuntu*” and being able to help each other. Participants were of the opinion that if the basic needs of all villagers could be met, then there would be no need for donor aid in Esigodini.

Participants also mentioned some positive outcomes that are not livelihoods-related, but may result from improved livelihoods. Such social outcomes include a decrease in the rate of domestic violence, as participants stated that they mainly fight over how to utilise the little disposable income they have. They also believe that rates of crime, such as theft and substance abuse, would also be reduced with employment creation for the youth, as they will no longer have too much idle time. They believe that they will also be able to create employment for those who are engaged in illegal alluvial gold activities that are currently having negative effects on water resources.

6.5 Chapter Summary

This chapter highlighted the anticipated opportunities and challenges of integrating traditional and Western-based knowledge into water governance from the perspectives of research participants, and also identified the positive outcomes for rural livelihoods that they expect from such a system. By providing low cost data collection and monitoring, an integrated system would provide solutions for some of the challenges government departments are currently facing when it comes to water service delivery. There is an evident knowledge gap between the villagers and government officials, but cross-learning can provide a platform for sharing of information between traditional and Western ways of knowing. A formal co-management arrangement between the villagers and relevant government departments will allow for traditional leadership to have real influence in decision making about access to water for rural communities.

Documenting Indigenous knowledge has the potential to address the concern participants have of losing this knowledge completely. Documenting it means it is in a form that young people in the village can identify with, and those who are yet to be born can also have access to it. It is also important that forms of information that are considered private by the local group are protected and they have the authority to select the aspects of their knowledge that are shared outside the group. Integrating Indigenous and Western knowledge also has its challenges, and these include negotiating intellectual property rights, implications of

integration at national scale, the loss of oral tradition, and the sacredness of some aspects of traditional knowledge.

This chapter also considered the perceived implications of an integrated water governance system for rural livelihoods, with most participants being of the opinion that such a system would yield positive results for rural livelihoods in Esigodini. Local level participants indicated that the government is currently not fulfilling its responsibility of rehabilitating and developing infrastructure in the village, and the villagers do not have the financial means or know-how to undertake such activities. This has left the village with poor access to and supply of water resources, and an integrated system would mean an improvement in access and supply as the village leadership will be able to formally participate in decision making. With better availability of water resources, participants believe that they can diversify livelihoods, expand horticulture, get women and youths more actively involved in livelihood projects, and this will help to foster a self-sufficient community that does not depend on donor aid. The next chapter (Discussion Chapter) provides a discussion of the findings of this study, which have been documented in chapters four to six, and also discusses how the findings relate to the literature section of this thesis (Chapter two).

Chapter Seven

Discussion

7.1 Introduction

This chapter discusses the results obtained through the semi-structured interviews, focus group discussions, and participant observations. It goes on to further discuss the findings of this study in relation to research by scholars in the fields of traditional knowledge, water governance, and rural livelihoods. The study found that traditional knowledge still exists and is used on a daily basis to manage water resources in Esigodini Village. However, this knowledge has not remained static, but has changed over the years to provide solutions for current water challenges. In some areas in the village there has been a high infiltration of other ways of knowing, and Indigenous knowledge has been significantly eroded. The research established that in areas where traditional water management systems still exist, these systems are contributing to the sustainable use of water resources. The community in these areas has maintained access to multiple water sources and there are lower rates of contamination. In areas where traditional knowledge has been highly eroded, water resources have been contaminated, some have dried up, and options are limited. The study also documented opportunities and challenges for an integrated water governance regime, and the implications for rural livelihoods as identified by participants. The chapter is split into four sections (according to the themes identified during data analysis) and these are: Indigenous knowledge, contribution of Indigenous knowledge to water sustainability, opportunities and challenges for integration, and implications for rural livelihoods.

7.2 Indigenous Knowledge as an Organised Way of Knowing

The study found that agriculture is the main livelihood practised in Esigodini Village, and the Ndebele people have established traditional water management systems to support this livelihood. Chapter four of this thesis described key aspects of the Ndebele group's traditional knowledge and established that, over generations, the group has studied the environment including water, wind, flora and fauna. They have developed methods to monitor and communicate changes within the social group and beyond without the aid of science or technology. The knowledge acquired has been used to make decisions about cropping seasons, agricultural methods, water harvesting and rationing. Over time, the villagers in Esigodini developed social structures that aid them in making decisions about boundary demarcations, community rules, and conflict resolution. The Ndebele group's world view determines how they relate with water in terms of how they use, conserve and protect the resource. The group's local knowledge systems have characteristics that are similar to those of other Indigenous groups around the world. Morgan (2006) describes these as holistic, bound by place and time, having a distinctive identity and a unique language. It is also

consistent with Berkes' (1999) description of a knowledge-practice-belief complex, and Harvetes and Reijnjes' (2010) concept of three interrelated domains (the natural, social and spiritual spheres).

Traditional knowledge has been described as a "way of life" and "lived knowledge" (e.g. Kambu, 2010). It is also referred to by scientific scholars as an informal, alternative or supplementary knowledge system. However, such descriptions give the impression that traditional knowledge is simplistic, not thought out by those who "live" it, and it suggests that Indigenous peoples are passive participants and that Indigenous ways occur without planning. This study, however, provides evidence of the organised nature of the Esigodini villagers' knowledge-practice-belief complex. Evidence of this is in the way the community is constantly obtaining new information about the environment and adapting their ways to respond to observed changes. Words such as "implement", "practice", "apply" and "use" are purposefully used in this thesis when referring to Indigenous knowledge to indicate that local ways are intentional and well thought out. As early as the 1960s, Strauss (as cited by Berkes, 1999) argued that Indigenous people have a "scientific curiosity", and that this was evidenced by their creation of watertight pots among other technologies. The author's work on Indigenous people during this time was controversial, as he was one of the first scholars to equate Indigenous and Western science, noting that the two systems are parallel ways of exploring the world and getting to know more about it – the only difference being that Indigenous knowledge is highly abstract and Western science is highly concrete.

The abstract nature of local knowledge puts spiritual beliefs at the centre of Indigenous groups' views of the world (Kambu, 2010). This study found this to be true for the villagers in Esigodini, who believe in God, ancestors, water spirits, and the sacredness of water bodies. The group believes that elements in the supernatural realm are responsible for blessing them with water, and for withholding it as punishment. It is this belief that necessitates thanksgiving ceremonies as well as those to appease the ancestors at specific times of the year. This aspect is difficult to comprehend, even those researchers that have shown a keen interest in integrating traditional knowledge and Western science struggle to comprehend how this aspect of local knowledge can be integrated. An example of this can be seen in the work of Gagnon and Berteaux (2009), who explored the complementarity of Western science and traditional knowledge, leaving out the spiritual aspect of the latter. Haverkort and Reijnjes (2010) also explored this issue, and emphasised that for Indigenous groups the three domains of traditional knowledge are holistic and inseparable. It has been suggested that aspects of spiritual knowledge be integrated into Western-based systems including research, legislation and policy, and parts the local groups do not wish to share be preserved (Berkes, 1999).

7.3 Contribution of Traditional Knowledge to Water Sustainability

7.3.1 *Myth of the Exotic Other*

Chapter five of this thesis explored the contribution of traditional knowledge to water sustainability in Esigodini Village. Scholars such as Buege (as cited by Berkes, 1999) have warned of some of the misconceptions about Indigenous knowledge, such as the myth of the “Exotic Other”, wherein researchers see Indigenous communities as people who can do no wrong in their interaction with the environment and nature. Although there are several examples of how Indigenous groups have utilised their principles of living in harmony with nature, reciprocity, and mutual respect to inform sustainable use of natural resources, there are also examples of Indigenous groups who have used resources unsustainably despite access to on-the-ground, traditional knowledge (Berkes, 2008). An example is that of the extinction of the Mōa and Huia bird species in New Zealand³⁷. However, Morgan (2006) points out that while this may be seen to challenge the sustainability of Māori traditional knowledge, Western science has also had its fair share of failures in terms of sustainable resource management. With this in mind, this research sought to establish if the Ndebele group’s traditional knowledge encourages sustainable behaviour in relation to water. The research compared two areas in Esigodini, one where local knowledge is still being utilised (Diana’s Area), and another where it has been highly eroded (Emsehleni Area). The study found that although traditional knowledge still exists in Diana’s Area, it is constantly changing to address the water challenges faced by the community, and integrating other ways of knowing. This is consistent with research on the evolving nature of Indigenous knowledge, which challenges the popular belief that it is static and archaic (David 2006; Anwar 2011).

