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URBAN SPRAWL AND ACCESS TO POTABLE WATER IN BINDURA, ZIMBABWE

BY

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Abstract

The study focused on the nexus between urban sprawl and clean and safe potable water accessibility in Bindura. The study explored the state of water security for residents in Bindura, specifically in Chipadze, Chiwaridzo and newly developed suburbs of Garikai and Brookdale. This research aimed at understanding potable water availability for residents in Chipadze and Chiwaridzo (old suburbs) in comparison to those occupying newly developed suburbs of Garikai and Brookdale. The research employed the political ecology theory to expand understanding on how water accessibility patterns and dynamics are shaped by the political influence. Qualitative case study research design was the empirical basis for this study, with a sample size of 71. The methodology made use of intensive interviews, focus group discussions and key informant interviews. Ethical considerations in accordance with the best practices conducted when collecting data, dealing with research participants and accessing archived data were duly observed. The study revealed that there is frustration amongst residents due to delays by local government to provide water services. Thus, there is overcrowding and overuse of the few boreholes drilled by the United Nations Childrens Fund (UNICEF) in Chipadze and Chiwaridzo. Consequently, water security and the human right to water are compromised as residents of Garikai and Brookdale struggle to secure clean and safe potable water. The inaccessibility of potable water has resulted in water borne diseases like cholera, typhoid and dysentery. Such inaccessibility results in the failure to maintain personal and household hygiene by dwellers of the new residential areas. All water related challenges occur despite the existence of a robust National Water Policy and comprehensive urban planning and governance policies that have not been properly implemented mainly as a result of resource restraints, political influence and corruption. The study recommends proper planning when expanding urban centers. Water and sewer pipes should be laid before residents are given approval to purchase and develop land. Local authorities should not prioritize political interests in urban planning and development as this limit effective implementation of policies at local level. More boreholes with water storage tanks should be made available in all areas that experience erratic water supply. Urgent financial resources should be mobilized towards refurbishment and upgrading of water facilities in Bindura. The study recommends further research on the capacity of local government in urban sprawl planning in order to address some of the identified weaknesses.

Key words: Urban sprawl, water security, portable water

Declaration page

I declare that this dissertation is my original work except where sources have been cited and acknowledged. The work has never been submitted, nor will it ever be submitted to another university for the award of a degree.

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_____ _____

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Dedication

This piece of work is dedicated to my son Anenyasha, my inspiration and source of power.

List of Acronyms and Abbreviations

ADB	African Development Bank
BM	Bindura Municipality
DAWASCO	Dar es Salaam Water and Sanitation Corporation
DWD	Department of Water Development
BUSE	Bindura University of Science Education
EMA	Environmental Management Agency
ESAP	Economic Structural Adjustment Programme
FAO	Food and Agriculture Organization
FDGs	Focus Group Discussion
GNU	Government of National Unity
GoZ	Government of Zimbabwe
GWC	Ghana Water Company
IWRM	Integrated Water Resources Management
LWB	Lilongwe Water Board
MDC	Movement for Democratic Change
MDGs	Millennium Development Goals
MLAWCRR	Ministry of Lands, Agriculture, Water, Climate and Rural Resettlement
NGO	Non-Governmental Organization
SDGs	Sustainable Development Goals
UNDP	United Nations Development Programme
UA	Urban Agriculture
UNCESCR	United Nations Committee on Economic, Social and Cultural Rights
WB	World Bank
WHO	World Health Organization
ZANU PF	Zimbabwe African National Union (Patriotic Front)
ZEGU	Zimbabwe Ezekiel Guti University
ZINWA	Zimbabwe National Water Authority

ZOU	Zimbabwe Open University

Definition of Key Terms

Urban sprawl Conceptions of urban sprawl vary as scholars acknowledge that the term lacks precision. However, urban sprawl chiefly refers to the unchecked and uncoordinated growth in urban areas of housing, commercial development and roads over huge swaths of land with little attention being paid to urban planning (Hogan, 2012).

Water security is an acceptable water level availability and accessibility sufficient to sustain livelihoods, human health and ecosystems (Cook and Bakker, 2012).

Water Access entails having the consistent opportunity to have and use clean and safe water. UNESCO (2012) focuses on three distinct measurable characteristics of drinking water sources which are the quantity of water, the safeness or quality of water, and the distance for collecting water.

Local governance denotes the existence of working local systems of collective action that manage a locality's public affairs and are accountable to local residents (Olowu and Wunsch, 2004). Local authorities are the face of the central government within localities in both unitary and federal states. Through councilors, mayors and chairpersons, local authorities play the role of a conduit through which national or central government implements policies and provide services to communities (Mapuva, 2014)

Service delivery is the distribution of basic resources citizens depend on like water, electricity, sanitation infrastructure, land, and housing (Le Chen, 2014).

Service provision relates to the role of the local authority in deciding what services should be made available to citizens and delivery of the services selected (Gukurume, 2011).

Water supply is the provision of water mostly by the local government or commercial entities through the use of pipes and pumps. Water supply is made possible by water supply systems that collect, transmit, treat and distribute water to various locations within a locality (Alvarez, Morais, Leyva, Almeida, 2015).

Water quality is simply the characteristics of water. These characteristics are measured to ascertain how the composition of what is in the water (physical, chemical, radiological and biological components) may affect humans, animals and plant ecosystems (World Health Organisation, 2017; United Nations Children's Education Fund, 2017).

Safe water is water that is free from substances that are of harm and endanger human health. It is also water whose taste smell and color is not acceptable to consumers (African Union, 2015)

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CHAPTER 1 INTRODUCTION

1.0 Introduction

Since the start of the new millennium, the number of people dwelling within urban settlements has exponentially grown especially in developing countries (United Nations, 2007). It is reported that half of mankind lives in urban areas. This number grows by two people every second (Alabaster, 2010). At this booming rate, Hoornweg and Munro-Faure (2010, p. 3) opines that, "by 2020 the developing countries of Africa, Asia, and Latin America will be home to some 75% of all urban dwellers". Specifically looking at the African continent, Muzondi (2014, p. 2) is of the view that, "only 160 million people were living in urban areas in 1990, but by 2014, this figure had doubled to 320 million". The increase in population and the spread of urbanization have been accompanied by the planned and unplanned growth of peri-urban areas (Tacoli, 2002; Allen, 2003; Narain, & Nischal, 2007).

In 2002, Zimbabwe had an urban population of 4 029 707 which grew by 6.31% to 4 284 145 in 2012, an increase of 0.63% per year (ZIMSTATS Population Census National Report, 2012). According to Narain (2009) urban sprawl was also accompanied by changes in land use, water-use patterns also undergoing significant changes chiefly meant to accommodate and cater for the growing urban population. Urban sprawl in Bindura saw its urban population growing from 21 456 in 1992 to 46 275 in 2012

(ZIMSTATS, 2012). One of the biggest challenges that emerged in 2002 to urban sprawl is the unavailability of safe, clean and potable water to these urban populations. Unless significant changes are made with regards to water policies and politics around water allocation both and national and global levels, two thirds of the world population will face water scarcity by 2025 (Barlow, 2007). According to the Council, United Nations Decade Programme on Advocacy and Communication and Water Supply and Sanitation Collaborative (2015), 2.6 billion people, 40% of mankind lack sanitation. Throughout the globe, 6 out of 10 people do not have clean disease-free sanitation services, whilst 3 out of 10 people do have safely managed water services (UNICEF, 2018). Anderson (2017, p. 2) asserts that, "over 80% of wastewater was said to return to the environment without sufficient treatment". The unaffordability, unavailability and inaccessibility of clean and safe water plus adequate sanitation systems exposes over two and half billion people to water related disease. According to the Centers for Disease Control and Prevention (2017) "diarrheal diseases linked to poor sanitation account for 1 in 9 child deaths throughout the globe therefore making diarrhea the third leading death cause among children under the age of 5".

Gleick and Iceland (2018) foresee a future whereby the lack of water will act as a destabilizing factor in a number of countries especially those who lack the financial and technical capabilities to manage their internal problems. Cognizant of the abovementioned facts, the study seeks to uncover the reasons behind the inaccessibility

of safe and clean to urban dwellers in Bindura in Zimbabwe specifically seeking to understand the link between urban sprawl and water accessibility.

1.2 Background to the Study

1.2.1 Urban Water Provision in Post 2000 Zimbabwe

Safe drinking water is a basic necessity for good health (Wolf, 2014). Gorerazvo (2015) notes that the coming of independence in 1980 in the southern African country saw government ministries delivering most of what was expected of them. Water provision was good probably because of the small urban population that did not require much to please. The most vital aspect that was neglected in this period of economic stability was that urban sprawl was on its way and alongside it was the need to expand social services.

The year 1992 saw the Zimbabwe economy starting to experience huge challenges such as inflation, price hikes and lack of adequate foreign currency among others. A number of aspects contributed to the economic trouble. These included a disputed Fast Track Land Reform Programme, issuing of cash handouts to appease grievances of war veterans in 1997, and the military intervention in the conflict in the Democratic Republic of Congo leading to budgetary constraints and overspending (Raftopoulos, 2009). The country also fell into arrears with the donor community, a factor that caused international assistance programmes being suspended whilst others were completely

withdrawn from the country (African Development Bank, 2011). Public policy making was therefore made under duress, turmoil and uncertainty (Zhou & Zvoushe, 2012).

Economically, local authorities also felt the pinch of administering over an ever-growing urban population on a shoe string budget. Chombo (2011) opines that the main challenges which disturbed water service delivery were obsolete design capacities of water and sewer infrastructure outmatched by growing urban sprawl and inadequate national and municipal financial resources. As a result of urban sprawl and other causes, social service delivery became erratic. Clean water availability dwindled whilst sewage management was generally poor (Chigonda, 2011). The Multiple Indicator Cluster Survey (2014) revealed that, "water shortages had escalated the national open defecation rate stood to 31.7 percent".

Chronologically, Dewa, Dziva and Mukwashi (2014) explore why service delivery has deteriorated over the years since 1980, noting that the problems affecting local governance started in the last years of the 20th century with the drying up of financing from the international donor community that supported local authorities. In 1990s, the government of Zimbabwe adopted the Economic Structural Adjustment Programme ESAP calling for an end to government subsidies to local authorities. Consequently, there was a gradual decline in service provision and delivery due to shortage of capital, vehicles and technical expertise. From the year 2000 onwards, hyperinflation, dwindling

of the national economy, shortage of foreign currency and high interest rates become some of the challenges facing urban councils.

1.2.3 Description of the Study Area

This study focused on Bindura, Mashonaland Central Province's administrative capital located 88kilometers outside Zimbabwe's capital city of Harare. It was given municipality status in 1999 and has since grown to house three universities, the provincial hospital and provincial administrative offices. Bindura falls under the Bindura North Constituency comprising of 20 wards. Of the 20 wards, 12 are in Bindura urban whilst the remaining 8 are in Rural Bindura. The economic activities that largely dominate in Bindura are mining and agriculture. The town is known for numerous mines where metals including nickel, copper, cobalt and gold are extracted. Specific suburbs such as Chipadze, Chiwaridzo, Garikai and Brookdale were chosen for this study trying to gather data from both old and new suburbs. Urban sprawl and parceling of land by land barons has spurred Bindura Municipality into parceling out pieces of land in the city that are not fit for the construction of houses. Kadziya and Chikosha (2013) study revealed that wetlands are being used for residential purposes.

Bindura Municipality has been responsible for financial affairs, maintenance and operation of water distribution and treatment in Bindura since February 2009 taking over from Zimbabwe National Water Authority (ZINWA) which had been in control of water management from 2004 to 2009. "Potable water sources for Bindura are the

Mazowe River and Mwenje Dam" (Chimusoro, 2015, p. 19). He further notes that, "Bindura's water treatment plant is designed to produce 14.4 Mega Litres (ML) per day". According to (Bindura Municipality, 2018, p. 5), "the plant is currently producing an estimated 8 to 10 ML per day. The domestic water demand estimate for Bindura's population which is 44 033 with approximately 11 172 households in Bindura urban falls between 7.1 to 9.7 ML". This estimate excludes agricultural, institutional and industrial water demand meaning that if other sectors are included, the water output does not suffice to cater for the whole of urban Bindura.

1.3 Statement of the Problem

Both Bindura Municipality and ZINWA that was in charge of water provision prior to 2004 did not foresee that the pace at which the urban center was sprawling meant that water infrastructure needed to be revamped and enlarged to cater for the increasing population. According to the 1982 census, the population of Bindura was 18 243 and this rose to 21 167 in 1992 and 46 275 in 2012 (Zimbabwe Statistics Agency, 2012). The problem is that water provision has not kept pace with the increasing demand. The problem is that urban population in Bindura does not have access to adequate, safe and clean water.

As outlined in the Urban Councils Act (29:15), Public Health Act (15:09) and the Constitution of Zimbabwe (Amendment Number 20), it is the legal mandate of local authorities to create structures that are responsive to the needs of the community at

grassroots level such as the provision of water. Large sectors of the population in densely populated urban areas in Zimbabwe do not have access to potable tap water and even bigger percentages of the population does not have access to proper sanitation (United Nations Development Programme, 2015). Data from the 2012 National Population Census shows that 25% of the households in Zimbabwe do not have any type of toilet facility (ZIMSTATS, 2012). The crisis on water and sanitation in the urban centers put residents at risk of water borne diseases such as typhoid and cholera and this is also a human rights violation.

1.4 Research Objectives

The study aimed to:

1. Assess provisions for water security in newly developed suburbs in Bindura town.
2. Assess the challenges and opportunities being faced by the residents of Bindura with regards to water security.
3. Analyze the implementation of the policy framework on water security.

1.5 Research Questions

1. In what ways is water security in newly developed suburbs of Bindura town being met?

2. What challenges are being faced by residents of Bindura with regards to water provision?
3. How is the local authority policy framework on water provision and urban planning affecting water security in Bindura town?

1.6 Assumptions

The researcher assumed that there exists a water provision framework and there is a gap in the implementation which the study seeks to augment. And that the rate of urban sprawl is out growing the capacity of the local authority to provide water to its residents.

1.7 Significance of the Study

The study is significant to the local government structures on policy formulation and implementation on issues of urban sprawl taking into cognizance its impact on water security. The study adds knowledge on how the Bindura Municipality can mitigate the adverse impact of urban sprawl. Residents' attitudes towards Bindura Municipality with regards to the quality of water it delivers are also exposed in the study, a factor that can significantly help the water authority improve the quality of water before residents start protesting.

Natural resource academics, especially those who are interested in water management and use benefit from the study as it fills the gap where other studies have been done on water governance but with little focus on water security. The study is significant to the Government of Zimbabwe on the negative effects of undesignated land sales to land

barons and how they impact on residents particularly in Bindura. The knowledge and comprehension of what land barons are doing in Bindura can be useful in the crafting of appendages of public policies like statutory instruments that bar local authorities from illegally selling huge pieces of land to land barons.

1.8 Delimitation of the Study

This research was conducted in Bindura. It focused on two neighborhoods of Chipadze and Chiwaridzo and the recently built neighborhoods of Brookdale and Chiwaridzo. Gathering data from two different residential areas within Bindura was aimed at understanding potable water availability to senior residents of the town as well as those occupying newly developed locations. Participants were residents of the aforementioned suburbs. Both male and female members between the ages of 18 to 64 years took part in the study. There were no political and religious restrictions attached to who could participate in the study. The timeframe for the study was delimited from 2013 to 2018 because the researcher sought to understand what the Bindura Municipality had done to provide safe and affordable water in the post Government of the National Unity (GNU) phase.

Water security is broad term that has been interpreted in various ways. The study however largely focused on water accessibility, affordability, its quality (free from pollutants, clean and safe for consumption) and lastly sustainability in Bindura. The specific focus on the abovementioned aspects of water security was premised on the

United Nations Habitat (2016) definition of water security as the capacity of a given population to sustainably accessing sufficient quantities of safe and clean quality water for sustaining their livelihoods and human well-being to ensure prevention of water borne epidemics and for the preservation of diverse ecosystems in a climate marked by positive peace and political stability. The researcher held that this definition was regarded to be encompassing important aspects of water security that were supposed to be considered in the study.

1.9 Limitations

Getting to interview Bindura Municipality personnel such as the Director of Housing and Community Services, town engineer and assistant to the District Administrator was difficult for the researcher. Even having had set appointments with them, they had busy schedules and most of planned meetings were rescheduled more than thrice. The researcher was however persistant in looking for the key informants and she succeeded in getting time to interview them. The researcher noted that residents were preoccupied with giving what they thought were correct answers to the researcher thereby not revealing the true state of affairs with regards to potable water accessibility in Bindura. The researcher had to explain before the start of an interview that there were no correct or wrong answers. The researcher clarified to residents that took part in the study that she was not in their midst representing the local government or political groupings but had come as a researcher pursuing knowledge on the availability of potable water in Bindura.

The interpretive nature of qualitative research, presented a chance for the researcher to make biased conclusions during the data collection phase of the study. The researcher however ensured that her findings and conclusions were presented with minimum bias. The issue of service provision is highly politicized due to active involvement of politicians in the decision-making bodies such as the local government. This aspect limited the researcher's ability to access and collect relevant data in some instances land developers, town clerks and other relevant authorities feared that the researcher was a journalist looking for newspaper stories disguised as a researcher. the researcher however clarified all doubts that participants had.

CHAPTER 2 LITERATURE REVIEW

2.1 Introduction

The purpose of this chapter is to examine what has been written with regard to the availability of potable water in growing cities. Water security has not been extensively explored in Zimbabwean urban centers especially considering the poor water supply by most local government authorities. The erratic supply of water has been cited as a huge factor to typhoid and cholera outbreaks that have been experienced in the country. Understanding water security, debates around water supply and other dynamics entangled to the availability of potable water is therefore crucial. Crucial is the factor that the unavailability of clean and safe potable is a violation of the human right to water. This chapter is a discussion of the aforementioned concepts. It also explores their applicability in the African, Zimbabwean and Bindura context so that a sound comprehension of prevailing water supply conditions is established.

2.2 Political Ecology Theory

Arguments presented in this study are theoretically premised on the political ecology theory. Political ecology states that a critical analysis of power relations between different actors in the management and exploitation of natural resources gives proper understanding of what will be taking place within any context (Reuber, 2005; Beckedorf, 2010). Specifically looking at the third world context, Blaikie and Brookfield (1987) argue that political ecology embodies the concerns for ecology in a

broadly defined political economy. Therefore, political ecology analyses how society, classified in various groups tussle to access land based resources.

This politics of ecology is a multidimensional approach incorporating politics, nature and social science (Zimmer, 2010b) that spells out the winners and losers as well as reasons which define who wins and why. Rauch (2010) argues that the cardinal concept of political ecology can therefore be summed up as analysis of resource use as a direct and indirect product of political, economic and social interest constructions and power structures. Actors are endowed with economic, social, in other scenarios cultural power to access and distribute resources. They may choose to use the power they wield in a manner that benefits society or to use the same power to serve their parochial interests. Although water supply in Zimbabwe is regulated by local authorities, its distribution has been skewed in favor of particular suburbs at the expense of others within urban centers.

Urban political ecology is an off shoot of political ecology that seeks to unravel the socio-ecological processes that produce uneven distribution and or allocation of natural resources in the urban setting. Specifically looking at the urban political ecology of water, Soames (2009) argues that focus is thrust on the choreographies of power that inform how much water flows through urban infrastructure as well as where it flows thereby shaping conditions and quality of water access within cities. Succinctly, Bakker (2003) notes that for the urban elite, water supply is often relatively abundant and relatively cheap. For the urban poor, the scarcity of potable water is a daily hardship.

Feminist political ecology explains how gender identities and social relations shape power relations and inequalities on issues linked to the environmental change. Sultan (2011) argues that access to, ownership and control of resources is not only facilitated through relations of power but also through emotional characteristics where emotions define how nature and society relate.

2.2.2 Understanding Water Security

The term has been defined in various ways encompassing a number of aspects as there both wide and narrow approaches that try to define the term. Cook and Baker (2012) are of the view that there is no consistence with regards to how water security has been defined for definitions have a tendency of varying with contexts and disciplinary perspectives on water use throughout the world. Gleick and Iceland (2018) define water security as a population's ability to safeguard access to sufficient and clean water that sustain livelihoods, human well-being and socioeconomic development. Water security directly or indirectly contributes to food security. If farmers do not have access to adequate water quantity for their crops, agricultural produce is significantly reduced which may cause drought of an escalation of food prices.

Nevertheless, the study adopts the UN Habitat (2012) definition which states that water security denotes the capacity of a given population to sustainably accessing sufficient quantities of safe and clean quality water for sustaining their livelihoods and human well-being a good life, freedom of choice and action, good social relations and security,

(UNDP, 2015) and socio economic development, to ensure prevention of water borne epidemics and for the preservation of diverse ecosystems in a climate marked by positive peace and political stability. Statistically, the UN Habitat (2010) clarifies the benchmark quantity that must be met for a particular locality to safely claim that its inhabitants have water security. It is an index that identifies a threshold of 1700m3 per capita per year of renewable water based on estimates of water requirements in the household, agricultural, industrial, and energy sectors as well as the needs of the environment. At least 2 liters of safe and clean water is needed per capita per day for food preparation. For lactating mothers, "the basic requirement of drinking water per capita per day is 7.5 liters" (WHO, 2017, p. 5).

Therefore, countries and nations whose renewable water supplies do not meet the abovementioned figure are reported to be undergoing water stress. In cases when supply falls below 1,000 m3 per capita per year, a country is said to experience water scarcity, and below 500 m3 per capita per year, absolute scarcity (UN Habitat, 2010). The UNDP (2018) argues that the majority of people who are considered be lacking clean and safe water around the globe are said to use about 5litres of water. What this means is that ordinary citizens struggle to secure enough water for daily needs. The urban poor are even in a worse position as they would have no money to set up alternative water sources like boreholes and protected wells. Consequently, they get water for daily needs from unprotected sources that expose them to water borne diseases.

The aspect of affordability is a worrisome dimension of water security when looking at third world country populations (Bigas, 2013). He notes that water access includes the means to get water and the cost of getting the water. Africa is the home of a greater majority of poverty stricken individuals in the world. In Paul Collier's words, these populations that experience acute poverty are the globe's "bottom billion" for they live in countries that have failed to economically grow at the same rate as others in the world, have high unemployment rates, high infant and maternal rates thereby undergoing stagnated development (Collier, 2007). The poor are more likely to suffer from water access which could then result in water insecurity. An example is that of Accra, in Ghana. Okello (2012) reveals that the urban poor pay up to 12 times more for a liter of water than other richer residents. The urban political ecology of water in Accra illustrates that local government water supply is for the rich. Local authorities have the utmost disregard about where and how the urban poor get water which is an antithesis of water security. Urban poverty thus plays a central role in determining residents' accessibility to potable water. In the process of urban sprawl, the population in urban centers correspondingly increases thereby increases the level of urban poverty (Cohen, 2016). Investigations by Nyemba, Mandizvidza and Nkiwane (2010) in Bulawayo, Zimbabwe's second largest city revealed that water distribution is skewed in favor of affluent low density suburbs like Famona**,** Burnside, Hillside and Matsheumhlope where the rich reside at the expense of high density areas such as Nketa, Makokoba Tshabalala and Mpopoma.

In a bid to clarify global water shortages that have rocked populations in different countries, water expert Peter Gleick coined the term peak water. Peak water denotes that approximately half of the existing stock of water on the planet has been depleted and the rate of water exploitation has peaked (Gleick and Palaniappan, 2010). An example is that of California in the United States of America where peak water has been reached. Water that is required by farms and cities is more than what can be provided by local water sources. What this entails is that bigger reservoirs and deeper wells will not be an adequate solution because demand has outgrown supply. The concept of peak water has been fleshed out into three different definitions which are peak renewable, peak non-renewable and peak ecological water (Gleick and Palaniappan, 2010).

Therefore, achieving water security is a global challenge but environmental impacts related to water use and consumption are essentially felt locally and regionally. Wichelns (2015) offers hope concerning the challenges of water security and highlighted that unlike other global environmental challenges such as climate change mitigation, managing water resources depends upon the local context, where local solutions are largely unhindered by externalities. Wichelns (2015) however, claims that the simple reduction of water consumption does not necessarily translate to water management since other dimensions like pollution can come into play.

Sustainability is one of the important considerations when looking at water security as water security cannot be achieved without sustainability and vice versa. Sustainability informs the utilization and safeguarding of water. The quality and quantity of water

supplies must be kept sacrosanct for societal and ecological needs for that future generations may benefit for the existing water sources (Smith, 2009). In the same vein, Resnik (2017) notes that water security require the existence of an authority responsible for the day-to-day and long-term management and provision of the water. Whilst national security places focus on state security, water security focuses on reliability, availability and accessibility of quality safe and clean water at affordable prices (Grey and Sadoff, 2007).

2.3 Relevance of the Theoretical Frame to the Study

This section clarifies how the political ecology of water impacts on water security through the use of examples from the African continent. Political ecology clarifies power relations between actors in as far as the exploitation of natural resources is concerned (Beckedorf, 2010). In Africa, some cases of water inaccessibility and lack of sanitation are as a result of a lack of interest in water issues by political leaders. Vidal (2017) notes that by year 2012 when MDGs had been put in place, Congo Brazzaville, Sao Tome and Principe, Nigeria and Sierra Leone did not have National Water Policies hence illustrating the lack of political will in ensuring water security in their countries. Conversely, where water and sanitization has been prioritized by the political elite, significant progress has been made. Post genocide Rwanda is an example. Paul Kagame's administration has recorded an escalation of the population that has decent sanitation and access to clean water rose from a paltry 1, 5 million people in 1994 to 4, 5 million

in 2012 (UNICEF, 2017). The political ecology within a country therefore helps in understanding reasons behind the availability or unavailability of water security.

Analyzing natural resource use through the lens of urban political ecology reveals the power choreographies and processes that give birth to skewed distribution and allocation of natural resources within urban centers (Atkinson, 2011). If governance is a vital determinant in ensuring the general security of populations, the same applies with regards to water security. The manner in which water provision issues are tackled determine if there is constant availability and accessibility of affordable safe and clean water to both rural and urban dwellers or not.

Musemwa (2014) argues that the authoritarian nature of Zimbabwe African National Union Patriotic Front (ZANU PF) rule in Zimbabwe since independence has seen the central government tussle for control with local authorities not only over water but also other commodities such as electricity, housing and public transport. Water is therefore viewed as an "object of social and political control of urban areas" In the fight for control between the aforementioned actors, water security is forgotten and urban dwellers suffer the pinch of water unavailability. Musemwa (2014) goes on to assert that post year 2000 patterns of water availability and accessibility and sanitation in Zimbabwe's urban centers should be understood as a reflection of the Zimbabwe African National Union Patriotic Front (ZANU PF) led central government's efforts to regain control since they are mostly dominated by the opposition party, Movement for Democratic Change (MDC). In this light, it becomes clear that urban political ecology

unpacks the socio-ecological processes at play in producing uneven waterscapes in urban areas (Rusca, Boakye-Ansahb, Loftusa and Ferreroc, 2017).