The study also found that the use of taboos, myths, folklore, and community rules encourages the sustainable use of water resources in Diana’s Area, where water is available for most of the year. This research also established that, contrary to the current discourse on decision making that encourages community participation at all levels (Morgan, 2016), in Esigodini crafting of community rules remains the domain of traditional leaders and is not a ‘democratic’ process. However, there are social structures via which the community can contribute to the discussion and debate around water resources. There is a general acceptance of traditional ways among the social group, and there was no evidence of them being forced on any community member. The study found that in Diana’s Area Indigenous water governance is used to ensure equitable distribution of water resources. Some scholars have argued that

³⁷ This is a controversial issue as some believe that the birds were hunted to extinction by the Indigenous Māori, while others believe that the changes that were brought about through colonisation (and particularly the introduction of new predators) were the main cause of the extinction of these birds.
Retrieved from <https://teara.govt.nz/en/extinctions>

Indigenous ways disadvantage women in favour of men (Awuku, 2016), but this study found that all community members in Diana's Area are allowed access to water irrespective of their gender, age, or social standing. All community members are affected by the long distances to water sources, however, by virtue of being primary caregivers, women bear the brunt of these distances. This is consistent with Manase, Ndamba and Makoni's (2003) argument that in such instances, women are worst affected by water and sanitation challenges. The study also established that there are gradual changes in the leadership structure, and more women now hold leadership and decision making roles within the village. Although representation is not yet equal, it is a great improvement on the past, when traditional leadership was passed on from father to son, and women could not hold such positions.

In contrast to local level water governance systems such as those implemented in Diana's Area, water governance systems based on paradigms such as IWRM are failing in many places to sustainably manage water and distribute it equitably (Mehta et al., 2014). Several scholars have argued that the "one glove fits all" approach of such paradigms is not appropriate for all contexts. This has been true in the Zimbabwean context, which has seen a peculiar economic, social, political and cultural situation over the past twenty years. Despite the introduction of a water governance system that is based on IWRM principles, the country still faces complex water challenges, especially in rural areas (Mapedza et al., 2016). An example is the case of Emsehleni Area where, according to the senior village head, 500 people share 4 boreholes and community members can walk up to 5kms to water their livestock during periods of water shortages. The sub-catchment councils that were established to ensure participation of all stakeholders in water discussions, saw limited involvement of communal farmers, and a lack of funding has seen most of them become defunct. Such challenges with the implementation of IWRM around the world have prompted scholars to advocate for solutions that are tailored to a specific context and based on local knowledge (Derman and Hellum, 2006). The Diana's Area example, and other case studies worldwide, indicate that there is great potential for the inclusion of Indigenous and Western-based knowledge in water governance for water sustainability, improved access, and security of supply.

In Emsehleni, the erosion of Indigenous knowledge and oral tradition has contributed to a decline in the quality of water resources. Livelihood choices are limited, and they have become individualised in comparison to the community-centred livelihood projects in Diana's Area. The study established that Eurocentric learning, modern technologies, and religion have contributed to the erosion of traditional knowledge in this area. It has been argued that although equipped with such a rich knowledge base, Indigenous people have been

indoctrinated through colonial legacies, Westernisation, education, and religion into believing that their knowledge is the lesser way of knowing (Smith, 2012).

7.3.2 Water Legislation and Loss of Culture and Language

This research found that in Emsehleni the oral nature of traditional knowledge is at risk of being completely lost. The older members of the community are now reluctant to share traditional knowledge with the young ones in the village, who have the impression that they have a “superior” way of knowing based on Eurocentric learning. The children and the youth in Esigodini Village can now question and argue with their elders over the relevance of traditional knowledge in a modern world. The study also established that one of the three government level participants had in-depth knowledge of the Ndebele group’s Indigenous ways, however, this is because he is part of the group and was raised and educated among them.

According to Vygotsky (1978:39), writing from a social constructivist perspective:

“Language and culture are the frameworks through which humans experience, communicate and understand reality.”

In a world where people of all ages are struggling to find their identity, language and culture give a sense of identity, of belonging, and of place. From the colonial era until the year 2016, the school curriculum in Zimbabwe mainly focused on teaching British history over that of Indigenous people. The new school curriculum, first implemented in 2016, introduced “Heritage Studies” as a subject³⁸. While this might be seen as a step in the right direction, this subject is also taught in English, which is the medium of instruction in Zimbabwean schools. According to Kambu (2010), Indigenous languages are rich with lessons about conserving, protecting, and maintaining natural resources, and translation into foreign languages leads to the loss of meaning. This kind of system disinherits the youth of their cultural heritage, as their reality is shaped by foreign perceptions, and this is how they grow to view the world and the ways of their people. The cohort of decision makers and researchers who are currently making decisions about water resources in the country have been schooled in such a system. According to Anwar (2011) they are not being prepared to engage meaningfully with local communities, and this often results in poor decision making that disadvantages rural communities. The Asian Development Bank (2003) identifies poor water governance policies as the main contributor to the water challenges currently being faced globally. In the case of Zimbabwe, this proves true as water legislation and policy have made water an economic

³⁸ Retrieved From <https://bulawayo24.com/index-id-opinion-sc-columnist-byo-103537.html>

good, and those who do not contribute to its commercial use are faced with major challenges in accessing the resource.

7.4 Opportunities for Integration - Complementarity and the Third Space

Chapter six of this thesis documented the opportunities and challenges for integration that were identified by the study participants. The study found that opportunities for integration identified by participants were based on the strengths of traditional and Western-based knowledge systems. Due to resource constraints, there is an informal system where both the villagers and the government have an arrangement for collecting data and monitoring water resources in Esigodini. It has been suggested by research participants that this arrangement be formalised to integrate traditional and science based data collection methods. Kambu (2010) asserts that traditional knowledge is a low cost option for services that local communities may otherwise not be able to afford. With the current financial crises faced by the Zimbabwean government, such a system might be an affordable option. The villagers in Esigodini are not rigid in their traditional ways, and this is evidenced by their openness to integrate other ways of knowing, including those from other cultures within Zimbabwe and beyond, for better water management. One of the strengths of Western science based knowledge is its rigorous documentation (Taylor and de Loë, 2012), and the study found that villagers in Esigodini are willing to explore this option in order to help preserve their knowledge for current and future generations.

The villagers have had negative experiences with participatory development processes, especially those led by the government, and they are currently interested in collaborative rather than consultative processes. Consultative processes have been referred to as part of a “knowledge extraction paradigm” (McGregor 2014), where information is elicited from local communities with no interest in further engagement. Data collected from the field study suggests that collaborative processes that have occurred in the past, including the construction of the Mbilambowe Dam in Diana’s Area, have seen government departments selecting instances where they engage the villagers. This is consistent with Smith’s (2012) assertion of dominant governance systems often dictating terms of engagement. Anwar (2011) argues that local communities should be approached with respect and under their own terms. After the construction of the Mbilambowe Dam, the government made no commitment to invest in water infrastructure that would benefit smallholder farmers. Currently the main beneficiaries of the dam are commercial farmers. Although, the collaborative project did not yield all the results the community anticipated, it does suggest that traditional knowledge, including its spiritual aspect, can be successfully used alongside Western ways of knowing. The Mbilambowe Dam project saw the utilisation of the villagers’ knowledge of land and water

resources in the siting of the dam, and traditional ceremonies were conducted before any work could begin on the ancestors' land. The villagers also used the skills of working the land that are traditionally passed on from generation to generation in the construction of the dam (they provided manual labour). The government provided the technical and financial resources for the project.

Berkes (1999) argues that early research on Indigenous knowledge systems paid too much attention to the differences between traditional and Western-based knowledge, with the former being used selectively, often being assigned a supportive role to modern science (Chikozho and Latham, 2005). Ludwig (2016) points out that debate on integration is shifting from establishing differences, to identifying complementarity. Scholars such as Gagnon and Berteaux (2009) have explored complementarity of these different ways of knowing across spatial and temporal scales. Although such contributions to the field of study are noble and valid, there needs to first occur a de-role exercise³⁹ for both the custodians of local knowledge and those of Western science, which Smith (2012) describes as “decolonising methodologies”. Such a process will entail the creation of a safe space where all stakeholders involved can make a meaningful contribution. Bhabha's (1999) theory of hybridity supports such assertions and suggests the creation of a third space for negotiation and for the two ways of knowing to learn from each other. For a third space to be effective, it is important for all parties to appreciate that there are multiple ontologies (Duncan, 2015). Ludwig (2016), supports such an approach and suggests the use of the standpoint theory, where issues of the marginalised including Indigenous groups can be viewed as matters of social justice. The author goes a step further and also suggests using ontological self-determination, which asserts that science cannot be the only lens used to research and understand Indigenous knowledge systems.

7.5 Challenges for Integration - Ontological Divergence

The data collected during the field work indicates that the two ways of knowing are complementary and can potentially be used to effectively manage water resources. However, there are concerns over integrating traditional and Western knowledge into water governance. These mainly stem from the differences between ontological materialism (science) and ontological idealism (Indigenous knowledge) (Ludwig, 2016). Some of the concerns around establishing an integrated water governance system include the private nature of some aspects of local knowledge and its applicability at national scale or outside the geographic location where it was developed and is being utilised. Research by Morgan (2006) explores the inclusion of a cultural criterion within decision support tools, which could allow for some

³⁹ A de-role exercise is a process of stepping out of one's usual role, to listen to the opinions and beliefs of other people that may be very different from one's own. It involves not judging or making decisions based solely on one particular way of knowing.

assessment of spiritual aspects of Indigenous knowledge. Such an approach may also allow decisions to consider the perceptions of local groups as well as those of experts, and can include room for compromise. The methodology can be adapted to other countries and contexts including Zimbabwe. Another concern was in relation to intellectual property rights and the degree of control the Ndebele group would have if their knowledge were put in the public domain and commercialised by entities outside the group. It was, however, established that South Africa has amended its Intellectual Property Rights Law to include Indigenous knowledge. Zimbabwe could learn from this precedent, and adapt the process to its context.

Loss of oral tradition through documentation was also identified by participants as a concern, although researchers such as Anwar (2011), have emphasised that the endurance of traditional knowledge can be explained by its ability to evolve and integrate other ways of knowing. The adaptation of Indigenous knowledge to include an aspect of documentation in written, oral and visual form may help ensure that it continues to be passed on from generation to generation, and, therefore, stands a better chance of being available to those yet to be born. The importance of maintaining the culture of passing down knowledge within Indigenous circles is reflected in a 1973 landmark case in Canada where an Indigenous group contested a claim that their land had been unoccupied pre-colonisation. Although the group did not possess a signed treaty, they successfully used accounts of their oral history to build their case, changing the manner in which First Nations land claims are handled (McConville, 1999).

Duncan (2015) suggests that Indigenous and Western science-based ways of knowing may be too different to be integrated, and should therefore be allowed to exist in parallel. Von der Porten et al. (2015) are of the opinion that state actors should invest in endogenous development instead of integration. These assertions may prove true in some contexts, however, their application may be difficult in the Zimbabwean context. Firstly, Duncan's study is based on the New Zealand context, where the relevant legislation (the Resource Management Act 1991, or RMA) acknowledges the founding Treaty of Waitangi, *Kaitiakitanga* (guardianship) and other issues that are of importance to Indigenous Māori. According to the RMA, "all persons exercising functions and powers ... shall provide for ... and regard" these issues. Zimbabwe on the other hand has a predominately Indigenous population, but water statutory instruments give no consideration for local or Indigenous knowledge and are ambiguous about water rights of Indigenous communal farmers. The main water statutory instrument, the Water Act (1998), makes no mention of traditional knowledge or Indigenous water rights. The country has been independent for over 38 years, and the two ways of knowing have existed in parallel, however, the government has made no effort to invest in traditional knowledge systems. The state of water resources in terms of quality, quantity and

accessibility in Esigodini is typical of those in other rural communities in the country. Therefore, the existence of a parallel system has not yielded positive results for communal farmers, who continue to face major barriers in accessing water for daily consumption and for livelihoods. The Royal Commission on Aboriginal People of Canada (as cited by McGregor, 2014), questions how governments expect a positive outcome today when they continue to govern resources in a manner that has not yielded positive outcomes in the past. There is, therefore, a pressing need to explore other options, including integration of traditional and Western knowledge systems.

7.6 Implications for Rural Livelihoods - The Right to a Livelihood

Research into the implications of integration for rural livelihoods has been limited, and this study makes an initial contribution towards understanding this issue. This study found that the villagers in Esigodini have poor access to water resources. Access, according to Ribot and Peluso (2006:153), is “the ability to derive benefits from things.” Based on this definition, communal farmers in Esigodini are currently unable to support large scale livelihood projects due to poor access to water resources. It was established that, due to over reliance on rainwater and poor access to other sources of water, there have been agricultural seasons where the small-scale farmers have not harvested enough to feed themselves and their families until the next rainfall season. Berkes (1999), has warned against the assumption that local communities have no desire to derive economic benefits from natural resources. This study found that the Esigodini villagers believe they have the ethical responsibility to look after natural resources, and that the natural environment also has a desire to look after them in return. The role of the environment in the reciprocal relationship includes, providing the villagers with services that enable them to benefit economically.

Currently communal farmers in Esigodini are classified as primary water users, and do not pay water rates. According to Ribot and Peluso (2006) such groups access water through those who currently make water decisions and view water as an economic good. To expand their agricultural activities, they will need improved access to water resources and with the current water legislation, this can only be done through the application for water permits and agreements that allow them to use water at a large scale. The right to water has been recognised as a basic human right in General Comment 15 by the United Nations Committee on Economic, Social and Cultural Rights (Derman and Hellum, 2016). It is also widely acknowledged that for most livelihoods to be successful, they require a consistent supply of water, and therefore this study argues that the right to water translates to a right to a livelihood. Derman and Hellum (2016) support this notion, and assert that a rights-based approach

should not only make provisions for primary water but also for the water needs of small-scale farmers.

According to the Zimbabwe Interim Poverty Reduction Strategy Paper for 2016 to 2018 (Ministry of Finance and Economic Development, 2016), 92% of the extremely poor population resides in rural areas. Seventy six percent (76%) of rural households are considered poor, compared to 38.2% of urban households. The Western-based water governance system applied to management of water resources in Zimbabwe has been criticised for not prioritising the livelihoods of the poor (Mehta et al., 2014). Research participants are optimistic that a system that better integrates traditional and Western knowledge will result in positive outcomes for rural livelihoods in Esigodini. Some of the outcomes they expect include improved access to and supply of water, expansion of horticulture, diversification of livelihoods, greater entry for women into male dominated livelihoods, employment creation, and a decrease in donor dependency. Ludwig (2016) in a study of overlapping ontologies, explores successes and failures of integration of the two ways of knowing in different contexts, and identifies opposing goals and agendas as one of the main causes for failure. It is, therefore, important to note that inclusion of traditional and Western knowledge into water governance does not necessarily translate to action. There needs to be a commitment by all stakeholders involved to ensure successful implementation. Commitment in this sense does not only refer to financial resources, but also to mutual respect, time and human capital. Although there are challenges to integration, these can be overcome by learning from case studies and experiences in comparable contexts, and adapting them to the Zimbabwean context.