Rampant water corruption by local government authorities is an aspect of political ecologies that inhibit water accessibility. UNESCO (2012) opines that water poverty that some urban in Africa have are of their own making. Local government officials are seriously entangled in collaboration allegations with "water mafias" in Kenya's capital, Nairobi. Local government officials cut water for long hours of the day to force residents to rely on high-cost and low quantity services offered by water mafias. Similarly, in Ghana, financial resources provided by development partners such as the ADB, Agence France de Development (AFD), Japan International Co-operation Agency (JICA) and UNICEF meant to repair damaged water infrastructure and upgrade obsolete machinery is said to be channeled towards the ruling political party's programmes. Minimum attention has therefore been given to the revamping of the water reticulation system in Ghana's economic and political nucleus, Accra. The Ghana Water Company (GWC) has not prioritized wastewater treatment thus resulting in enormous volumes of water circulating in the city's water system without adequate treatment (Van Rooijen, 2015). Consequently, the World Bank estimates that 20% to 40% of the African continent's public water investment by both International Financial Institutions and donor agencies is gobbled by corruption (Odiwuor, 2013).

2.4 Access to Potable Water as a Challenge

According to the WHO (2017) when a water source is located more than 100 meters from a household, it is highly unlikely that people will be able to collect over 20litres of water per person. Therefore, to get between 50 to 100litres of water per person per day, it has to be made sure that the water source has to be near or within a household's compound. Similarly, Sustainable Development Goal (SDG 6), on access to water denotes ensuring availability and sustainability with regards to the management of water and sanitation for all by the year 2030. Access to water therefore means that a given population should have an improved drinking water sources that is located within a home or living compound, is readily available whenever it is needed and is also free of faecal or chemical contamination (United Nations, 2016).

Vulnerable groups such as people living with disabilities, women, children, and the old must have adequate water at all times. Mwanza (2005) opines that water and socio economic development are intertwined and integrally connected; either creating a vicious downward spiral of underdevelopment or as a mutually reinforcing, positive development. Thus, the sustainable development of urban areas, particularly new ones; requires reliable, equitable, and easily accessible water. While this is so, the provision of safe, potable water to the rapidly growing urban populations in developing nations creates a complex logistic and economic problem (Dewa, Dziva and Mkwazhi, 2014). This is exacerbated in areas where there is urban sprawl, a largely informal an unplanned phenomenon. Demand is difficult to project and consumption is difficult to

either measure or monitor since indicator methods are commonly used for evaluating urban water management. The development of successful indicators for tracking water use requires continued efforts to track and quantify the relationships between urban sprawl, sustainable water management and environmental sustainability.

Figure 1 shows that access to water in urban areas has been declining since 1990 and yet, the government's target remains at 100 per cent. The question is how can government estimates remain at 100% in the face of constraints such as imposed sanctions by the West, corruption, and inadequate resources that they have openly admitted are stifling efficient service delivery.

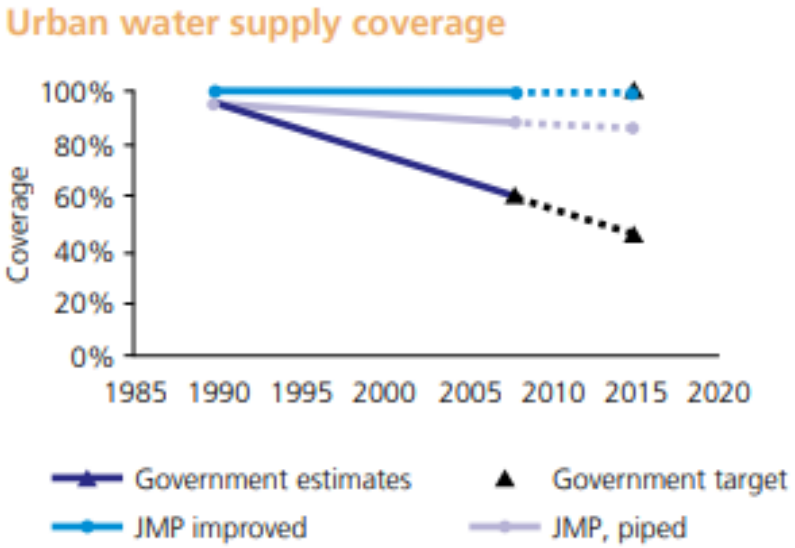

Figure 1: Urban Water Supply Source: Joint Monitoring Programme (UNICEF, 2017)

It is imperative to understand what makes water inaccessible to populations in Zimbabwe. Most of the water treatment plants are old and malfunctioning. Remigios and Never (2011, p. 214) highlight that, "the Kadoma treatment plant was found to

produce an average of 12 000m3 per day instead of producing at least 18 000m3 of water per day". Kadoma's scenario demonstrates that most water plants in the country do not produce adequate water hence water rationing. Water rationing therefore comes in handy for local governments. In Chipinge, Gokwe, Kwekwe, Rusape, Karoi and Gweru, pipe water is only available for an average of 8 hours per day (Zuze, 2016). Therefore, despite the proliferation of national policies, strategies and legislation on water development and management in Africa, efforts to achieve SDG 6 which incites states to "Ensure availability and sustainable management of water and sanitation for all" appear to be futile. One hundred liters of safe and clean water per person per day is necessary to meet all health requirements. Nevertheless, in times of water scarcity and stress and also in water stressed regions of the world, WHO has set an absolute minimum of 20litres of safe and clean water per capita per day (WHO, 2017). These WHO set water quantity standards are not being met in most urban centers in Zimbabwe.

2.5 African Cities and their Water Governance

2.5.1 Dar es Salaam and Lilongwe

Dar es Salaam is Tanzania's capital city with an estimated population of 4.4 million people (USAID, 2016). Water governance in Tanzania is anchored in the National Water Policy initially formulated in 1991 and amended in 2002. The policy embodies a robust framework for the sustainable management of water resources in Tanzania. The

Tanzania Development Vision, TDV (2015) lays much emphasis on universal accessibility of safe and clean water to Tanzanians by 2025. National legislation has also been promulgated as a legal basis for the drive towards the accessibility of water in the country. Examples are the Water Resource Management Act No11 and the Water Supply and Sanitation Act No 12 of 2009 (Kabote and John, 2017).

Nevertheless, the road to achieving adequate water accessibility in Tanzania has not been smooth. Nganyanyuka, Martinez, Wesselink, Lungo & Geordiadou (2014). Nganyanyuka (2017) holds that a significant population of the city does not have access to safe and clean potable water. The official public water supplier, Dar es Salaam Water and Sanitation Corporation (DAWASCO) supplies heavily rationed, low pressure and unreliable water to only 51% of Dar es Salaam's population according to government estimates. The other 49% purchase water from fellow resident who have private boreholes, purchase bottled mineral water whilst those who cannot afford the first two options fetch water from shallow unprotected wells (Twaweza, 2008).

In the face of an unreliable water provision, Dar es Salaam dwellers have devised coping strategies. Households who have access to piped water also have to drill deep private wells that cushion them in times of water scarcity. In part of the city that includes Masaki and Oyster Bay, the aforementioned wells produce salty water which is mostly not suitable to drink Nganyanyuka et al. (2014). When water scarcity is on its

peak, well owners sell water to neighbours. Urban dwellers in Dar es Salaam also buy water from water vendors.

In Mkunduge, residents buy water from motorized tanker trucks and push cart water vendors. Water kiosks which are a brainchild of DAWASCO are not being used by DAWASCO. Instead, private actors sell water to residents at exorbitant prices. Water is also bought from mosques. According to Islamic teachings and way of life, Muslims are supposed to wash their bodies in a ritual manner before they pray to Allah. Therefore, every mosque has a deep well so as to ensure constant water supply. Residents who live close to mosques buy water from mosques (Nganyanyuka et al., 2014).

2.5.2 Lilongwe, Malawi

Lilongwe is the capital city of Malawi. UN Habitat (2011) highlights that the country has a population of approximately 1 million people living in 58 administrative units. Water delivery is executed by the Lilongwe Water Board (LWB) whose services reach an estimated 78% of the population. Water service delivery in Lilongwe is not uniform as high income residents have in house connections followed by some who have compound or yard water taps. Those who cannot afford in house and yard tapes get water from water kiosks and shallow wells (Rusca et al., 2017).

Water supply inequalities have historic origins. Post-colonial Lilongwe was built with the imagination that it was supposed to be the jewel of Malawi endowed with the seat of

government and rendezvous for world visitors. Urban planning was therefore influenced by a visionary image of a beautiful city that relocations of the poor took place to make way for a grand city. In some cases, water pipe network was meant to circumvent "undeserving" poor suburbs (Potts, 1985). Resultantly, in house connections were designed and installed for special areas including Capital Hill, Parliament and other government buildings, senior government officials' residencies, banks and other financial institutions buildings, military establishments and hotels. Low income housing was planned to be catered for by water kiosks (Englund, 2002).

Such poor urban planning policies resulted in fragmented development of areas within Lilongwe. The city also has a fragmented waterscape marked by unequal water services. Water inequality in Lilongwe is demonstrated in various ways. With regards to pipes and taps, LWB replaced old corroded galvanized iron pipes with new high density polyethylene ones only on water lines leading to in house water connected areas. Water kiosks on the other hand continued with their old small pipes. The dichotomy put on water infrastructure unevenly protects residents from chemical contamination and water borne epidemics (Boakye-Ansahb, Ferrero, Rusca and Zaag, 2016).

2.6 Water Inaccessibility's Impact to Human Development in Africa

WHO (2012, p. 9) states that, "88% of diarrhoea induced deaths emanate from the inaccessibility of clean water". Conversely, improved water accessibility aids in de-escalating diseases such as helminthes, guinea worm, fluorosis, arsenicosis not

forgetting enteric and diarrhoeal that are caused by bacteria and viruses such as typhoid and bacillary dysentery (Fewtrell, Pruss-Ustun, Bos, Gore & Bartram, 2007). Nutritional wellbeing is seriously shaken especially in children by diarrhoea and intestinal worm infestations that are as a result of unclean water. Children also succumb to dehydration and malnutrition, causes of death that can be prevented. Ntouda, Sikodf, Ibrahim & Abba (2013) findings reflected that diarrheal infections chiefly caused by consumption of unsafe water were responsible the severe diarrheal morbidity for children under the age of five in Sub Saharan Africa.

Sustainable Development Goals (SDGs) are an embodiment of seventeen set human development goal that world nations strive to achieve by 2030. SDG four calls upon nations to "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" However, even with these set global education goals; water inaccessibility adversely affects the achievement of this goal. UNDP (2016) uncovers that an estimate of 443 million school days are lost due to water and sanitation related diseases. This phenomenon of missed school days usually occurs in third world countries that are hard hit by water shortages. It is appalling to learn that in 50% of girls drop out of school in grade 2 or 3 because their schools do not have ablution facilities. Improved clean and safe water accessibility has a direct impact on the school enrollment and retention as diseases are prevented and timely checked when they surface.

Time is spent by water fetching errands especially by girls who happen to be the primary water collectors in families (UN Water, 2009; UNICEF, 2010). An aptly fitting illustration of this occurs in Africa where ninety percent of the work of gathering water and wood for the household and for food preparation, is done by women and girls. In Tanzania, a survey found school attendance to be 12 per cent higher for girls in homes located 15 minutes or less from a water source than in homes one hour or more away. Attendance rates for boys appeared to be far less affected by distance from water sources United Nations Department of Economic and Social Affairs (UNDESA, 2014).

It is therefore plausible to claim that providing access to clean and safe water close to the home can significantly reduce women's workloads also free up time for other quality of life improving economic activities. For their daughters, this time can be used to attend school. Research in sub-Saharan Africa suggests that women and girls in low-income countries spend 40 billion hours a year collecting water which is the equivalent of a year's worth of labor by the entire Work force in France (World Bank, 2012).

2.7 Water as a Human Right

Human rights are a necessary condition for the good life. Due to their singular importance, individuals are entitled to, indeed, required to claim them and society is enjoined to allow them, otherwise the quality of life is seriously compromised (Ake, 1987). International law states that it is a human right to have access to water. The

United Nations Committee on Economic, Social and Cultural Rights (UNCESCR) (2010) was the first to firmly declare that humanity has the right to water.

In 2010, the United Nations General Assembly Resolution 64/292 recognized that the right to safe and clean drinking water and sanitation were requisites for the full enjoyment of life in general and all human rights. The 2015 set SDGs also aimed at ensuring that safe and clean water is available to all throughout the globe through SDG seven on water. SDGs are a reaffirmation and continuation of Millennium Development Goals (MDGs) that had been set in 2000. Both MDGs and SDGs also underline that access to adequate, safe and clean water is a human right. This placed water security on the global agenda encouraging nation states to ensure that their populations had access to affordable and clean water which is crucial for sustainable and dignified livelihoods (Suarez, 2016).