7.7 Chapter Summary

This chapter has discussed the results obtained from the research in the context of literature that was analysed for this study. The Ndebele group's Indigenous knowledge shares many similarities with Indigenous knowledge around water and the environment, as described by authors working in other contexts around the globe. Through the analysis of traditional water management systems of the Ndebele people in Esigodini, this study argues that, contrary to the popular belief that this knowledge system is lay and simplistic, it is well thought out with instances where the group has shown scientific curiosity. When traditional knowledge is implemented holistically, with acceptance from the wider social group, it does lead to positive outcomes for water resources and livelihoods. It was also established that the opportunities and challenges for integration identified by participants are also being experienced in other nations that are currently implementing or have attempted to establish such a system. Investigating the implications of an integrated water governance system on rural livelihoods

explores a field that is relatively new, with very little research having been done in the area. Such research provides insight into the expectations of an integrated water governance system and there is scope to carry out studies on actual impacts when such systems have been implemented. The chapter that follows (Chapter eight) concludes this thesis, and will be divided into three sections. These sections present: a summary of findings, conclusions reached through the study, and recommendations.

Chapter Eight

Conclusions and Recommendations

8.1 Introduction

This chapter provides a summary of findings, conclusions, and recommendations from this study. The recommendations will be discussed under three sections, with a first section directed to the international community (including the UN community, researchers and policy makers), a second to the Zimbabwean government and decision makers, and a third section that is directed to the Esigodini villagers. The chapter also informs a document ([Appendix D](#)) summarising the findings and recommendations, which will be shared with local level and government level participants who took part in this study. The research set out to answer the following research question:

Can traditional and Western-based water management systems be integrated into water governance for effective water management and how will this affect rural livelihoods in Esigodini?

The study found that there is potential for the establishment and implementation of a water governance system that integrates traditional and Western-based knowledge. However, there are also concerns over the modalities of establishing such a system and putting it into action. The study found that a water governance system that is informed by both Indigenous and Western ways of knowing has the potential to improve the management of water and have a positive impact on rural livelihoods in Esigodini.

8.2 Summary of Findings and Conclusions

The study found that most villagers in Esigodini are not formally employed and rely on agriculture as a source of livelihood. Due to poor access to and supply of water, the villagers are largely subsistence farmers who rely on rainwater for farming activities, which include cereal crop cultivation, vegetable gardening, and livestock production. The research also found that the government has been facing resource challenges for almost two decades now, and there has been very little investment in water infrastructure in rural communities. In Emsehleni Area, it was found that five hundred people share four boreholes, and villagers can walk between one and two kilometres to access this common water source. Low levels of investment in water infrastructure, coupled with droughts that have become more frequent and severe, are leading to poor harvests and the loss of livestock. The villagers in some areas, however, do have traditional practices in place that they use to protect and conserve water in their community.

The villagers have in-depth knowledge about the land, water and animals, which has been passed on to them by their parents and other elders in the village. They observe changes in

flora, fauna, wind, the sun, and the moon to predict rainfall and droughts, and the knowledge acquired is used to make agricultural decisions, such as when to plant their crops. The villagers also use traditional methods in cropping fields and vegetable gardens to conserve water and to minimise water loss. The Esigodini villagers have social institutions in place that ensure that everyone has access to water for their basic needs, and rules are put in place for equitable distribution of the resource. There are also rules around the use of water during periods when the supply is low, such as during drought and winter periods. The study also found that some villagers believe in a superpower that provides them with rain, and it is this water from God that provides water for their livelihoods. The village, therefore, has seasonal ceremonies to request rain, to appease the ancestors during drought periods, and to thank God, the rain spirit, and the ancestors for rain.

The study found that in areas such as Diana's Area, where traditional knowledge is still being practised, water resources are in a healthier condition compared to areas such as Emsehleni, where traditional knowledge is rarely used. In Diana's Area, all community members have a role to play in maintaining water quality and identifying those who break community rules. To deter villagers from contaminating water resources, the "polluter pays" rule is enforced through customary law, and fines depend on the severity of the offence. Community members in Diana's Area have more options for water sources for their livelihood activities as the traditional rules and institutions ensure that the water resources are kept in a usable condition. By using multiple water resources, pressure is not exerted on a single source of water, and boreholes in this area break down less frequently. The opposite is true for Emsehleni Area, where the community has lost much of its respect for water as a living being, and traditional water sources such as rivers and streams are now polluted. Boreholes break down frequently and require repairs often, and this is a cause for conflict among the community members. The study therefore established that traditional knowledge encourages the sustainable use of water resources in the areas of Esigodini where it is still practiced.

The social structures and community rules that the villagers have in place ensure that all people have access to water for primary purposes, irrespective of gender, age or position within the village. The villagers go out of their way to provide water for older and unwell community members. When there is a community event, they work together to ensure that there is adequate water. Although traditional knowledge does not discriminate in ensuring access to water to all villagers, culturally women are the primary care-givers, and it is their duty to provide water for their families on a daily basis. Traditionally women carry buckets of water on their heads, and they also have to walk long distances to access water, which makes water collection a very tiresome and time consuming task. In areas such as Diana's Area,

there are still a number of community-based livelihood projects, and provision of water for these is a group effort. However, in Emsehleni Area, livelihoods have become more individualised with each household providing water for their own livelihood activities.

The study found that the parallel legal system that exists in the management of water resources is currently not yielding positive results for rural livelihoods. Although the villagers are represented on fora where decisions about water resources are made, their water challenges are not addressed, and their ways of knowing are rarely acknowledged. The villagers believe that a water governance system that integrates Indigenous and Western knowledge will have positive impacts on their livelihoods. The outcomes expected by the villagers from such a system include, improved access to and supply of water, which the villagers believe is the key to the improvement of livelihoods in Esigodini. The villagers also indicated that an integrated system will provide opportunities for diversified livelihoods, as they can branch into other sectors such as fish farming. Expansion of vegetable gardening is another positive outcome envisaged by the villagers, with some of them expressing a desire to practice market gardening at large scale. The Villagers are also keen to explore opportunities in horticulture for export purposes. Women would like to gain entry into male-dominated livelihoods as they currently do not have the time to venture into livelihoods such as brick making due to water collection chores. Men are keen to have the village experience a decrease in dependency on donor funding, and have the residents more self-sufficient.

By adopting aspects of best practice from Indigenous and Western ways of knowing to make amendments to the current water legislation, policy and institutional arrangements, there is potential for better management of water resources and improved rural livelihoods. There are, however, concerns from both local level and government stakeholders over establishing and implementing such a system, and these include a mistrust of participatory processes that involve the government, and aspects of traditional knowledge that are a secret. The section that follows provides recommendations that address some of these concerns.

8.3 Recommendations

8.3.1 The International Community

A review of the literature addressing traditional knowledge and water management (e.g. Mapedza et al., 2016⁴⁰; Mehta et al.; 2014⁴¹; Swainson and de Loë, 2011)⁴² found that there is a history of water management concepts and interventions that are crafted at international level as a panacea for water challenges around the globe. An example of such a concept is

⁴⁰ Whose writing is based on Zimbabwe.

⁴¹ Writing with a focus on the South African context.

⁴² Whose writings are focused on Canada.

integrated water resource management (IWRM). There are success stories, where nations have effectively applied IWRM, but there is a growing argument about the applicability of such concepts in the developing world. This study suggests that the international community needs to understand that context matters. Each country has its own unique environment, and the “one glove fits” all approach will not yield positive results for the management of water resources. Although many developing countries lack the financial capital to invest in water infrastructure projects, local people usually possess in-depth knowledge about their context, and have the ability to steer their own path towards water governance that is relevant to their particular situation. In this light, water interventions crafted at international level should take into account differing contexts. Funding offered for their implementation should be flexible. Developing countries should be given the opportunity to tailor make their own version of water management paradigms and interventions, and international concepts should only be used as a guide. Most importantly, countries should be able to negotiate for terms that suit their local environments, including the integration of local and Western-based water management systems to better manage their water resources.

There have been great strides made internationally to recognise traditional knowledge and its custodians, including recognition in the United Nations Declaration on the Rights of Indigenous People (2007) and the Convention on Biological Diversity. Indigenous groups have also declared spaces they would like to occupy in the management of water in the Indigenous Peoples Kyoto Water Declaration (2003). The Declaration also reflects an increasing demand for self-determination and the recognition of Indigenous water rights among local groups. This increased assertiveness of Indigenous people requires that Indigenous voices are included in the crafting of water interventions at the international level. This study found that although there is increased recognition of Indigenous knowledge and local groups in water policies around the world, in many instances, these policies are not implemented at the local scale. It is therefore important that there is more emphasis on investment of financial, time, and human capital into the roll-out of such policy in order to realise the anticipated results for Indigenous groups and water resources.