The human right to water is a derivative right that already existed even before it was clearly stated that there is indeed a human right to water. As argued by Gleick (2011) the right to water already existed implicitly and explicitly within various pieces of international law, state declarations and practice. He gives the examples of articles 11 and 12 of the International Covenant on Economic and Social Rights as implicitly declaring that the human right to water must be recognized and respected. In Gleick's view, a number of benefits are attained with recognizing and respecting that water is a human right. Firstly, it reinvigorates state's endeavors to ensure that their citizenry has adequate and safe water. Secondly, water policies move up the priorities ladder because

successful implementation of water policies is upholding a people's right to water. Thirdly, the incorporation of the right to water in global governance has spurred states to adopt it in national legislation.

Prominent Swedish scholar, Maude Barlow in her book, Blue Covenant explains why clean and safe water is a basic human right. She argues that the due to water shortages, the world is sliding into a corporate steered freshwater cartel where private entities with the support of governments are making crucial decisions on who must have access to water, when and under what circumstances. In such a situation, most of the global human population would have no access to sufficient clean water supply. By making water a human right, water deprivation would be fought thereby ensuring water access to all (Barlow, 2008). In her words, water is a flow resource that is requisite for the sustenance of life as well as ecosystem health. Water has no substitute and must therefore be regarded as a public good for all in both law and practice (Barlow, 2012).

It is vital to clarify that Barlow's argument is not an indirect assertion that the private sector should not be involved in ameliorating water scarcity and water insecurity or that water should be accessible and available for free without payment. Instead, private entities dealing with water should not operate on a full cost recovery principle, making huge revenue at the expense of those who need water, especially the poor who Paul Collier dubs the "Bottom Billion".

2.8 Urban Sprawl in Zimbabwe

Urban sprawl has been explained as an ambiguous term. As a result of its ambiguity, it can be viewed, interpreted and described in a multiplicity of ways. In other terms, it is a multidimensional phenomenon. Bourne (2011) claims urban sprawl is basically any extension of the suburban areas. It is unplanned, haphazardly done, poorly serviced and generally disorganized due to an acute demand of urban land. Encroachment into sensitive green fields, wetlands and agricultural soils is witnessed.

Urban sprawl, in Zimbabwe can be attributed to a number of factors to include government policy on urban planning, political influences and economic hardships (Munzwa and Wellington, 2010). Political and economic influences shaped much of how urban centers expanded in the post 2000 phase. During the land reform era, ZANU PF elites made use of peri-urban land distribution to reward their societal elements that were loyal to them.

Looking at this phase of the history of urban sprawl in Zimbabwe from an urban political ecology perspective, it is clear that ZANU PF political party interests took center stage disregarding the environmental and human security implications of the land reform era. Watts's (2000) assertions that urban political ecology explains and clarifies environmental conflict as a struggle over natural resources such as land and water between the powerful and powerless poor rings true. In the aftermath, the resettled poor and their "innocent" surroundings grapple to have basic service delivery.

The patronage system explained above was to be repeated in other public policies such as the indigenization and economic empowerment drive. Thus in the fog of "jambanja" meaning land reform violence the majority peri-urban land that was once in the hands of privately owned farms overnight fell into the hands of the state whilst legal mechanisms to the conversion of this land from rural to urban use were either relaxed or removed. A number of land dealers surfaced grabbing peri-urban land for housing development (Government of Zimbabwe, 2013). Urban sprawl has seen informal settlements enlarge across cities and towns in Zimbabwe. Without certified authorisations houses have mushroomed in Harare, Ruwa, Chitungwiza, Bulawayo and Epworth. Even after the controversial Operation Murambatsvina of May 2005, illegal urban settlements have resurfaced thus bringing to light an assumption that the government has failed to curb urban sprawl (Msindo, Gutsa and Choguya, 2013).

Learning from the prevailing situation in the country, private land owners cashed in by sub dividing their plots for sale (Research Africa Unit, 2017). On the other hand, villagers changed agricultural land to residential use so that they could accommodate encroaching urban dwellers on a rental basis. Also in the confusion of *"jambanja"* boundaries earmarking public land was removed for instance grazing land in Seke, Goromonzi and Domboshava rural areas in peri-urban Harare in a process entitled Operation Garawadya meaning "eat first then ask questions later". Such developments led to the fast growth of small towns simultaneously increasing mobility and informality and the rise of an informal *"kukiya kiya"* trader society strengthened the booming of

towns and cities such as Chitungwiza, Beitbridge and Plumtree and also highway settlements such as Ngundu and Mhandamabwe (Research Africa Unit, 2017).

Land barons banking on political power they wielded and in some cases political powers that they were connected to illegally occupied and or sold state land whilst in other cases they have also settled people on undesignated places (Kakore, 2017). Destruction of home seeker's property by the Harare City Council at *kwaBhobho* close to Mabvuku and Tafara and Pota farm among other places has been witnessed as council orders occupants to evacuate. In Chitungwiza, Frederick Mabamba has been fingered in selling land to multiple buyers on state land in Seke and Nyatsime. Innocent Hamandishe has faced charges linked to criminal cases at Caledonia Farm. These and other land barons have faced charges such as fraud, theft of trust funds and other corruption related offences (Nemukuyu, 2018).

Insufficient funds are allocated to new investments such as newly developed locations in the small towns and growth points in rural Zimbabwe with the government citing various reasons for this failure ranging from sanctions by the West to mal administration (Mashingaidze, 2014). Urban sprawl has therefore posed social, economic and environmental challenges and not only to the urban communities but to the rural areas as well. The two major challenges noted are inadequate supply of water resources and the widespread of water borne diseases. In essence, undesignated land sales and unplanned settlements should be halted with immediate effect as part and parcel of the drive to ensure the accessibility of clean and safe water to urban dwellers in Zimbabwe.

2.9 Zimbabwe's Policy Landscape for the Provision of Potable Water

The Water Act (20:25) of 1998 governs water use in Zimbabwe. It reformed water use and management from what the colonial Water Act of 1976. The act embodies primary water purposes such as agriculture and also local government uses in electricity generation and road building. Zimbabwe's water act aims at ensuring more equitable distribution of water and also the inclusion of relevant stakeholders and actors in the management of water resources in the country. Private ownership of water is disallowed in Zimbabwe's water act since water is treated as an economic good. Water contamination by both individuals and other entities is classified as an offense under the water act. Also, the Water Act provided for the formation of the Zimbabwe National Water Authority (ZINWA) as a replacement of the Department of Water Development (DWD). Together with ZINWA, Catchment Councils and Sub-Catchment Councils for each river system in the country were also formed.

In line with the Water Act, the Zimbabwe National Water Policy also guides the government, the public and private sector on water use and management (Tom and Munemo, 2015). Launched on World Water Day (22 March 2013), the National Water Policy aims at improving water security within the country with specific emphasis on harnessing, conserving, protecting and managing water. What both the Water Act and National Water Policy state is primarily executed by the Ministry of Lands, Agriculture, Water, Climate and Rural Resettlement (MLAWCRR), currently led by Retired Air Chief Marshall Perrance Shiri. MLAWCRR in turn oversees the Zimbabwe National

Water Authority ZINWA whose preoccupation is water supply for agricultural and industrial purposes. ZINWA manages over 250 dams within the country (ADB, 2017).

Also, Section 77 of Zimbabwe's constitution which states that that;

"Every person has the right to

(a) Safe, clean and potable water and

(b) Sufficient food, and the State must take reasonable legislative and other measures, within the limits of the resources available to it, to achieve the progressive realization of this right"

Although the constitution does not clearly state that there must be accessibility of water to Zimbabweans, it mentions that having clean sufficient water is a human right that must be recognized and respected. Currently, Zimbabwe is guided by the Transitional Stabilization Programme Reforms Agenda espoused by President Mnangagwa in his inaugural address on 24 November 2017. It aims at making Zimbabwe a prosperous and empowered middle income economy by 2030. With that vision, the Zimbabwean government has vowed to invest in public water infrastructure since they are some of the vital enablers in unlocking economic growth (Government of Zimbabwe 2018). Under the infrastructure and utilities cluster, the government of Zimbabwe aims at discharging all sewerage into the environment and ensuring that 90% of urban residents should have access to safe and clean drinking water.

2.10 Chapter Summary

The chapter discussed the political ecology theory that is used throughout the study as an analytical lens. The relationship between urban political ecology was also explored

in the chapter analyzing how governance influences accessibility or inaccessibility of clean and safe water. Urban water political ecology theory also exposes actors' interests' relationships and positions with regards to water distribution. The provision of safe, clean water at affordable prices is a cardinal factor in guaranteeing water security and also sustainable human development. A number of obstacles stand in the realization of water security in African continent and more specifically Zimbabwe. Among these challenges are poverty, corruption and bad governance, lack of resources and poor implementation of water governing policies.

CHAPTER 3 METHODOLOGY

3.1 Introduction

This chapter provides a guide as to the conduct of the field study and justifies the methods and processes that were used to collect data. Data collection was carried out in September and October 2018 in Bindura. The researcher adopted the case study research design and through a qualitative approach engaged residents of the Chipadze, Chiwaridzo, Brookdale and Garikai suburbs. Other stakeholders who partook in the study include representatives of the Bindura Municipality, ward councilors, political party leaders, and Zimbabwe National Water Authority and land developers. Both positive and negative experiences that the researcher met during the course of collecting data are also included in the chapter.

3.2 Research Design

The researcher chose the case study research design. It was used because it explores, in depth, the relationship between urban sprawl and accessibility or inaccessibility of potable water within the city of Bindura. The case study method becomes clearly ideal when considering that close analysis of dynamics surrounding urban sprawl and potable water accessibility in Bindura, in depth, is a rich source of data that can be used in comprehending the state of water accessibility within the city.

The study sought to understand the state of water accessibility in small but expanding cities in Zimbabwe. Most scholarly, non-governmental organizations and media houses′ attention on water availability and urban sprawl has been casted on major cities like

Harare, Bulawayo and Mutate. The case study approach proffered the researcher a chance to gather a detailed analysis of the causes of water accessibility and inaccessibility together with the consequences that came with either accessibility or inaccessibility in an urban expanding city. This therefore allowed for a thorough and deep investigation and exploration of the research problem.

The researcher employed a qualitative research approach coupled with a descriptive and exploratory strategy. The flexibility offered by the qualitative research approach fitted well with the main objective of the study which was to understand the link between urban sprawl and water accessibility in Bindura. Qualitative research allowed for a detailed description of issues to do with water accessibility in the suburbs of Bindura. In other words, participants had sufficient room to explain what in their view what they thought caused water inaccessibility and also, challenges that they encountered in trying to satisfy their water needs. This was very helpful in revealing the very sensitive nature of the research topic. In their responses, participants revealed feelings of anger whilst in some instances they revealed expectations that they thought local authorities would fulfill but had not been addressed. The research required participants′ own terms and interpretations, hence the choice of a qualitative methodology.

3.3 Population and Sampling

The study engaged both male and female persons from the age of 18 years from 600 households in Bindura′s suburbs of Chipadze, Chiwaridzo, Garikai and Brookdale.The research did not filter participants based on their political and religious affiliations. The

target was to interview 60 households from the targeted residential areas. The researcher initially aimed at engaging 3 representatives of the Bindura Municipality (Director of Housing and Community Services Town Engineer and personal assistant to the District Administrator), 4 Ward Councilors, 1 Zimbabwe National Water Authority representative (ZINWA) and 2 land developers. However, the data collection process revealed to the researcher that there were other people with the information that was crucial for the study. Resultantly, a representative of EMA and UNICEF were added to the list of key informants that took part in the study.

The selection of the sample typically involved random selection mechanism. With regards to the targeted areas of Chipadze, Chiwaridzo, Brookdale and Garikai, cluster sampling was used on study participants. That is the researcher had four clusters, study participants in each of the four residential areas forming a cluster. Each cluster had a sample of 15 residents adding up to a total of 60 residents who took part in the study. The selection was random so as to reduce conscious and unconscious bias by the researcher. The researcher randomly chose households from which data was collected in the four residential areas hence giving an equal opportunity for every citizen of Chipadze, Chiwaridzo, Garikai and Brookdale to be selected to air their views on the subject matter of the nexus between urban sprawl and water accessibility in Bindura.

Another sampling technique for the key informants that was employed in the study is purposive sampling. The biggest advantage for the researcher in using this purposive sampling was that the deliberately chosen individuals were key informants in the area of study. They had knowledge of water provision, water quality, urban sprawl in Bindura

and other related aspects of the study. These included Bindura Municipality, Ward Councilors, ZINWA and land developers.

The snowball sampling technique was also used in the procedure of selecting participants as a way of uncovering other hidden characteristics about the population. In this study the key informants initially selected by the researcher led the snowballing process as she was referred to individuals within institutions who knew about issues under study. In an interview with the town engineer, KII4 (24 September 2018), she was referred to the EMA to inquire on the water quality that was being consumed by Bindura residents. Also whilst collecting data from the ZINWA KII2 (3 October 2018), the researcher was also referred to UNICEF to inquire about their efforts to alleviate potable water shortages in recently developed residential areas like Garikai.

3.4 Data Collection Instuments

This research used the qualitative data collection methods. Primary data collection methods used in the study included interviews, FDGs and observation whilst secondary data collection methods were Zimbabwe's Water Act, water policy and Constitution, ZINWA handbooks and brochures, Bindura Municipality public documents and reports, newspaper articles and scholarly journals. The qualitative data collection methods were used in this study because they provide useful information for understanding the processes behind observed results and assess changes in people's perceptions of their well-being.