Paradigms such as IWRM have been criticised for not considering the livelihoods of the poor, who mainly reside in rural communities that may be beyond the reach of Western-based water governance systems. It has also been argued that such concepts are backed by institutions and multilateral organisations that lack interest in localised livelihoods, such as those based on small-scale agriculture. This has seen the application of the concept of IWRM in countries such as Zimbabwe not recognising the water needs of subsistence farmers, except for primary purposes. Water has been recognised on international platforms as a fundamental human

right (e.g. by the United Nations Committee on Economic, Social and Cultural Rights in 2002, and the United Nations General Assembly, 2010). It is therefore important that interventions at the international level, by foreign funding organisations recognise the need to invest in the improvement of water resources for rural farmers to expand agriculture and realise their right to a sustainable livelihood.

8.3.2 National Level

As stated in the section above, developing countries have the ability to steer their own development trajectory, however, they often lack financial resources and, in some instances, the institutional capacity to implement projects guided by local vision. Developing countries often rely on external loans and funding, and these usually come with terms that are not relevant to specific country contexts. In the case of Zimbabwe, the effects of the Economic Structural Adjustment Programme, that was implemented in the early 1990s have rolled over into the twenty first century, and are still affecting the country. The country has also been facing major challenges in implementing a water governance system based on the principles of IWRM, not only because of the nation's complex political and economic situation, but also because of the over-reliance on external funding for the success of the system. It is therefore important that when negotiating for funding for externally crafted interventions, the nation's leadership should be assertive in including terms that work for the local conditions. This assertiveness should go as far as declining funding for water projects that have conditions that are irrelevant or inappropriate to the national context and particular local settings. Accepting such conditions is a waste of financial, human, and time resources, as they are sure to fail or not produce the desired outcomes, leaving the country in debt.

According to the Constitution of Zimbabwe (2013: s33), the state has a duty to protect and preserve traditional knowledge systems that are possessed by the local groups in the country. However, this study found that traditional knowledge is not recognised in water legislation and policy. Although there are institutions that have been put in place to ensure the participation of local groups in discussions around water issues, their participation has in practice been limited. The villagers took part in the consultative process that led to the crafting of current water statutory instruments that make no mention of their ways of knowing. The Esigodini villagers have grown to distrust such processes. There is a need for the government to approach traditional leaders, rebuild confidence, and negotiate terms for re-engagement. To overcome the current trust issues, this study recommends the engagement of a third party from within Zimbabwe, to facilitate the creation of an environment for re-engagement, and to establish the relevant protocols for the integration of traditional and Western-based knowledge into water governance. Some of the issues that will need to be addressed include:

- i. Terms for engagement and setting out anticipated outcomes
- ii. Intellectual Property Rights (to outline the rights of local groups to their Indigenous knowledge that they have chosen to make public)
- iii. Roles and responsibilities of local group and government representatives
- iv. Implementation timelines (for example, for the amendment of water legislation to include traditional knowledge and leadership)
- v. Monitoring and evaluation of outcomes

The process will be time consuming and will require an investment of resources. However, if the outcomes that were identified by participants in this study are realised, communal farmers will graduate into rate payers who make a meaningful contribution towards the Gross Domestic Product of the country. The state will also be honouring its duty to preserve traditional knowledge and engage its custodians in decision making, as stated in the Constitution of Zimbabwe and international conventions which the country is signatory to.

The study established that there are key lessons to be learnt from the manner in which traditional knowledge is practised by the Ndebele group. The villagers in Esigodini monitor water quality and quantity, and anticipate the onset of droughts and rainfall on the basis of traditional knowledge and practice. With the current challenges faced by the nation in implementing a top-down approach to water management, such low cost, localised methods of managing water resources can offer solutions to ease the load of the government in water service delivery. The villagers also have in place methods and social institutions that ensure that all persons in the village have access to water for primary purposes without discrimination. The current Western-based water governance regime being promoted in the country places more emphasis on supplying water to those who are able to pay for its consumption. There is scope for government departments to learn how villagers with limited financial resources and restricted access to water, manage to share the water equitably. Decentralisation of the maintenance of boreholes in Esigodini is good practice, and government departments can explore this further by tapping into traditional knowledge systems to monitor water resources at village level.

8.3.3 Village Level

It is evident that areas which still use traditional knowledge have developed more sustainable water management practises compared to those that are not utilising this knowledge in Esigodini village. It is, therefore, important for the village leadership, with the guidance of the Chief, to develop strategies that will encourage wider use of Indigenous knowledge within the village. Traditional water conservation and storage is one area that is critical in a semi-arid

village such as Esigodini. The study found that most local level participants assume that they can only learn from science, but they cannot teach scientists what they know traditionally. It is these kinds of beliefs that contribute to their limited participation in decision making processes, as they believe that their traditional knowledge is inferior. It is important for the Esigodini villagers to understand that Western science is not a superior way of knowing. It has its merits and demerits just like traditional knowledge. There is room for the two knowledge systems to learn from each other and improve the manner in which water resources are managed. Currently the villagers are being consulted, but the use of their traditional knowledge is limited, and they sometimes do not benefit from the outcomes of such consultative processes. An integrated water governance system should give traditional leadership a more formal role in decision making. This may then increase their ability to assert local needs and secure water justice for their communities.

The study found that there are areas in Esigodini where traditional knowledge is still practised, however, this knowledge has been adapted to deal with current water challenges. There are also some areas where traditional knowledge has been highly eroded, and it is barely being utilised or passed on to younger generations. The very foundation for the survival of traditional knowledge is its ability to be shared with the young ones in the village, and it is, therefore, important for the elders of the village to search for innovative ways of sharing this knowledge. Integrating traditional and Western-based knowledge provides an opportunity to document traditional knowledge and share it within and outside the village. If the process of integrating local knowledge is done in good faith, the local groups will have the platform to state the terms for the documentation of their knowledge. Issues of intellectual property rights will need to be negotiated by the traditional leadership, and traditional knowledge can be made available in both the local language and English. In order to maintain the oral nature of traditional knowledge, village elders can be recorded both in audio and visually while telling their folklore, taboos and myths as they would usually tell them within the village and household setting. These recordings can be archived within the village and in national libraries or made available on the internet and can be accessible to researchers, Indigenous youth, and those who have an interest in such knowledge. The villagers will also need to create an environment where the aspects of their knowledge that are private continue to be passed on to relevant individuals in the village.

While the study did not observe any obvious discrimination against specific groups in accessing water resources, women as primary care givers, bear the brunt of the challenges in accessing water. There was very little evidence in the communities visited to suggest that there is an effort to lighten this burden. Traditional leadership can lead by introducing ways of

encouraging men to participate more in water collection activities, or to make available wheelbarrows and scotch carts to lighten the load for women. The village leaders can target respected men in the community to be “change agents” by helping their wives and daughters collect water and having them use implements that make the task easier. This will help lift the stigma that is associated with men frequently fetching water or women using implements to carry water. Such a change will also provide women with time to engage in other productive activities that improve their livelihoods.

8.3.4 Scope for Future Studies

This study has concluded that the two ways of knowing (traditional knowledge and science) are different, however, they can complement each other. Due to time and resource constraints, the sample size for this study was small, however, the interviews were in-depth. This research has laid a foundation for further research that could develop a model water governance system that integrates traditional knowledge into the current Western-based water governance system in Zimbabwe. Such a model would be of relevance to other countries where traditional and Western resource management regimes remain separated, and might be adapted to their specific contexts. If such a system is implemented in Zimbabwe, there is scope for the development of a monitoring and evaluation framework for assessing the effectiveness of the integrated system, and the investigation of implications of the integrated system for rural livelihoods.