3.4.1 Interviews

The researcher conducted semi-structured interviews with participants from Chipadze, Chiwaridzo, Brookdale and Garikai suburbs. The researcher interacted and waited in water queues with family members, friends, neighbours and other members of the community. It was within conversations with other members of the community that the researcher obtained some information on coping strategies that helped in the study. Most of the interviews were conducted in Shona. Some participants however chose to have the interview in English which they felt they could express themselves better. Participants chose for themselves, pseudo names that were used throughout the course of the interview.

In a period of three months (August, September and October 2018), the researcher conducted all the interviews personally. With the consent of the interviewee, interviews were recorded. The majority of participants lasted an average of 30 to 40 minutes, the researcher made sure that the interview ended within a space of time when the interviewee would have not been bored by the interview but also made sure that the necessary important data had been collected. Some participants had to question the reason behind recording the interviews saying "The voice recordings you want to keep; won't you keep them for political ends? I do not want to end up being beaten" Some participants plainly refused that their interviews be recorded.

The venues of the interviews varied with each participant. Some of the interviews were carried out in the homes of the participants especially with residents of the four suburbs whilst other were conducted outside the homes of residents. There were interviews

carried out in the offices of the participants especially those who were representatives of organizations. Conducting interviews within offices was aimed at ensuring that participants were not inconvenienced by having to come to venues that the researcher would have requested. Also the researcher ensured that participants were settled and relaxed in the same environments that they knew and worked in. An example is that of Bindura Municipality who were interviewed at their offices located at 565 Thurlows Avenue, Bindura. Such interviews were conducted the working hours between 8am and 4pm.

The researcher in this study had to constantly check with the research objectives and research questions whenever interviews were conducted. Some participants went off the aim of the interview asking for employment opportunities at the Municipality. The researcher however clarified that she solely targeted at acquiring data on the relationship between urban sprawl and accessibility of potable water in their areas of residents.

Interviews demand an enormous amount of time to collect and analyze the responses due to their diversity. Nevertheless, their flexibility necessitated a better understanding of seemingly unclear issues with regards to the urban sprawl and the accessibility of potable water in Bindura. For instance, in an interview with an elderly woman in Chipadze on 18 September 2018, explained that it is not entirely local authorities′ fault that water was unavailable. She pointed residents had grown to be rude, arrogant and adamant to pay water rates. When local authorities came to cut water supply, they would upon the departure of the authorities reconnect water. She said it was a common

practice in Chipadze, Chipindura and Chiwaridzo among other suburbs in Bindura but it was bad because it meant that the local authorities lost money as people defaulted paying rates and also evaded punishment when it came.

3.4.2 Focus Group Discussion (FDGs)

A focus group is a carefully planned discussion designed to obtain perceptions on a defined area of interest in a permissive, non-threatening environment, the researcher initially intended to have four FDGs. Four FDGs aimed at acquiring diverse viewpoints of members of Garikai, Brookdale, Chipadze and Chiwaridzo communities which the study focused on. **N**evertheless, she through counsel from the concillors learnt that it was not feasible to have the discussions because of a number of reasons chief among them being that a politically polarised nature of the communities and that people were angry over water provision. The councillors therefore highlighted that it was very risky to call people to converge because they would think that the researcher came with solutions to water accessibility problems or had some incentives for them to participate in the study when it was in actual fact just a scholarly investigation. Such an attempt according to the councillors would result in both the councillors and researcher being insulted.

Resultantly, the researcher conducted one FDG in Garikai. It was a group of women who had gathered for their weekly informal financial association commonly referred across Zimbabwean communities as *"club yemadzimai"*. The researcher was invited to have the group discussion by the councillor whose wife was part of the association. It

was a one hour and a half hours long discussion which had 16 women and three men on the 7th of September 2018 at one religiously popular old woman's residence.

3.4.3 Observation

Observation allowed the researcher to learn about issues the participants were unaware of or that they are unwilling or unable to discuss candidly in an interview or focus group discussion. Observations were done for the purpose of describing settings, activities, people, and the meanings of what would have been observed from the perspective of the participants. For example, some of the minute details that might have not been captured by the other two tools such as filling containers and buckets with water at homes commonly known as *"kucheredza mvura"* and digging of protected and unprotected wells.

Direct observation was used as a cross checking method throughout the field work. Important information was yielded especially pertaining to the socio-cultural patterns, customs and local behavior of the community pertaining to the accessibility of water in Bindura. They formed the bedrock of vital insights that eluded the interviewee, and at times were the only window through which the researcher saw what the participants were not inclined to talk about. Various feelings were noted as a result of observation. There was fury within some of the residents. Some of them answered the researcher saying "Do not bother us with useless questions" Some showed clear signs of lack of hope that the situation will change for better. One woman in Brookdale said "...with the way things are... we do not know how things can be set right." Feelings of vindication

were also evident within participants as some of them said "Bindura Municipality officials must be arrested because they get paid but do not work".

3.5 Analyisis and Organisation of Data

Once the researcher secured the data, analysis to find out answers to the research questions was done. After each day's data collection episode, typed raw data into her personal computer. Thereafter, a process of data cleaning was done and eventually, breaking up the data was done to come up with its constituent elements. Through coding, the transcribed data was reduced to simpler tables and phrases and categorized under specific themes and subthemes that relate to the research questions. Similar to the data collection process, this study adopted a mixed method in data analysis by use of tabulation, pie charts, and captured texts. As will be seen in chapter four, data analysis therefore mainly focused on thematic and narrative analyses. This enabled the researcher to summarize large amounts of data that she gathered from various stakeholders and sources and facilitated the drawing of conclusions by major themes. Revisiting of the recorded data and field notes was taken into consideration as a matter of refining the analysis and interpretations to ensure validity and reliability.

Direct quotations from the interviews and focus group discussions were presented to bring out the authenticity of the data collected. Common strands like potable water accessibility, water inaccessibility and conflict, lack of political will, structural weaknesses, water rationing and gender dimensions of potable water inaccessibility. Data sets were established and interpreted in the context of study objectives.

3.6 Ethical Considerations

The ethics of research concerning the appropriateness of the researcher's behavior is in relation to the subjects of the research or those who are affected by it. The study ensured that all ethical issues in the research were strictly observed. The study respected freedom to participation. Participants voluntarily consented to participate without coercion. The researcher addressed possible ethical concerns during the study by obtaining informed consent from the participants and emphasising confidentiality. During the data collection process, the researcher did not give any of the participants any form of reward to give data to her. Also, authorisation although sometimes verbal was sought from relevant authorities to conduct research in Chipadze, Chiwaridzo, Garikai and Brookdale.

Participants were told about the following: the purpose and objectives of the research; expected conduct from a research participant; expected risks and benefits; the fact that participation is voluntary and that one can withdraw at any time with no negative repercussions; anonymity of the data collected in order to enhance confidentiality. The participants were also told about the amount of time required of them to participate in this research. When participants felt uncomfortable, the interview was cancelled or deferred. This happened only once in the process of data collection.

3.7 Chapter Summary

This chapter focused on methodology used in this study. The study aimed at understanding the nexus between urbanization and the accessibility of water in Bindura.

It is imperative to understand that qualitative research design methods were the aptly fitting data collection methods since they are rich, and flexible. They allowed the researcher to capture the essence of the day to day lives of residents in Bindura, uncovering how they grappled with the adverse and debilitating effects of an unsound water provision system. The chapter described the research design used and also incorporated the data collection methods which the researcher used and these include unstructured interviews and semi structured interviews, the key informant interviews and focus group discussions. Triangulation with other respondents and literature was also used to ensure data validity and reliability and ethical issues which were considered during research design and the actual interviews were also discussed. The next chapter looks at the analyses of data and the interpretation of the results.

CHAPTER 4 DATA PRESENTATION, ANALYSIS AND INTEPRETATION

4.1 Introduction

The chapter presents findings that were collected during the data collection process. Findings reveal the various views on the relationship between urban sprawl and the accessibility of potable water. The chapter is an embodiment of data gathering fieldwork experiences and narrative extracted from the communities of Chipadze, Chiwaridzo, Garikai and Brookdale. The fulcrum of the data gathering experiences and narrative is to illustrate the day to day potable water challenges, their roots and coping mechanisms that have been devised by the local people to weather the water challenge storm. Bindura urban residents' feelings of fury, frustration, pain and hopelessness are also captured in the chapter as it starts with the finding and ends with analysis on the findings. Findings are presented according to the study objectives.

4.2 Data Presentation

Data collected from Chipadze, Chiwaridzo, Brookdale and Garikai was presented in this section paying specific attention at the three central tenets of water security which include water accessibility, water affordability and water quality. Residents in Brookdale and Brookdale voiced that they had a number of concerns that they wanted the city council wanted to address such as the laying and connection of water and sewer pipes. The period that the city council had agreed upon with the residents that they would lay and connect the abovementioned pipes had passed without any form of feedback on the progress that the council had made towards their promise. A furious

young lady from Garikai registered her displeasure in an interview on the 10th of September 2018. She said

> "If it is about the connection of water and sewer pipes, I no longer want to hear about it. Ever since we started staying here, our councillors said that the Bindura Municipality was coming to install pipes but up to now nothing has been done. The Bindura Municipality is good at telling us lies".

Similarly, at a focus group discussion on the 8th of September 2018, anther hopeless resident said

> "If you did not dig a well on your house waiting for BM, you will suffer because as we see it, we do not see BM installing water and sewer pipes any time soon. Probably we are going to be like parts of Chitungwiza where there is no city council water which reaches them".

The above responses by residents illustrate that the newly established locations of Garikai and Brookdale are water insecure. Chipadze and Chiwaridzo residents are also experiencing similar water stress. Residents also highlighted that UNICEF sank a borehole in Chiwaridzo which has a water tank donated by Member of Parliament for Bindura North. However, the boreholes frequently break down due to poor maintenance. The assertions by the residents above reveal that the responsible local authorities in Bindura have failed to deliver potable water to residents and they now resort to alternatives which may not be standard and safe. Water security proponents assert that the accessibility of water in the cardinal tenet when looking at how far populations in any given part of the world are water secure.

In its defence, the Bindura Municipality Director for Housing and Community Services cited that the installation of water and sewer pipes in all new residential areas its

priority. Nevertheless, the lack of financial resources to fulfil this wish stalled their progress.

> "Our plea to the central government and International organisations has not changed over the years. We chronically lack funds to spearhead projects aimed at fully developing new residential areas, collect refuse, repair and or replace obsolete infrastructure and install the water meters and sewer pipes that residents in Garikai and Brookdale are complaining about said a ZINWA official in an interview on the 3rd of September 2018".

Assessing what both the residents and the local authority had to say, the researcher was left with the impression that the local authority has not done enough with regards to planning a new location. They should have serviced the whole area and they later on allocated land to the different land buyers that allocating land and then later on plan to service the land. One middle aged woman who is also, a resident of Brookdale on the 31st of August 2018 at a focus group disccussin said that:

> "The failure by Bindura Municipality to cater for our needs makes us feel as if we have been dumped here and duped as well especially considering that we paid money from our long and hard earned savings to purchase these stands".

Other residents also noted that due processes requisite in land development for residential purposes were "skipped" as the land developer is alleged to have purchased the land through corrupt means. It is imperative to point out that what is transpiring in Garikai and Brookdale is not only promoting water insecurity but also an infringement of human rights to water. Zimbabwe as party to international laws which explicitly state that access to water is a human right must ensure citizens have adequate water.

4.2.1 Potable Water Inaccessibility

Brookdale and Garikai residents who did not have wells on their homes had to walk to neighbours' homes to fetch water or the nearest borehole. Also, in Chipadze and Chiwaridzo, residents who lived away from boreholes had to walk for an average of 200meters to fetch water more than twice per day. The study's findings on water inaccessibility in Bindura are consonant with the evidence extracted as early as 2011 from several suburbs in Harare in places such as Budiriro, Sunningdale, Highfields and Epworth. They brought to light an undeniable reality that water and sanitation was ailing (Muzondi, 2014). Observations found in Harare in 2011 before the cholera epidemic claimed nearly 5000 lives in Zimbabwe, are similar to this study's findings, meaning that little or nothing has been done to improve such a grave situation with regards to water accessibility throughout Zimbabwe as a country.

Bindura Municipality representatives revealed to the researcher that they were running the city on a shoe string budget chiefly funded by donor money. Hence drinking water pipe leakages; water rationing and flows of sewerage punctuate the daily lives of Bindura residents as is the case in most of Zimbabwe's urban centres. The Environmental Management Agency (EMA) on the other hand noted that Rooftop Rainwater Harvesting although at a small scale had helped residence deal with water shortages in Bindura. Some of the residence do not have enough money to install gutters and storage tanks at their homes, rooftop rainwater harvesting was being done using buckets and dishes for water to be used in toilets (KII 7 – 18 October 2018)

4.2.2 Portable Water Affordability in Chipadze and Chiwaridzo

Due to the advanced age of water pipes in Chipadze and Chiwaridzo, water leakages are rife. As a result of slow responses by BM to fix broken pipes, residents take it upon themselves to have the pipes fixed. Chipadze residents noted that plumbers charge very high prices to repair broken pipes, whilst buying the required pipes and other inventory aggravates the situation as they are mostly charged in United States Dollars at local hardwares. An elderly man in Chiwaridzo on 10 September 2018 in an interview noted that,

> "If a household decides to ignore leaks or take long to fix them, waiting for BM to repair or replace them it is a remedy for disaster. All the leaking water will be charged at that particular household's account and at the end of the day that particular resident or household suffers as they would not have the money to pay for an inflated water bill".

In Shona he clearly said that "ndiwe unoona moto" meaning it is you who suffer in the end.

Chipadze and Chiwaridzo residents also noted with great concern that estimations have worsened the water crisis situation. They maintained that the BM staff who are supposed to take meter readings are not doing their work. They were widely reported to be incompetent and lazy individuals who do not take meter readings, instead, they estimate high water consumption quantities. The issue of water estimates made potable water unaffordable. Water disconnections by BM come because residents fail to pay high water bills that would have been necessitated by water consumption estimations.

Garikai and Brookdale

Participants from parts of Brookdale and Garikai noted that they had water and sewer pipes installed. Nevertheless, they could not access water because they could not afford related costs. Land developers from whom they had bought land from had stated that despite the pipework having being laid, Bindura Municipality would connect water and sewer pipes when full payments of the residential stands had been made. This issue made water unaffordable because they did not have the required amounts of money to satisfy various conditionalities like the ones mentioned above.

Resultantly, residents resorted to digging shallow wells so that they can have water. Nevertheless, water from the unsafe water sources is unclean and they have to use disinfectants, an aspect which compromises clean and safe potable water affordability. As illustrated in figure 2, thirty percent of the residents in Brookdale and Garikai also revealed that they use disinfectants such as water guard and aqua tabs which are accessed at the local shops and clinics for one or two dollars sustaining them throughout an entire month. The other seventy percent of residents revealed that they just drink untreated water because they cannot afford to buy disinfectants. Garikai and Brookdale residents fear of the long term effects of untreated water such as cancer and water borne diseases such as cholera, typhoid and dysentery among others.

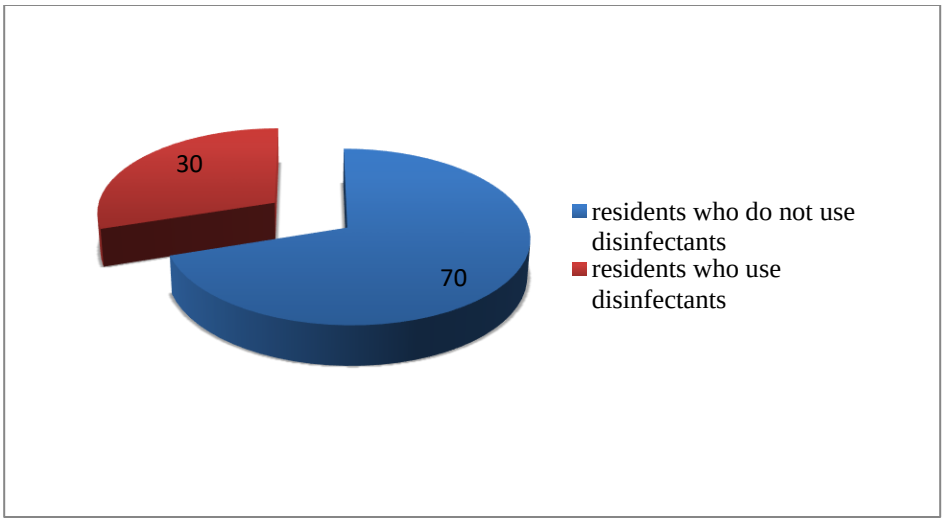

Figure 2: Disinfectant use among newly established suburbs in Bindura.Source: Research Data

4.2.3 Portable Water Quality

In Chipadze and Chiwaridzo, residents voiced their discontent with regards to the quality of water that BM was delivering to them. Their answers demonstrated that they are indeed unhappy with the quality of water. Dissatisfaction was rooted in a number of aspects. They said it has often visible impurities coupled with poor taste. The water has a green colour when placed in a container clearly revealing that it cannot be consumed without boiling it.

In an interview with the ZINWA representative, she noted that

> "ZINWA working tirelessly to ensure that water quality that came from Mwenje dam is free from biological and chemical impurities. It is the reason why they have searched for assistance from international organisations such as UNICEF which is providing water treatment chemicals", (KII 2, 30 August 2018)

She went on to explain that low revenue levels translate into inadequate financial resources. Inadequate financial resources incapacitate ZINWA in cohorts with the local

government to treat and deliver internationally pegged quality water in that caters for all populations within any urban center. This challenge is not peculiar to Bindura but most if not all of Zimbabwe's urban centers. A city or town may have plenty of water in its reserves but unfortunately, it cannot deliver it for human consumption in its natural raw state. There is important need that it gets treated so that residents are not at risk of contracting water borne diseases.

4.3 Challenges Faced by Residents of Bindura with Regards to Water Provision

4.3.1 Lack of Toilets

The focus group discussion underscored alarming environmental issues as challenges faced the residents of the Garikai and Brookdale suburbs. One of the focus group discussion participants noted that:

> "There is no sewerage system in the areas hence they hence resorted to using bush system for the have no resources build household dug toilets. However, those who have managed to build some toilets face the challenge having to destroy them and rebuild them again because the pits would have been filled within a space of a year as neighbours who have not yet built theirs also use the same toilets".

Over 2000 households remain unconnected to the sewerage system in Bindura (UNICEF, 2018). Residents therefore resort to open defecation especially those who do not have Blair toilets. Participants noted that others are in the habit of defecating in plastic bags especially during the night then throw them in the open. Such environmentally harmful practices are prevailing as residents are left with no choice because of the unavailability of potable water to use in toilets.

As that is not enough, residential stands that are yet to have houses built on them are viewed by other residents as fitting areas to dump refuse and human excreta in plastic bags. The researcher passed such places that are punctuated by putrid smells and clearly saw that there was need that the local authority addresses not only water challenges by all aspects of public service delivery.

4.3.2 Failure to Maintain Personal and Household Hygiene

The World Health Organisation (2014) states that all human beings should have access to adequate safe water and sanitation. An adult individual should have access to at least 20litres and at most 100 litres per day of safe and clean water for drinking and for personal hygiene (WHO, 2017). It is therefore the prerogative of the state to ensure that this quantity of water is available. However, the local and central authorities everywhere including in the metropolitan city suburbs have failed to service people with clean let alone adequate water "I pay my water bills on time since 1982 when we bought this house with my husband who worked at Trojan Mine but water unavailability prevails... we are surely in difficult times". Similarly, in explaining the inaccessibility of potable water in Garikai, a 54-year-old man said, "My child the unavailability of water here where we reside is a huge problem in our hearts and minds. As we see it, the city council has forgotten about us".

Women complained that to maintain personal hygiene such as taking a baths two or three times per day was being viewed as a luxury by society because of water inaccessibility. "we are no longer able to properly clean our households as we wish"

was one of the main pleas that women at a focus group discussion in Chipadze revealed the residents' main argument was that water shortages has been a major challenge posing a direct limiting factor towards personal and household hygiene. Lack of accessible safe water provisions, combined with poor sanitation facilities is a human security crisis; hence it should be put into a serious consideration by the relevant authorities as challenge faced by the resident of Bindura.

Giving the example of Kuma One, Bindura's oldest residential areas in Chipadze built in the 1950s, UNICEF highlighted that

> "During Zimbabwe's economic meltdown piped water significantly deteriorated within Bindura as was witnessed in other urban centers. Bindura municipality is failing to repair and upgrade water pipes that were originally built to accommodate a small population. As such there is need for broad coverage water and sanitation overhaul so as to normalise a disturbed urban lifestyle".

4.3.4 Financial Burden

According to the data collected by the researcher, the majority of the people who settled in these emerging suburbs such as Garikai are from low income families. Sixty percent of respondents noted that their monthly income only went up to as high as $400 (see figure 4.2), have occupations as security guards, maids, general laborer and vendors, whilst the remaining 40% of the other residents were teachers, soldiers, gold panners and or dealers, policemen and women and nurses. Through observation, the researcher noted that some of the infrastructure built in the stands demonstrated that residents were truly of low financial status as they were built with low quality farm bricks and cheap

roofing sheets. In some instance bare hand plastering of house walls was visible therefore revealing the poor status of residents in Garikai.

In this economic scenario, it becomes more difficult for these people to carter for extra costs of digging and constructing standard and protected wells in their premises as they are even struggling to make ends meets with other bills and life's necessities. Some residents living with the urban poor have cushioned themselves from water inaccessibility as they have better alternatives. An example of residents who have better income in Brookdale was that of a man who is a gold dealer. He had drilled boreholes at his home laid water pipes, built standard flush toilets and installed sewer pipes to a well-built septic tank. He also mounted two 5000 litre *Jojo* tanks to store water at his residence as he had bought two stands and joined them together. "In times of extreme scarcity like in the month of October, people who live near my residence come to me for help because their wells would have dried up". However, what Tomas did to ensure accessibility of potable water cannot be done by other less economically strong residents.

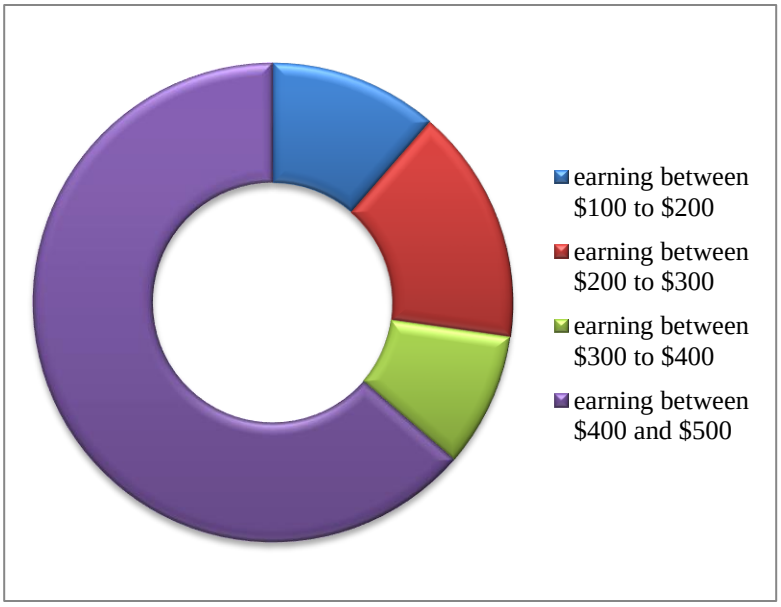

Figure 3: Monthly incomes of residents of Garikai and Brookdale suburbs

Figure 3 demonstrates the link between urban poverty and accessibility to potable water. The urban poor suffer more from water inaccessibility than other sections of the society with better incomes. This is the direct opposite of water security which holds that water must be affordable so that everyone can access it. In the process of urban sprawl, Bindura as the provincial capital of Mashonaland has attracted a huge number of people. In such a scenario, water inaccessibility is aggravated for the number of poor people who cannot access water increases.

The issue of unaffordability of safe potable water in Bindura confirms Bigas' (2013) worries with regards to how populations throughout the world secure day to day water. It is a worrisome dimension of water security when looking at third world country populations who struggle to secure food, clothing and shelter. When water becomes expensive, it worsens their fight with extreme poverty and reversal of any progress made in attaining MDGS. Statistically, the poor are more likely to suffer from access issues, which could then result in water insecurity.

As noted earlier in the chapter, residents dwelling in areas where water and sewer pipes have been installed by not connected showed lot of displeasure in the current setup where there is piped water underground but they cannot access it because they still owe the land developers money. The participants also underscored that due to their financial status and national economic stresses, many residents are likely to take 3 to 5 years to clear the balance before they can get access to water.

Also, since there are no sewer systems in the areas, it is upon each household, to construct temporary sewer systems for themselves. This places low income households under financial hardships they are added with another financial burden on top of securing the basic needs for survival. They have to dig wells, Blair toilets, Pit latrines and or temporary septic tanks. Participants noted that to get a well dug up until the water table is reached, the people who do that require $200 payment upon finishing the job. If it is to be paid in installments, then the price is raised to $250. The same conditionality applies when one wants a Blair toilet constructed at their home. The charge is $150 for the labor whilst cement, pit sand and bricks are supplied by the customers. With these considerations put together it is the researcher's conviction that the majority of the resident do not afford the resources needed for support their wellbeing let alone built infrastructure to ensure water accessibility and sanitation.

4.3.5 Undermining Urban Life Style

Participants from the old locations of Chipadze and Chiwaridzo argued that that of the urban lifestyle standards in Bindura just like in most cities have been circumvented and also deteriorated by the serious lack of potable water provisions. They noted that there was a time when there was no tussle for water as it is, when the city of Bindura had not expanded in a gigantic way. Some participants did not blame the expansion per se but blamed poor planning on the part of the Bindura Municipality. The main reasons cited were those of poor planned urban expansion and maladministration.

This lack of planning dimension cited by residents in Bindura has an interesting dimension. The researcher argues that citing population growth as a causal factor in

poor service delivery reflects shallow analysis on exactly what transpires on the ground. In any state, population grows as time passes, urban centers also expand and it is the prerogative of the central government to plan according to the population growth and urban sprawl projections, so that it caters for its population. The same must be done by the local authorities, when mapping housing projects, establishing and revamping water reticulation plants and sewer systems among other issues entangled with service delivery. Therefore, urban expansion should not be blamed for poor service delivery in Zimbabwe; instead the lack of planning which shows the absence of responsiveness (a key feature of good governance) must be cited as the problem.