8.4 Indigenous Voices Matter

This chapter has provided a summary of the findings of this thesis in relation to the research questions. The study found that small-scale agriculture is the main source of livelihood in Esigodini Village, and there are sections of the village that still holistically apply traditional knowledge in the practical management of water resources. It was also found that social institutions and community rules have been developed to ensure that all persons have access to water resources. The study established that in areas of the village where traditional knowledge is still practised, water resources are in a healthier state, and there are more options for the community, than in areas where traditional knowledge is not practiced anymore. Research participants believe that if done in good faith, the integration of Indigenous and Western knowledge into water governance will have a positive impact on the rural livelihoods in Esigodini.

The study concluded that an integrated water governance system will improve the management of water resources and will yield positive results for rural livelihoods in the study area. The study recommends that Indigenous voices, water rights, and rights to self-determination be included in the crafting of policy both internationally and nationally. The

Government of Zimbabwe has a constitutional mandate to preserve and protect Indigenous knowledge, and incorporating this knowledge into water governance, will bring it closer to fulfilling its duty. With formal recognition, local groups can become more assertive when taking part in decision making processes, and can confidently debate and address water issues using their own ways of knowing. It is also important for local groups to understand that their ways of knowing are relevant for effective water management, and they should develop innovative ways of sharing and preserving this knowledge in order to keep it alive for future generations.

This study can be used as a foundation for future research, which can include the development of a model of a system that integrates traditional knowledge into the current water governance regime and a framework for the monitoring and evaluation of such a system.

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APPENDIX A: Human Ethics Approval Letter



HUMAN ETHICS COMMITTEE
Secretary, Rebecca Robinson
Telephone: +64 03 369 4588, Extn 94588
Email: human-ethics@canterbury.ac.nz

Ref: HEC 2018/10/LR

14 May 2018

Xolile Ncube
Waterways Centre for Freshwater Management
UNIVERSITY OF CANTERBURY

Dear Xolile

Thank you for submitting your low risk application to the Human Ethics Committee for the research proposal titled “Traditional Knowledge Integration in Water Governance and its Implications for Rural Livelihoods in Esigodini, Zimbabwe”.

I am pleased to advise that this application has been reviewed and approved.

Please note that this approval is subject to the incorporation of the amendments you have provided in your emails of 28th April and 9th May 2018.

With best wishes for your project.

Yours sincerely
pp.

Professor Jane Maidment Chair, Human Ethics Committee

APPENDIX B: Interview and Focus Group Discussion Guide (Local Level Participants)



Traditional and Western-Based Knowledge Integration in Water Governance and its Implications for Rural Livelihoods in Esigodini, Zimbabwe

Interview and Focus Group Discussion Guide (Local Level Participants)

Interview Date: _____

Interview Location: _____

Start Time: _____ End Time: _____

Designation of Participant: _____

Theme 1: Traditional Management Systems in Esigodini

1. What do you understand by the term traditional knowledge?
2. What are the traditional water management practices currently being implemented at household and community level in Esigodini?

Follow on questions:

- How did you get to know about them?
 - Are they applied differently by men and women and by community members of different age groups? If yes, what is the difference and what are the reasons for this distinction in application?
3. Have these traditional water management practices changed over time? If yes, elaborate on how and why they have changed.
 4. Who is responsible for allocation and demarcation of water resources? Please give designation of persons and their role.

Follow on question:

- How do you ensure that allocation and demarcation rules are adhered to?
5. What kind of water conflict has been experienced or is currently being faced by the village (including human-wildlife conflict) or with other villages? What are the channels for resolution of such disputes? How are these conflicts resolved? (Give examples where possible)
 6. Have there been instances where both formal and informal water governance systems have been used to resolve water problems in the village? Please explain.

Theme 2: Contribution of Traditional Knowledge to Water Sustainability

7. What are the main sources of water in the village?
8. What are the reasons behind implementation of traditional water management systems (mentioned in question 2) on these water resources?

Follow on question:

- What are the short-term and long-term implications of their use?
9. Do these practices change at different periods e.g. during drought and lean periods? If yes, elaborate on how and why they change?

Theme 3: Opportunities and Challenges for Integration of Traditional Knowledge into the Current Water Governance Regime

10. Are you aware of the current mainstream water governance regime? If yes, please elaborate.
11. How has the state engaged you in the past on water related issues and what has been the outcome?
12. What role has the government through the local authority and other state actors played in the improvement of access to water for rural livelihoods over the past ten years?
13. Which are the non-state actors that contribute to water management (e.g. NGOs) in the village and what has been their role? How have your local norms informed their interventions?
14. Do you see integration of traditional knowledge as a possibility? If no, why? If yes, state some of the opportunities and challenges that you envisage with such a system?
15. What role would you as custodians of Indigenous knowledge want to play within such a system? Will these roles be assigned differently to males and females?

Theme 4: Implications on Rural Livelihoods

16. What are the current water dependant rural livelihoods in the village?
Follow on question:
-Are the livelihoods gender specific? If yes, please define the different livelihoods by gender.
17. How are you currently accessing water for these livelihoods? (include distance to water source and type of water source)
18. In your view, how would a water governance regime informed by both traditional and science/Western knowledge impact water dependant livelihoods in your village?
19. In your view, how would such a system benefit households and the community of Esigodini?

Analytical Memo (*To be completed straight after the interview)

1. What were your personal feelings and reflections as you were interviewing? How did you personally relate to the participant(s)?
2. What questions were useful/relevant? What were not?
3. Were there other questions you should have asked? How satisfied are you with the interview?
4. What concepts stand out for you from the interviews? What information was most useful/relevant?

APPENDIX C: Interview Guide (Government Officials)



Traditional and Western-Based Knowledge Integration in Water Governance and its Implications for Rural Livelihoods in Esigodini, Zimbabwe Interview Guide (Government Officials)

Interview Date: _____

Interview Location: _____

Start Time: _____ End Time: _____

Designation of Participant: _____

Theme 1: Traditional Management Systems in Esigodini

1. What do you understand by the term traditional knowledge?
2. What are the traditional water management practices currently being implemented by the local community at household and community level in Esigodini?

Follow on questions:

- How have different generations learnt about these traditional water management practices?
 - Are they applied differently by men and women and by community members of different age groups? If yes, why is this so?
3. Have these traditional water management practices changed over time? If yes, elaborate on how and why they have changed.
 4. Are you aware of allocation and demarcation responsibilities for water resources? If yes, please give designation of persons and their role.

Follow on question:

- How does the community ensure that allocation and demarcation rules are adhered to?
5. What kind of water conflict has been experienced or is currently being faced by the village (including human-wildlife conflict) or with other villages? What are the channels for resolution of such disputes? How are these conflicts resolved?

Follow on question:

Have there been instances where both formal and informal water governance have been used to resolve water problems in the village? Please explain.

Theme 2: Contribution of Traditional Knowledge to Water Sustainability

6. What are the main sources of water in the village?
7. In your expert opinion, do traditional water management systems contribute towards water sustainability? If yes, what is their contribution? Is there evidence of this opinion and is this evidence documented?
8. Do these practices change at different periods e.g. during drought and lean periods? If yes, elaborate on how they change and what the reason behind the change is?

Theme 3: Opportunities and Challenges for Integration of Traditional Knowledge into the Current Water Governance Regime

9. How is your department/institution engaging local communities as custodians of Indigenous knowledge? What has been the outcome?

10. What considerations are made of traditional knowledge during state-led/initiated processes e.g. sub-catchment council meetings?
11. What role has the government, through the local authority and other state actors, played in the improvement of access to water for rural livelihoods over the past ten years?
12. Which are the non-state actors that have contributed to water management (e.g. NGOs) in the village and what has been their role? How have they used local knowledge to inform interventions in the village?
13. Do you see integration of traditional knowledge as a possibility? If no, why not? If yes, state some of the opportunities and challenges that you envisage with such a system?
14. What role would the Esigodini community as custodians of Indigenous knowledge play within such a system? In your opinion, will these roles be assigned differently to males and females?

Theme 4: Implications for Rural Livelihoods

15. What are the current water dependant rural livelihoods in the village?
16. Does gender influence the type of livelihoods practiced? If yes, explain.
17. How is the local community currently accessing water for these livelihoods? (include distance to water source and type of water source)
18. In your professional opinion, how would a water governance regime informed by both traditional and science/Western knowledge impact water dependant livelihoods in the village?
19. In your view, how would such a system benefit households and the community of Esigodini?