The residents who responded unanimously conceded to the fact that the challenge is water crisis is a problem for all and because the residents do not have potable water within their homes instead they hardly access it from boreholes and wells outside their homes. This is not ideal for an urban set up, it looks more like an extension of the rural areas. A male participant, laughed saying *"tatove kumaruzevha ka"* (we are already living like we do in the rural areas). Nevertheless, despite the water crisis undermining their urban style, residents of the new locations of Garikai and Brookdale highlighted that they are in a way pleased by current arrangements that they are staying at their own premises without having rent someone's house. A middle aged woman of Brookdale said that "yes we have our challenges, it is clear... but being a landlord feels good. It is not the same as being a tenant. We hope the water crisis changes for better in the near future"

4.4 The implementation of the Policy Framework on Water Provision

Key actors in the implementation of Zimbabwe's Water Policy are the Ministry of Lands, Agriculture, Water, Climate and Rural Resettlement (MLAWCRR), Ministry of Local Government, Public Works and National Housing (MLGPWNH) and Ministry of Health and Child Care (MHCC). The implementation of national policies like Zimbabwe's Water Policy is affected by the prevailing political, economic and social factors. It is therefore of utmost importance to focus on both micro and macro spheres of policy making in policy analysis is also brought by to the attention of policy analysts. However, is also key to understand since policy making and implementation interact, some gaps are created in the policy making stage and spill over to implementation and formal policy principles and statements may not be implemented in practice.

The National Water Policy together with the 1998 Water Act and the Zimbabwe National Water Authority Act are sound policy documents whose implementation is problematic. Water pollution is a factor that draws back the successful implementation of both the Water Act and National Water Policy. A total of 43 sewerage treatment plants are said to be discharging raw sewerage into water bodies where drinking water is drawn from in Zimbabwe. Also known huge corporates are releasing industrial effluent into water bodies thus damaging the ecosystem (World Bank, 2012). The pollution of water bodies has a negative effect on the quality of water which Zimbabwe's water policy classifies as a public good hence demonstrating that the implementation of the water laws and policies in Zimbabwe is problematic.

The loss of revenue is another drawback factor in as far as the successful implementation of the National Water Policy is concerned. Most municipalities and city councils in Zimbabwe are said to have minimum cost recovery due to poor billing and other revenue collection measures, faulty and or nonexistence meters, illegal water connections, estimation of water consumption rather than accurate knowledge among other factors. This results in local governments losing much needed revenue. Tom and Munemo (2015) therefore lament the lack of qualitative analysis that reveals policy design and implementation gaps as a contributor to a continuation of policy implementation failure.

Political interference into water and sanitation management within both rural and urban set up is another factor that stifles effective water implementation. The involvement of politics in water management in Zimbabwe has it genesis in the government's decision to let ZINWA take over water supply management from all urban authorities after year 2000 (Musemwa, 2014). Political meddling into water provision has done more harm than good as residents have been discriminated against because of a perception that they are of a "wrong" political orientation (Nyambuya, 2015). Abuse of office by politically connected local authorities, embezzlement and nepotism among other forms of corruption have characterized local governments much to the detriment of urban dwellers who struggle to access water.

Zimbabwe's National Water Policy refers to Integrated Water Resources Management (IWRM) as a tool to ensure availability of potable water. IWRM has been touted in a

number of scholarly writings as the universal panacea for water problems in contemporary towns. Musingafi (2013) for example, strongly recommends the adoption of IWRM in all water catchments to ensure water availability in rural as well as urban settings. However, IWRM is good as a water conservation technique rather than as a technique for ensuring availability of potable water. In addition, Enrique (2015) the operationalization of the IWRM principles is usually costly and difficult.

4.5 Discussion and Interpretation

4.5.1 Water Inaccessibility Related Conflicts

Residents noted that the inaccessibility of water at household level has given rise to conflicts that are generated within families, homes, and at alternative water points Conflicts associated with maintenance and servicing of the boreholes as well petty issues of cues for accessing water. Residents in Chipadze highlighted that almost all the time the community boreholes break down, nasty words are exchanged between residents for various reasons. One Chipadze resident gave a number of scenarios that breed conflict in the areas when boreholes break down. The researcher looked at three one that had interesting details.

Scenario 1. Some residents feel that people who use the borehole frequently and live closest to the borehole cannot contribute the same amount of money, a flat rate of $2 as those who live far from the borehole and also benefit less because of the distance.

Scenario 2. Other residents claim that borehole maintenance fees are too much. They feel that organisers of maintenance programmes steal some of the money for personal gain hence it needs to be cut from the current $2 per month per house to a dollar or even 50cents.

Scenario 3. An opinion or suggestion on how maintenance management can be improved can be crushed by the community on the basis of it having been said by a person considered to be of loose moral, someone who has been convicted or on the basis of being a woman. Senior community member is reported to have said to women airing their views that (you cannot tell us anything, we have been living here for a long time), (FDG 1, 7 September 2018).

In trying to discuss and iron out differences in perception with regards to borehole management conflict arise. Some conflicts are said to have ended in direct violence through fist fights with antagonists having to go to the Police to settle issues. Female participants also highlighted that conflict also arises when young and middle aged men come to fetch water at boreholes. They noted that men also always want to go to the front, fetch water and leave. This results in women standing in the line complaining through shouts and insults to such men. The researcher observed that boreholes are a bee hive of activity especially in the morning and sunset hours of the say and truly conflicts arise as everyone in the community wants to secure water for the evening and for tomorrow morning.

Frustration is brewed within residents as they have to wait for hours in queues to fetch water. Therefore, there are arguments almost every day on who got to the borehole first,

and who put his or her bucket or container first. Participants noted that gold panners, due to their reputation of leading violent lives, do not stand in borehole queues. They go all the way to the front and mostly no one asks them to stop because they are violent personalities. Also, the sick are exempted from queuing for water at boreholes. Lastly elderly members of the community do not stand in the queue because they are feeble. In the end, people end up complaining the number of people who are getting free passes to fetch water and go whilst they stand in line is too much. Again it becomes a source of conflict.

Such conflicts destroy the glue that holds society. Residents in the Chipadze and Chiwaridzo highlighted that they know of cases whereby people who were once friends no longer greet one another because of these water related conflicts. Perception and misperceptions embodied in statements such as

> "They refused to help me with water to bath yet I was in a hurry to go to town to do important business... or They do not want us to fetch water from at their residence yet they have a borehole...they are cruel".

4.5.2 Structural Weakness

Local governments or city councils derive the legal authority to operate and run urban centers curtsey of the 1998 Water Act and the Urban Councils act, Chapter 15:29 (Hove and Tirimboi 2011). To be exact, Chapter 29:15 and part xiii: 183 clarify the responsibilities that local governments are charged with in as far as the provision of clean and safe water to residents in Zimbabwe. Also, the clause addresses maintenance in all forms of water facilities and infrastructure that guarantees that clean water reaches

urban populations. Laying scrutiny on the Urban Water Act exposes numerous weaknesses. Firstly, the Act fails to give clear and concise regulation on the management of urban water supply. The document can be described as big text that does not have sufficiently elaborate on how best water supply should be overseen as in prescribed by the government. It must be highlighted that such laws must lucidly the responsibility of the local governments with regards to urban water supply (Ruvheyi, 2012). Technically it may be argued that city and town councils do not have a legal authoritative source they can refer to as to their urban water supply responsibility.

Looking at the Zimbabwe National Water Authority (ZINWA), it also has inherent defects that stifle its operation. Chawasemwa (2013) notes that the ZINWA Act was crafted and promulgated in 1998 and the organization roared into life in 2000. The act provides mere guidelines on catchment management but does not address urban water management guidelines. In simpler terms, it basically has no mandate in urban water provision yet it is the nation's water authority and the greater majority of the Zimbabwean population lives in urban centers. It is imperative to take into cognizance that in the urban areas where ZINWA is overseeing water provision management, it has no organization ensures that its operations are monitored and evaluated. This therefore suggests that even mismanagement, lack of qualified staff, bureaucratic delays and pure graft prevail unchecked. It must be highlighted that such structural weaknesses that hamper efforts to ensure that safe and clean water is available to urban populations.

4.5.3 Water Rationing

Most of the areas in urban Bindura, depending on the gradient of the locations, have access to tap water during 8pm and 6am which is an average of 9 to ten hours without clean and safe water. In similar study in Kadoma, Mangizvo and Kapungu (2010) uncovered that the majority of suburbs in the city have water available to them for a meager one or two days during the course of the week as the city is expanding.

Water rationing stifles urban agriculture yet families consume and sell vegetables farmed and harvested from their urban fields and gardens. Urban Agriculture provides good access to food, a source of income and good quality food at low cost and the possibility of savings and a return on their investment in urban property (Hoornweg and Munro-Faure, 2010). Nevertheless, when water is being rationed such that it is available only for two days a week, it is difficult to sustain urban agriculture. Chipadze and Chiwaridzo residents expressed huge concerns that their gardens had been decimated by water inaccessibility as it was difficult to water gardens with water fetched from boreholes.

It is imperative to reiterate on the point raised in chapter two that access to clean and safe water is a human right. Water rationing which results in resident going for hours and days without water is in actual fact an infringement of the human rights of residents.

4.5.4 Gender Dimensions of Potable Water Inaccessibility

Women bear the full brunt of water inaccessibility in most societies because as household managers, they are left with no other choice but to ensure that family's water needs defined by their gender roles are addressed. The study found out that women and children are highly affected with water inaccessibility as compared to men. Their direct involvement in domestic water use puts them in a vulnerable position. Demonstrating the patriarchal nature of the Zimbabwean society as a typical African country, 90% of respondents noted that since women spend more time at home, they have to do water sourcing whilst their male counterparts were at work securing financial income. Since children upon returning from school are at home, they help their mothers in sourcing for water at alternative water points.

During one of the participant observation exercise in Chipadze, the researcher learnt that the borehole water queues largely comprised of women and girls. In the same neighborhood, Cohorts of young men were seated at street corners, smoking tobacco and listening to urban music commonly referred to as Zimbabwe Dancehall. The few young men who came to the borehole showed signs of disgust waiting in line for water, resultantly they bypassed they went directly to the borehole and forcefully fetched water much to the dislike of the women queuing for water. During a FGD in Chipadze, an elderly woman on 7 September 2018 highlighted that

> "As women, we usually stand in the queue for a long time. When men come to fetch water they don't stand in the queue, they just skip and go in front. That is why we go there early morning or at night".

The old lady's statement got approval from all the women in the group, reflecting that it was a sad truth that they experienced on a daily basis. Patriarchal tendencies of the Shona societies surfaced during the data collection phase of the study as one male participant, on 19 September 2018 noted that "I cannot come from work and then also go to work when my wife is there, it cannot happen, maybe if she falls sick I might go"

An interesting dimension is of employed women who are not housewives. The study uncovered that they fetched water with the aid of "water boys". These are young boys who fetch water for employed women who spent the day at work for a fee. At the time of the study, fetching four 25 litre containers filled with water costed a dollar. It is informal employment that the young men mainly in Chipadze and Chiwaridzo have at the same time helping formally employed women to cater for their needs.

4.5.5 Water and Politics

Interviews conducted both the old and new locations demonstrated that residents traced their potable water woes to the political realm. Their responses connected water accessibility or shortage with either some political figures were either happy or sad with the current state of affairs. Eighty percent of participants revealed implicitly or explicitly that water scarcity was as a result of pure ignorance by political leaders for one reason or the other. The researcher came to realise that the political ecology of potable water in Bindura had the elite on the winning side whilst residents received the bitter end of the stick.

The political ecology of potable water in urban Bindura is in tandem with Krings (2008) and Zimmer (2010) that the political ecology of any setting determines the triumphant and those on the losing side and the reasons for either winning or losing. Water can therefore be used to chastise populations for voting *"wrongly"* through siding with a perceived opponent. In this scenario, the politically powerful, with the influence and money they wield act in a manner that do not benefit society. Instead they use their power to serve their parochial interest.

Further looking at the issue of political mistakes that residents are said that political figures during visits rallies and any opportunity that they found reiterated that "Know must know who to vote for. This is the time to learn that in the next election how we are going to vote" a young man in Chipadze. Respondents also noted that water provision was being used by a political tool by both ZANU PF and MDC because their representatives echoed the same message. Resultantly, residents felt that water inaccessibility despite the financial problems that the country and Bindura Municipality was facing, was a product of political parties tussling for supporters in the city.

> "We know the country is undergoing a series of problems... lack of money being at the centre of the storm of problems but we cannot overlook political influence here in Bindura has its hand in the water challenges we are facing" said Shuvai at a Focus Group Discussion conducted on the 18th September 2018.

Due to fear of victimisation, the majority of respondents failed to clearly state the people they perceived to be behind neglected the water needs of Bindura residents. Deep probing on the area of politics, water allocation and quality by Bindura Municipality

resulted in respondents showing signs of discomfort. Whenever such signs surfaced, the researcher immediately went to the next question. The crux of residents' arguments was however made clear to the researcher. Water challenges are not a priority to political actors within the central and local government. Their preoccupation is to amass power, consolidate and secure it. If it came to water challenges, the elite such as the governor, minister of state, major and town clerk live in affluent suburbs which seldom experience water rationing. Also, they have the financial means to drill boreholes or protected wells. The winners are clearly the poor ordinary citizens whilst the rich political actors are the winners for they do have accessibility to potable water.

Water provision challenges in Zimbabwean centres are a direct result of the tussle for power between ZANU PF and MDC. Polarization is not only confided to other political aspects of Zimbabwean societies. Even when water pipes burst, there is assessment to see which area it is before fixing it. A Bindura University student Joana said that "living in opposition political party led areas automatically translates into doom when it comes to water provision" An elderly man on 18 September 2018 in Chipadze echoed the same sentiments.... As he said "Such areas are political liabilities to a ZANU PF led central government.