Analytical Memo (*To be completed straight after the interview)

1. What were your personal feelings and reflections as you were interviewing? How did you personally relate to the participant(s)?

2. What questions were useful/relevant? What were not?

3. Were there other questions you should have asked? How satisfied are you with the interview?

4. What concepts stand out for you from the interviews? What was the most useful/relevant information?

APPENDIX D: Summary of Results and Recommendations

Traditional and Western-Based Knowledge Integration in Water Governance and its Implications for Rural Livelihoods in Esigodini, Zimbabwe

Introduction

This document gives a discussion of results and recommendations from a study that was conducted in partial fulfilment of Xolile Ncube's Master of Water Resources Management Degree with the Waterways Centre for Freshwater Management at the University of Canterbury, New Zealand. The topic of the research is "Traditional and Western-Based Knowledge Integration in Water Governance and its Implications for Rural Livelihoods in Esigodini, Zimbabwe". Traditional knowledge is still widely used by local groups across the globe to manage water resources on a daily basis, however, its merits are rarely recognised in Western-based water governance regimes. This is the case in Zimbabwe where the Water Act (1998), ZINWA Act (1998) and the Water Policy (2013) make no mention of traditional knowledge. This research explores the integration of traditional and Western-based knowledge in water governance and how this would impact the livelihoods of communal farmers in Esigodini, Zimbabwe. The objectives of the study are as follows:

- i) To identify traditional knowledge systems around water management
- ii) To assess the contribution of traditional knowledge to water sustainability
- iii) To identify opportunities and challenges for integration of traditional and Western-based knowledge into water governance
- iv) To establish how changes in water governance will affect rural livelihoods

Data for the study was collected in Esigodini during the months of May to July 2018 and three data collection methods were used: individual interviews, focus group discussions, and participant observations. Nine local level and four government level participants took part in the individual interviews. Ten female and nine male participants took part in the focus group discussions, with two households, one female headed, and one male headed taking part in the participant observations. The section that follows will give a summary of findings from the study and recommendations for the international community, for the Zimbabwean government and decision makers, and for the villagers in Esigodini.

Summary of Findings and Conclusions

The study found that most villagers in Esigodini are not formally employed and rely on agriculture as a source of livelihood. Due to poor access to and supply of water, the villagers are largely subsistence farmers who rely on rainwater for farming activities, which include cereal crop cultivation, vegetable gardening, and livestock production. The research also found that the government has been facing resource challenges for almost two decades now, and there has been very little investment into water

infrastructure in rural communities. In Emsehleni Area, it was found that five hundred people share four boreholes, and villagers can walk between one and two kilometres to access these shared water sources. Low investment in water infrastructure, coupled with droughts that have become more frequent and severe, are leading to poor harvests and the loss of livestock. The villagers in some areas, however, do have traditional practices in place that they use to protect and conserve water in their community.

The villagers have in-depth knowledge about the land, water and animals, which has been passed on to them by their parents and other elders in the village. They observe changes in flora, fauna, wind, the sun, and the moon to predict rainfall and droughts, and the knowledge acquired is used to make agricultural decisions such as when to plant their crops. The villagers also use traditional methods in cropping fields and vegetable gardens to conserve water and to minimise water loss. The Esigodini villagers have social institutions in place that ensure that everyone has access to water for their basic needs, and rules are put in place for equitable distribution of the resource. There are also rules around the use of water during periods when the supply is low, such as during drought and winter periods. The study also found that some villagers believe in a superpower that provides them with rain, and it is this water from God that provides water for their livelihoods. The village therefore has seasonal ceremonies to request rain, to appease the ancestors during drought periods, and to thank God, the rain spirit, and the ancestors for rain.

The study found that in areas such as Diana's Area, where traditional knowledge is still being practised, water resources are in a healthier condition compared to areas such as Emsehleni where traditional knowledge is rarely used. In Diana's Area, all community members have a role to play in maintaining water quality and identifying those who break community rules. To deter villagers from contaminating water resources, the "polluter pays" rule is enforced through customary law, and fines depend on the severity of the offence. Community members in Diana's Area have more options for water sources for their livelihood activities as the traditional rules and institutions ensure that the water resources are kept in a usable condition. By using multiple water resources, pressure is not exerted on a single source of water, and boreholes in this area break down less frequently. The opposite is true for Emsehleni Area, where the community has lost touch with the traditional ways that emphasise the respect for water as a living being, and traditional water sources such as rivers and streams are now polluted. Boreholes break down frequently and require repairs often, and this is a cause for conflict among the community members. The study therefore established that traditional knowledge systems encourage the sustainable use of water resources in the areas of Esigodini where it is still practiced.

The social structures and community rules that the villagers have in place ensure that all people have access to water for primary purposes, irrespective of gender, age or position within the village. The villagers go out of their way to provide water for older members of the community and those that are unwell. When there is a community event, they work together to ensure that there is adequate water.

Although traditional knowledge does not discriminate in ensuring access to water to all villagers, culturally women are the primary care-givers, and it is their duty to provide water for their families on a daily basis. Traditionally women carry buckets of water on their heads, and they also have to walk long distances to access water, which makes water collection a very tiresome and time consuming task. In areas such as Diana's Area, there are still a number of community-based livelihood projects, and provision of water for these is a community effort. However, in Emsheleni Area, livelihoods have become more individualised with each household providing water for their own livelihood activities.

The study found that the parallel legal system that exists in the management of water resources is currently not yielding positive results for rural livelihoods. Although the villagers are represented on fora where decisions about water resources are made, their water challenges are not addressed, and their ways of knowing are rarely acknowledged. The villagers believe that a water governance system that integrates Indigenous and Western knowledge will have positive impacts on their livelihoods. The outcomes expected by the villagers from such a system include, improved access to and supply of water, which the villagers believe is the key to the improvement of livelihoods in Esigodini. The villagers also indicated that an integrated system will provide opportunities for diversified livelihoods, as they can branch into other sectors such as fish farming. Expansion of vegetable gardening is another positive outcome envisaged by the villagers, with some of them expressing a desire to practice market gardening at a larger scale. The villagers are also keen to explore opportunities in horticulture for export purposes. Women would like to gain entry into male-dominated livelihoods as they currently do not have the time to venture into livelihoods such as brick making due to water collection chores. Men are keen to have the village experience a decrease in dependency on donor funding and see the residents more self-sufficient.

By adopting aspects of best practice from Indigenous and Western ways of knowing to make amendments to the current water legislation, policy and institutional arrangements, there is potential for better management of water resources and improved rural livelihoods. There are however concerns from both local level and government stakeholders over establishing and implementing such a system, and these include a mistrust of participatory processes that involve the government, and aspects of traditional knowledge that are a secret. The section that follows provides recommendations that address some of these concerns.

Recommendations

The International Community

A review of the literature addressing traditional knowledge and water management (e.g. Mapedza et al., 2016; Mehta et al., 2014; and Swainson and de Loë, 2011) found that there is a history of water management concepts and interventions that are crafted at international level as a panacea for water challenges around the globe. An example of such a concept is Integrated water resource management

(IWRM). There are success stories, where nations have effectively applied IWRM, but there is a growing argument about the applicability of such concepts in the developing world. This study suggests that the international community needs to understand that context matters. Each country has its own unique environment, and the “one glove fits all” approach will not yield positive results for the management of water resources. Although many developing countries lack the financial capital to invest in water infrastructure projects, local people usually possess in-depth knowledge about their context, and have the ability to steer their own path towards water governance that is relevant to their particular situation. In this light, water interventions crafted at international level should take into account the differing contexts. Funding offered for their implementation should be flexible. Developing countries should be given the opportunity to tailor make their own version of water management paradigms and interventions, and international concepts should only be used as a guide. Most importantly, countries should be able to negotiate for terms that suit their local environments, including the integration of local and Western-based water management systems to better manage their water resources.

There have been great strides made internationally to recognise traditional knowledge and its custodians, including recognition in the United Nations Declaration on the Rights of Indigenous People (UNDRIP, 2007) and the Convention on Biological Diversity (CBD). Indigenous groups have also declared spaces they would like to occupy in the management of water in the Indigenous Peoples Kyoto Water Declaration (2003). The Declaration also reflects an increasing demand for self-determination and the recognition of Indigenous water rights among local groups. This increased assertiveness of Indigenous people requires that Indigenous voices are included in the crafting of water interventions at the international level. This study found that although there is increased recognition of Indigenous knowledge and local groups in water policies around the world, in many instances, these policies are not implemented at the local scale. It is therefore important that there is more emphasis on investment of financial, time, and human capital into the roll-out of such policy in order to realise the anticipated results for Indigenous groups and water resources.

Paradigms such as IWRM have been criticised for not considering the livelihoods of the poor, who mainly reside in rural communities that may be beyond the reach of Western-based water governance systems. It has also been argued that such concepts are backed by institutions and multilateral organisations that lack interest in localised livelihoods, such as small-scale agriculture. This has seen the application of the concept of IWRM in countries such as Zimbabwe not recognising the water needs of subsistence farmers, except for primary purposes. Water has been recognised on international platforms as a fundamental human right (e.g. by the United Nations Committee on Economic, Social and Cultural Rights in 2002, and the United Nations General Assembly 2010). It is therefore important that interventions at the international level, by foreign funding organisations recognise the need to invest

in the improvement of water resources for rural farmers to expand agriculture and realise their right to a sustainable livelihood.

National Level

As stated in the section above, developing countries have the ability to steer their own development trajectory, however, they often lack financial resources and, in some instances, the institutional capacity to implement projects guided by local vision. Developing countries often rely on external loans and funding, and these usually come with terms that are not relevant to specific country contexts. In the case of Zimbabwe, the effects of the Economic Structural Adjustment Programme (ESAP), that was implemented in the early 1990s have rolled over into the twenty first century and are still affecting the country. The country has also been facing major challenges in implementing a water governance system based on the principles of IWRM, not only because of the nation's complex political and economic situation, but also because of the over reliance on external funding for the success of the system. It is therefore important that when negotiating for funding for externally crafted interventions, the nation's leadership should be assertive in including terms that work for the local conditions. This assertiveness should go as far as declining funding for water projects that have conditions that are irrelevant or inappropriate to the national context and particular local settings. Accepting such conditions is a waste of financial, human, and time resources, as they are sure to fail or not produce the desired outcomes, leaving the country in debt.

According to the Constitution of Zimbabwe (2013: s33), the state has a duty to protect and preserve traditional knowledge systems that are possessed by the local groups in the country. However, this study found that traditional knowledge is not recognised in water legislation and policy. Although there are institutions that have been put in place to ensure the participation of local groups in discussions around water issues, their participation has in practice been limited. The villagers took part in the consultative process that led to the crafting of current water statutory instruments that make no mention of their ways of knowing. The Esigodini villagers have grown to distrust such processes. There is a need for the government to approach traditional leaders, rebuild confidence, and negotiate terms for re-engagement. To overcome the current trust issues, this study recommends the engagement of a third party from within Zimbabwe, to facilitate the creation of an environment for re-engagement, and to establish the relevant protocols for the integration of traditional and Western-based knowledge into water governance. Some of the issues that will need to be addressed include:

- i. Terms for engagement and setting out anticipated outcomes
- ii. Intellectual Property Rights (to outline the rights of local groups to their Indigenous knowledge that they have chosen to make public)
- iii. Roles and responsibilities of local group and government representatives

- iv. Implementation timeline (for example, for the amendment of water legislation to include traditional knowledge and leadership)
- v. Monitoring and evaluation of outcomes

The process will be time consuming and will require an investment of resources. However, if the outcomes that were identified by participants in this study are realised, communal farmers will graduate into rate payers who make a meaningful contribution towards the Gross Domestic Product (GDP) of the country. The state will also be honouring its duty to preserve traditional knowledge and engage its custodians in decision making, as stated in the Constitution of Zimbabwe and International Conventions which the country is signatory to.

The study established that there are key lessons to be learnt from the manner in which traditional knowledge is practised by the Ndebele group. The villagers in Esigodini, monitor water quality and quantity, and detect the onset of droughts and rainfall on the basis of traditional knowledge and practice. With the current challenges faced by the nation in implementing a top-down approach to water management, such low cost, localised methods of managing water resources can offer solutions to ease the load of the government in water service delivery. The villagers also have in place methods and social institutions that ensure that all persons in the village have access to water for primary purposes without discrimination. The current Western-based water governance regime being promoted in the country places more emphasis on supplying water to those who are able to pay for its consumption. There is scope for government departments to learn how villagers with few financial resources and limited access to water, manage to share the water equitably. Decentralisation of the maintenance of boreholes in Esigodini is good practice, and government departments can explore this further by tapping into the traditional knowledge systems possessed by villagers to monitor water resources.

Village Level

It is evident that areas which still use traditional knowledge have developed better water management practises compared to those that are not utilising this knowledge in Esigodini village. It is therefore important for the village leadership, with the guidance of the Chief, to develop strategies that will encourage wider use of Indigenous knowledge within the village. Traditional water conservation and storage is one area that is critical in a semi-arid village such as Esigodini. The study found that most local level participants assume that they can only learn from science, but they cannot teach scientists what they know traditionally. It is these kinds of beliefs that contribute to their limited participation in decision making processes, as they believe that their traditional knowledge is inferior. It is important for the Esigodini villagers to understand that Western science is not a superior way of knowing. It has its merits and demerits just like traditional knowledge. There is room for the two knowledge systems to learn from each other and improve the manner in which water resources are managed. Currently the villagers are being consulted, but, the use of their traditional knowledge is limited, and they sometimes

do not benefit from the outcomes of such consultative processes. An integrated water governance system should give traditional leadership a more formal role in decision making. This may then increase their ability to assert local needs and secure water justice for their communities.

The study found that there are areas in Esigodini where traditional knowledge is still practised, however, this knowledge has been adapted to deal with current water challenges. There are also some areas where traditional knowledge has been highly eroded, and it is barely being utilised or passed on to younger generations. The very foundation for the survival of traditional knowledge is its ability to be shared with the young ones in the village, and it is therefore important for the elders of the village to search for innovative ways of sharing this knowledge. Integrating traditional and Western-based knowledge provides an opportunity to document traditional knowledge and share it within and outside the village. If the process of integrating local knowledge is done in good faith, the local groups will have the platform to state the terms for the documentation of their knowledge. Issues of intellectual property rights will need to be negotiated by the traditional leadership, and traditional knowledge can be made available in both the local language and English. In order to maintain the oral nature of traditional knowledge, village elders can be recorded both in audio and visually while telling their folklore, taboos and myths as they would usually tell them within the village and household setting. These recordings can be archived within the village and in national libraries or made available on the internet and can be accessible to researchers, Indigenous youths, and those who have an interest in such knowledge. The villagers will also need to create an environment where the aspects of their knowledge that is private continues to be passed on to relevant individuals in the village.

While the study did not observe any obvious discrimination against specific groups in accessing water resources, women as primary care givers, bear the brunt of the challenges in accessing water. There was very little evidence in the communities visited to suggest that there is an effort to lighten this burden. Traditional leadership can lead by introducing ways of encouraging men to participate more in water collection activities, or to make available wheelbarrows and scotch carts to lighten the load for women. The village leaders can target respected men in the community to be “change agents” by helping their wives and daughters collect water and having them use implements that make the task easier. This will help lift the stigma that is associated with men frequently fetching water or women using implements to carry water. Such a change will also provide women with time to engage in other productive activities that improve their livelihoods.

Scope for Future Studies

This study has concluded that the two ways of knowing (traditional knowledge and science) are different, however, they can complement each other. Due to time and resource constraints, the sample size for this study was small, however, the interviews were in-depth. This research has laid a foundation for further research that could develop a model water governance system that integrates traditional

knowledge into the current Western-based water governance system in Zimbabwe. Such a model would be of relevance to other countries where traditional and Western resource management regimes remain separated, and might be adapted to their specific contexts. If such a system is implemented in Zimbabwe, there is scope for the development of a monitoring and evaluation framework for assessing the effectiveness of the integrated system, and the investigation of implications of the integrated system for rural livelihoods.