Boreholes have been drilled where there are said to be large concentrations of ZANU PF supporters such as Garikai where Bindura North ZANU PF Member of Parliament, even installed a water storage tank. Conversely, areas where there was said to be opposition party elements are deliberately meant to wallow in the struggle for water.

4.6 Chapter Summary

The chapter started with the presentation of findings collected from the field. These were presented in accordance with the research objectives. Findings were later fleshed out in the analysis section. Themes discussed include potable water inaccessibility; water inaccessibility related conflicts, lack of political will, structural weakness, water rationing, gender dimensions of potable water inaccessibility, water and politics. Analysis in the chapter grappled with the relationship between urban sprawl and water accessibility in Bindura.

CHAPTER 5 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

Having collected data in Bindura, this chapter summary, concludes the study and proffers recommendations. The data collection period uncovered the relationship between urban sprawl and water accessibility. As the city of Bindura is expanding the city council does not have the capacity to cater for the water needs of its population. The researcher learnt of various challenges that are barring the residents of Chipadze, Chiwaridzo, Garikai and Brookdale from accessing clean and safe potable water. The study exposed the social consequences of water inaccessibility with residents also explaining the coping mechanisms that they have devised to ensure their households have water. Having understood this, this chapter proceeds to offer recommendations meant to improve accessibility of clean and safe potable water in Bindura.

5.2 Discussion

The study was inspired by the need to understand the implications of urban sprawl on water security of residents in Bindura town. The research explored water security that guides how water social services are provided in old and newly developed towns, council's consistency in implementation of these and analyze challenges being faced by residents if there are any with regards to water security. The study was conducted in Bindura focusing on two old locations of Chipadze and Chiwaridzo and newly established locations of Brookdale and Chiwaridzo. This was aimed at understanding

potable water availability to senior residents of the town as well as new those occupying newly developed locations.

The political ecology theory informed arguments made in the study. The theory holds that a critical analysis of power relations between different actors in the management and exploitation of natural resources gives proper understanding of what will be taking place within any context (Reuber, 2005; Beckedorf, 2010). Through a case study research design, employing the qualitative research design, the researcher managed to gather valuable insights from the targeted population. Ethical considerations in accordance with the morally proper conduct in dealing with research participants or the accessing of archival data were all observed.

The researcher encountered a number of obstacles in the process of gathering data. The researcher noted that residents were preoccupied with giving what they thought were correct answers to the researcher thereby not revealing the true state of affairs with regards to potable water availability in Bindura. The researcher however explained there were no correct or wrong answers. Some residents were infuriated by water accessibility issues such that they vented their anger towards the researcher. The interpretive nature of qualitative research, presented a chance for the researcher to make biased conclusions during the data collection phase of the study. The researcher however ensured that her findings and conclusions were presented with minimum bias. As set by the study's objectives, the researcher managed to uncover that clean and safe potable water is not accessible to the greater majority of Chipadze, Chiwaridzo, Garikai and Brookdale.

5.3 Conclusion

Urban sprawl has like in other urban centers it has been experienced, had a negative impact on water availability in Bindura. Urban sprawl has its own negative effects that are associated with it which are compounded by the lack of proper urban planning. When there is poor planning, service delivery is left in shambles. Consistent service delivery especially with regards to water and sanitation service is cardinal in achieving SDGs. Lamentably, urban sprawl in Bindura came but without the expansion of neither service provision nor infrastructure and machinery that executes service delivery. Resultantly, residents in old suburbs of Chipadze and Chiwaridzo no longer have adequate safe and clean water as they used to have before the city expanded. It is noteworthy that urban sprawl has brought with it the huge problem of water rationing as Bindura Municipality struggles to cater for an escalating population using an obsolete and poorly maintained water infrastructure. Bindura residents are therefore exposed to seriously debilitating water inaccessibility challenges.

Such a situation is not in tandem with water security provisions which hold that clean and safe potable water must be accessible to all in sufficient quantities. Bindura residents are not having the minimum of 20 and a maximum of 100litres of water per person per day, (WHO, 2003). On the hand, the prevailing tough economic conditions in the country characterized by a non-functional industry, acute lack of foreign currency and austerity measures among other factors stalls the central government's progress in rapidly addressing the water challenges through massive revamping of city council's water infrastructure even with a National Water Policy in place.

The combination of an expanding city and potable water inaccessibility is a water borne disease ticking time bomb as resident resort to unclean water sources. The study concludes that residents of Bindura are at risk of contracting cholera, diarrhea, typhoid, dysentery and other water borne diseases that have killed populations in other Zimbabwean centers. Unfortunately, Zimbabwe's local governments comprising of 30 urban and 60 rural district councils (Research Triangle Institute, 2010) have low political will to address water related problems. Politicians haggle over elections, parties and their leaders spend time, energy and state resources pursuing and consolidating political power but no one talks of service delivery. Resultantly, people continue to wallow in poverty and poor service delivery.

While there have been efforts by international organisations to ensure that alternative sources of clean water have been installed in the form of boreholes, they have not sufficed. The ratio between boreholes and populations living in those localities is not proportional. Also their establishment is said to be done in a skewed fashion along political party's choices and interests. In this storm of water inaccessibility women suffer more than men as they try to ensure that households have enough water to cater for all family needs. The study's findings reinforce observations by international institutions such as the WB and WHO that women are very burdened by water inaccessibility in diverse societies throughout the globe.

5.4 Recommendations

From the findings of this study, the study forwards recommendations.

5.4.1 To the Government of Zimbabwe

Good governance should be adopted to deal with bad governance rampant in all the city councils in Zimbabwe. The initiative must commence at national level and then cascade down to the local authorities.

Prepaid meters should be considered an option to ensure effective and efficient use of the limited resources. Since water is a human right, government should then subsidize the rates so that are affordable to all.

Urgent financial resources should be mobilized towards refurbishment and upgrading of water facilities throughout the country.

5.4.2 Bindura Municipality

Proper planning when expanding urban centers must be done. Water and sewer pipes should be laid before residents are given the green light to purchase and develop land.

Local authorities should not prioritize political interest in urban planning and development as it limits effective implementation of policies at local level. Parochial political party interest must not be forwarded at the expense of efficient service delivery.

Land developers should not be given power to stop residents from connecting water and sewer pipes as a way of ensuring that they receive full payment for the land. Local authority should be consistent with the implementation of their policies.

More boreholes with water storage tanks should be installed in all areas that experience erratic water supply. Residents' access to potable water should be a priority for the local authority.

Water rationing must be fair so that all residents receive an equal amount of water.

5.5 Suggestions for Further Research

i) The institutional capacity of local governments in urban sprawl planning.
ii) The impact of political influence in water accessibility in Zimbabwe.
iii) Zimbabwe's water policy and water security.

5.6 Summary

The chapter summarized the entire study, highlighting that the motivation behind the study was the need to understand the link between urban sprawl and water accessibility in Chipadze, Chiwaridzo, Brookdale and Garikai. Arguments in the study were influenced by the political ecology theory in a bid to understand to role that political actors played with regards to who got potable water, when and how. Through a qualitative research approach, the researcher gathered valuable information in Bindura observing all ethical considerations and ensured that her findings and conclusions were

presented with minimum bias. Recommendations were also given with the objective of improving urban sprawl and water accessibility not only in Bindura but throughout the country. The crux of arguments presented in the chapter aimed at illustrating that better planning can help local governments deliver safe and clean potable water to the entire populations within urban centers.

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APPENDICES

Appendix 1: Key Informant Interview Guide

Introduction

My name is **Gillian Chinzete** I am conducting this research for a **Master in Public Policy and Governance with Africa University**. The research is being conducted in order to understand the impact of urban expansion on access to potable water in Bindura. I am interested in understanding the perceptions, opinions and feelings of the residents on how they regard access to portable water highlighting issues of access quality and cost. Everything that you are going to say will be used solely for this only and not any other purpose. In order further protect your privacy in terms of views and identity; your name will not be used. Do you have any questions or anything that require clarification from me before we start?

Sex	
Age	

Opening questions on access

1. What do you think about the current status of water accessibility in the new and old locations?

2. How does that make you feel?

Questions on perceptions

3. Can you tell me any incident that has happened in your any of locations with regards to access to portable water?

4. What is your view of the water provision pattern in the new and old locations?

5. Do you think that the local authority has a role to play in improving water access and quality? Explain

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

6. Describe your experience(s) with residents living with the limited water supply.

7. Have you ever encountered any case of water borne disease? Explain.

8. Do you think the local authority has done enough in terms of infrastructure development? Why?

9. What do you think can be done by the local authority to improve the current situation.

Probe: views on what has been done and what can be done.

10. Responsibility towards improving water access.

Responsibility towards improving access to water quality water	**Strongly Agree**	**Agree**	**Undecided**	**Disagree**	**Strongly Disagree**
It is the role local authority					
It is the role of individuals					
It is the role of communities					
It is the role land developers					

11. How consistent has the local authority been in water provison for both old and new locations.

Appendix 2: Focus Group Discussion Discussion Guide

Introduction

I would like to start by thanking you for coming for our discussion today. My name is **Gillian Chinzete** and I am a Masters student at Africa University. During the next weeks I am going to be conducting a research on the impact of urban expansion and access to portable water in Bindura. Feel free to express your views, experiences and opinions. Different views will be accepted and respected. Everything that we are going to discuss will be confidential and will be used exclusively for research and nothing else. Participation is voluntary and should feel the need to discontinue, you are free to do so and I will respect your decision. During the discussion I will be taking down some notes and with your permission I will be happy to record the entire discussion so that I do not miss any of your opinions and any of opinions and views. The discussion will be for 1 hour.

Introductions: Group member's introductions will be done in the form of self introductions.

1. At local level describe the current status of water access in your location.

2. Describe your experience(s) of living with the limited water supply

3. Do you think the residents are facing any challenges with regards to water access? Explain.

3. Have you ever encountered any incident of water borne diseases

4. Do you think it is possible for the local authority to rectify the current status?

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

5. Do you think the local authority has done enough in terms of infrastructure development in the new locations and maintenance of ageing infrastructure? Why?

6. How can the local authority rectify the current status? Give examples.

7. What role can individuals play to improve water accessibility? Elaborate.

Conclusion

Appendix 3: Interview Guide for Residents

Introduction

The research is being conducted in order to understand the impact of urban expansion on access to portable water in Bindura. I am conducting this research for a Masters degree at Africa University. I am interested in understanding the perceptions, opinions and feelings of the residents on how they regard access to portable water highlighting issues of access quality and cost. Everything that you are going to say will be used solely for this only and not any other purpose. In order further protect your privacy in terms of views and identity; your name will not be used. Do you have any questions or anything that require clarification from me before we start?

Sex	
Age	

Opening questions on access

1. What do you think about the current status of water accessibility in your location?

2. How does that make you feel?

Questions on perceptions

3. Can you tell me any incident that has happened in your area with regards to access to portable water?

4. What is your view of the water provision pattern in your location?

5. Do you think that the local authority has a role to play in improving water access and quality? Explain

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

6. Have you personally been a victim of any water borne disease? Explain.

7. Do you think the local authority has done enough in terms of infrastructure development? Why?

8. What do you think can be done by the local authority to improve the current situation.

Probe: views on what has been done and what can be done.

9. Responsibility towards mending relations

Responsibility towards improving access to water quality water	**Strongly Agree**	**Agree**	**Undecided**	**Disagree**	**Strongly Disagree**
It is the role local authority					
It is the role of individuals					
It is the role of communities					
It is the role land developers					

10. How consistent is the local authority in implementing its policies on water provision

11. Have you personally done anything to improve water accessibility?

Probe: personal involvement and creativity community development.

Appendix 4: AUREC Approval Letter

AFRICA UNIVERSITY
(A United Methodist-Related Institution)

INVESTING IN AFRICA'S FUTURE

AFRICA UNIVERSITY
RESEARCH ETHICS COMMITTEE (AUREC)

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Box 1320
Mutare

Dear Gillian

RE: URBAN EXPANSION AND ACCESS TO PORTABLE WATER IN BINDURA

Thank you for the above titled proposal that you submitted to the Africa University Research Ethics Committee for review. Please be advised that AUREC has reviewed and approved your application to conduct the above research.

The approval is based on the following.

a) Research proposal
b) Questionnaires
c) Informed consent form

- **APPROVAL NUMBER** AURECAU510/18

This number should be used on all correspondences, consent forms, and appropriate documents.

- **AUREC MEETING DATE** NA
- **APPROVAL DATE** 19/ 04/2018
- **EXPIRATION DATE** 19/04/2019
- **TYPE OF MEETING** Expedited

After the expiration date this research may only continue upon renewal. For purposes of renewal, a progress report on a standard AUREC form should be submitted a month before expiration date.

- **SERIOUS ADVERSE EVENTS** All serious problems having to do with subject safety must be reported to AUREC within 3 working days on standard AUREC form.
- **MODIFICATIONS** Prior AUREC approval is required before implementing any changes in the proposal (including changes in the consent documents)
- **TERMINATION OF STUDY** Upon termination of the study a report has to be submitted to AUREC using standard form obtained from.

Yours faithfully,

CHINZOU MARY. AUREC A/RESEARCH ETHICS PROGRAMME OFFICER
FOR CHAIRPERSON, AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE