CHALLENGES AND OPPORTUNITIES OF WATER SUPPLY AND SANITATION IN UNPLANNED SETTLEMENTS OF MONZE URBAN IN SOUTHERN PROVINCE, ZAMBIA.

BY

CONCEPTOR SIAFWANZYA

A thesis submitted to the University of Zambia in fulfilment of the requirement for the award of the degree of Master of Integrated Water Resources Management

THE UNIVERSITY OF ZAMBIA

LUSAKA

2023

DECLARATION

I, **Conceptor Siafwanzya** do hereby declare that the work contained in this study is sorely my work and does not contain any work done by other people that has not dully been recognised. I have also not submitted this work to another university or institution for award of another degree.

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APPROVAL

This thesis by **Conceptor Siafwanzya** has been approved as fulfilling the requirements for award of **Master of Science in Integrated Water Resources Management by research** by the University of Zambia.

Examiner 1	Signature	Date
……..	……	……
Examiner 2	Signature	Date
……..	……	……
Examiner 3	Signature	Date
……..	……	……
Chairperson Board of Examiners	Signature	Date
……..	……	……
Supervisor	Signature	Date
……..	……	……

ABSTRACT

Human access to water and sanitation services is essential to sustainable development. However, people living in unplanned settlements still lack water and sanitation services. Monze town lies in the Southern Province of Zambia and it consists of both planned and unplanned settlements. Southern Water and Sanitation Company (SWSC) has been mandated to supply water and provide sanitation services to the residents of Monze town. There has been an increase in unplanned residential areas, and challenges have been noted in supplying and accessing water and sanitation services. Unplanned settlements face complex water and sanitation issues due to limited access, inadequate sewage systems, and limited resources. Enhancing these requires community-level solutions, low-cost sanitation technologies, and government support. On the other hand, policy, institutional, and legal frameworks significantly influence water supply and sanitation in unplanned settlements, but weak or absent policies hinder service provision and regulation. This study aimed at assessing the challenges and opportunities of water supply and sanitation in unplanned settlements of Monze urban in Southern Province of Zambia. The specific objectives were to; assess the water supply and sanitation service provision in unplanned settlements; evaluate the effectiveness of policy, institutions and legal frameworks on water supply and sanitation services provision in unplanned settlements and establish the opportunities of water supply and sanitation in unplanned settlements of Monze. Data was collected through household questionnaires, semi-structured interviews, observation checklist from 176 participants comprising of households, civic leaders, SWSC officials and health personnel. A descriptive survey design was used. Quantitative data was analyzed using SPSS version 21 while qualitative was analysed thematically. The results indicated that residents accessed water from taps installed by SWSC and shallow wells in poor conditions. About 92.9 percent of the households experienced water shortages while 84.7 percent of the households used pit latrines on a shared basis posing a health risk. Results also revealed that implementation of the water policy in unplanned settlements was slow. This situation would be addressed if the sector ministry and local authorities incorporate unplanned settlements into existing sector investment plans. Besides, most of the households complained of high water tariffs and delays in connecting water. On the other hand, reports from SWSC and observations revealed that vandalism and illegal water connections led to leaking and hence less supply of water to the users. The respondents indicated that government and other stakeholders should introduce water schemes to improve access to water. The responses from the households were that improved toilets like Urine-Diverting Dry toilets were the best. To achieve the Sustainable Development Goal number six, a multi-sectoral approach was key in solving the challenges of water supply and sanitation in enhancing opportunities in unplanned settlements.

Keywords: challenges, opportunities, unimproved sanitation, unplanned settlements, water supply.

DEDICATION

I dedicate this thesis to my husband Jonathan and my children David, Andrew and Ruth. They have been instrumental in my motivation to do this study.

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LIST OF ACRONYMS

ACRONYM	DESCRIPTION
7NDP	Seventh National Development Plan
8NDP	Eighth National Development Plan
AMCOW	African Ministers' Council on Water
CBOs	Community Based Organizations
CSO	Central Statistics Office
CU	Commercial Utilities
DFID	Department for International Development
EcoSan	Ecological Sanitation
ECZ	Environmental Council of Zambia
EHT	Environmental Health Technician
FAO	Food and Agriculture Organisation
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GLAAS	Global Analysis and Assessment of Sanitation and drinking-water
GRZ	Government of the Republic of Zambia
JMP	Joint Monitoring Program
LAs	Local Authorities
LCC	Lusaka City Council
LWSC	Lusaka Water and Sanitation Company
MLGRD	Ministry of Local Government and Rural Development
MoFNP	Ministry of Finance and National Planning
MWDS	Ministry of Water Development and Sanitation
NGO	Non-Governmental Organisation
NHC	Neighbourhood Health Committee
NWASCO	National Water and Sanitation Council

OECD	Organization for Economic Cooperation and Development
PCU	Programme Co-ordination Unit
PSP	Private Sector Partnership
RDCs	Residents Development Committees
SDG	Sustainable Development Goals
SODECI	Société de Distribution d'Eau de la Côte d'Ivoire
SWSC	Southern Water and Sanitation Company
UDDT	Urine-Diverting Dry Toilet
UN DESA	United Nations Department of Economic and Social Affairs
UN	United Nations
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VIP	Ventilated Improved Toilets
V-WASHE	Village WASHE Committees
WARMA	Water Resources Management Authority
WASHE	Water, Sanitation and Hygiene Education
WHO	World Health Organisation
WSP	Water and Sanitation Program
WSPIP	Water Sector Performance Improvement Project
WT	Water Trusts
WWG	Water Watch Group
ZDHS	Zambia Demographic Health Survey

CHAPTER ONE: INTRODUCTION

1.1 Introduction

This Chapter presents the background of the study, the statement of the problem and the purpose of the study. It also outlines the study objectives, study questions, significance of the study and limitation of the study. The chapter closed with key definitions of terms that will guide the study.

1.2 Background of the study

There are projected increases in the numbers of urban residents in the developing world over the next 20–30 years causing serious challenges in the years ahead (UN DESA, 2022). Water supply and sanitation are the public services affected by this scenario (Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), 2019). These services are necessary in household and municipal activities (FAO, 2008). Though continuity of water supply and sanitation is taken for granted in most developed countries, it is a severe problem in many developing countries (UN-Water, 2007).

In today's world of about eight billion people (United Nations, 2017), providing water and sanitation services is already a serious challenge, straining management systems and institutions. Water supply and sanitation in Zambia is characterized by poor levels of access and service quality. Further, the 2018 Zambia Demographic Health Survey (ZDHS) report shows that 36 percent (21 percent urban and 47 percent rural) of households had access to unimproved sanitation facilities while the 2013-14 ZDHS report shows that 55 percent (27 percent urban and 74 percent rural) of households had access to unimproved sanitation facilities (CSO, 2018). From the given information above, the situation has not improved in terms of water supply and improved sanitation for households especially in peri-urban areas which have similar characteristics to unplanned settlements.

In Africa, water shortages are related to both under-development of potentially available water resources and their uneven distribution. This is coupled with an unrelenting population growth rate of 3 percent per year which is a major factor in on-going water and sanitation problems (UNICEF, 2016). Water supply services in Zambia's peri-urban areas vary widely from one settlement to another even within the

same town. Water supply systems have been poorly maintained in most of Zambia's urban centers (Chitonge, 2011).

The Water supply and Sanitation Act No. 28 of the Zambian constitution states that all citizens have the right to sustainable, efficient water and sanitation services (GRZ, 1997). However, citizens especially in unplanned settlements continue to face serious challenges in accessing these services (WHO/UNICEF, 2017). According to some experts, it may be difficult to extend service infrastructure to these places since utilities may not have the required tools or technical capacity (Dos Santos et al., 2017; Pierce, 2017). Concerns about cost recovery also arise from the possibility that people living in informal settlements won't be able to afford to pay enough to cover the expenses of service investment (Pierce, 2017).

In order to address the challenges, government policies were devised while at the community level, water point committees have been put in place. However, these have not been achieved due to inadequate resources; implementation of policies has been slow, weak and approaches to community and private management models have not been adequately explored. Several studies on water and sanitation have been conducted in some parts of Zambia (Mwanza, 2001; Chitonge, 2011; Namafe, 2013), while some of these researches were done in rural areas of Monze (Shaw, 2012) but none was done in unplanned settlements of the town. Therefore, it is imperative to conduct a research on challenges and opportunities of water supply and sanitation provision in unplanned settlements of Monze in a bid to generate sufficient knowledge on how to improve the current problem.

1.3 Statement of the problem

Monze town lies in Southern Province of Zambia and is composed of both planned and unplanned settlements. The town has experienced an immense increase in unplanned residential development posing challenges in accessing water and sanitation services to the residents. It is anticipated that by 2030, Monze town would have 83,060 residents (CSO, 2022). In order to accommodate these additional homes, the urban area will need to grow by 142–297.5 hectares, causing Monze town to enlarge even further into the wards of Mayaba and Munungu (Monze Town Council, 2021). This situation has the potential to overwhelm and outgrow the water and sanitation infrastructure already in place. he constitution of Zambia safeguards

adequate access to water for all citizens as a basic human right. The reality, however, is far from the aspirations and entitlements of many dwellers particularly those in the unplanned settlements of Monze.

As stated in the Eighth National Development Plan (8NDP), access to water and sanitation services by all segments of the population is a key component of sustainable development (GRZ, 2022). The reality of provision is far from the entitlements of many people in unplanned settlements (GRZ, 2010; Simukonda et al., 2018). Besides, dilapidated pit latrines are the predominant form of toilets used by 80 percent of the population in slums (Chipungu et al., 2019). All these have far-reaching implications, in affecting residents' access to water and sanitation in the unplanned settlements of Monze. Among other measures, Southern Water and Sanitation Company (SWSC) has been providing informal settlements with water through kiosks. Unfortunately, most kiosks have broken down arising from vandalism, and lack of community participation. Vandalism of water facilities in informal settlements can occur due to limited access and inequality of water supply to the residents (Adams, 2019; Omarova et al. 2019). In order to address this challenge, there is need to raise awareness about the importance of water infrastructure and involve residents in maintenance and management.

Moreover, scholars have established opportunities of market-driven sanitation services in certain informal settlements and the promotion of commercial sustainability of utility companies (O'keef et al., 2015; Chimangeni, 2019). However, these opportunities sideline the users in unplanned settlements. Recent studies have concerned much with formal settlements in terms of water supply (Adams, 2019), social dynamics around shared sanitation (Chipungu et al., 2019), policy implementation (Greywoode, 2021), leaving issues like opportunities and challenges in unplanned settlements, a gap which this study intended to address.

1.4 Aim of the study

The aim of this study was to assess the challenges and opportunities of water supply and sanitation in unplanned settlements of Monze urban in Southern Province of Zambia.

1.5 Objectives of the Study

The following were the specific objectives that guided this study:

i. To assess access and quality of water supply and sanitation service provision in unplanned settlements;
ii. To establish the challenges and opportunities of water supply and sanitation in unplanned settlements of Monze; and
iii. To evaluate the effectiveness of the policy, legal and institutional frameworks implementation on water supply and sanitation services provision in unplanned settlements.

1.6 Research Questions

This study was guided by the following research questions:

i. How is the water supply and sanitation service provision in unplanned settlements of Monze Township?

ii. What challenges and opportunities of water supply and sanitation are there in unplanned settlements of Monze?

iii. How effective are the current policy, legal and institutional frameworks on water supply and sanitation services provision in unplanned settlements?

1.7 Significance of the Study

This study aimed at assessing the supply of water and sanitation services in unplanned settlements. The research also intended to study various challenges of water supply and sanitation such as inadqauate facilities, demographic pressures on water and sanitation management, process of urban supply and deterioration of infrastructure. Among others, the study also revealed the problem of inadequate water supply and sanitation in unplanned settlements. The possible opportunities to water supply and sanitation were also looked at. The study may offer a platform for the development of cost-effective, environmentally friendly, and hygienic sanitation solutions, such as composting toilets or container-based sanitation. Most importantly, community engagement in water management can be strengthened to foster sustainability and ownership. Implementing efficient water use practices and technologies to minimize

waste and optimize water supply is one potential opportunity to improve water supply and sanitation.

The provision and access to clean water and sanitation is instrumental for achieving various interconnected Sustainable Development Goals (SDGs), particularly SDG number 6 which ensures the availability and sustainable management of water and sanitation for all. Other SDGs that could be achieved by improved water supply and sanitation provision are those related to health (SDG 3) in where it reduces waterborne diseases, maternal mortality, and child mortality. The availability of quality water and sanitation provision would also help to achieve SDG 5 on improving women's and girls' health, education, and economic opportunities by reducing time spent on water collection.

Since inequalities have been noted in the provision of water supply and sanitation between people in formal settlements and those in unplanned settlements, this study helps bridge the gap between the two settlements in that it echoes for an equal focus to planning and the provision of safe water and sanitation. A multifaceted strategy is needed to close the service provision gap between planned and unplanned settlements. Decentralized energy, sanitation, and water treatment facilities appropriate for unplanned settlements could potentially be implemented to do this. Improved access to water and sanitation facilities for unplanned settlements can be achieved through creative finance strategies like impact investment, which assist service delivery.

The anticipated beneficiaries of this study are the community members, policy makers, planners, local authority personnel and utility companies. The study would offer data-driven insights for resource allocation and policy creation, as well as evidence-based planning for water and sanitation infrastructure, to the government and policy makers. Opportunities for business would be provided by NGOs and the private sector by identifying of areas for investment in water and sanitation infrastructure. Moreover, this research will also benefit the community in terms of clean and safe water and improved sanitation facilities services by utilities.

1.8 Theoretical framework

According to the theory of planning and building cities, urban planning is governed by social structure, level of development of productive forces, science and culture, natural and climatic conditions, and a country's national characteristics (Cao, 2013). This theory has been developed by planners based on theoretical schools of urban planning, such as de-urbanism (related to the late 19th Century concept of the garden city) and urbanism (the designs of Le Cor-busier, the leader of the school in the 19th Century). Urban planning encompasses a complex network of socioeconomic, civil engineering, architectural and decorative, water and sanitation problems. The general rule for pre-socialist urban planning involved to some degree the influence of private ownership of real estate and land.

The inequality of property distribution was reflected in the methods of planning and construction in the organization of public services of urban territory (Rohani and Ma, 2018). Ruling-class residential areas, created on the basis of the best contemporary urban planning achievements were drastically different from the overcrowded working-class areas and unplanned settlements, which lacked essential public services such as water and sanitation (UN-Habitat, 2016). Furthermore, in both rural and urban settings, access to better water and sanitation is concentrated among wealthier households and rises with increasing wealth quintile (Mulenga, et al., 2017). These inequalities have been noted in the study area where the residents face challenges in accessing water and sanitation services. rIn order to reduce inequalities in service provision, the government and other stakeholders must intervene and either provide the facilities or subsidize their provision in order to increase access to better water and sanitation.

The theory and practice of urban planning accomplishes two tasks: the reconstruction and development of old cities and the construction of new cities. It proposes zoning of urban territory to be carried out in order to create the most beneficial living conditions for the population and to facilitate the functioning of the city as a whole (Faludi, 2012). Urban planning decisions should be made with due regard for the development of industrial, residential, and recreation areas and for satisfying the requirements of sanitary engineering for example in water and sanitation (Friedmann, 2003).

Moreover, policymakers can utilize urban planning theories to enhance water and sanitation services in unplanned communities by creating plans accordingly. The theories would also support phased development, which would allow for both long-term growth planning and immediate demands to be met. These modified theories of urban planning can aid in addressing the particular difficulties associated with unplanned settlements, encourage community involvement, and enhance quality of life (Pojani, 2019). Most importantly, the urban theory shows how the challenges of water supply and sanitation will be tackled basing on the theory of planning and building cities. There exist an unplanned residential developments that lack adequate water supply and sanitation. This calls for adequate provision of water and sanitation in Monze through urban planning.

The tragedy of the commons theory served as the other theoretical framework for this study. One of the theory's proponents, Hardin, contended that the world's natural resources are limited and can only sustain a finite population. People will misuse their privilege to utilize resources if they are available without paying for them, which will eventually lead to the depletion of the resources. From the standpoint of environmental sustainability, the tragedy of the commons will ultimately lead to the depletion of all natural resources on Earth because there is no strict control mechanism in place to manage resource consumption (Ostrom, 2008).

The safety of people and ecosystems is at risk when there is insufficient water, either in terms of quality or quantity. Comprehensive institutional frameworks that regulate the various levels of elements causing water insecurity are necessary to reduce this risk. The tragedy of the commons thesis focuses on implementing coercive regulatory schemes to meet the demands of water users from the perspective of water security (Anabo, 2013). This remedy implies that one of the main causes of the water resources tragedy is the absence of coercive regulatory tools for managing water demand. According to Ashutosh and William (2019), water sustainability can be improved by tackling water overexploitation through extensive institutional structures. Since regulatory rules might not be sufficient to effect change, it is imperative that such systems be implemented inclusively and thoroughly.

Furthermore, privatization or state control of natural resources is Hardin's answer to the tragedy of the commons, as the "owner" will safeguard the resources for the good

of all. Ostrom (2008) contends, however, that stakeholders and institutional arrangements have the capacity and motivation to cooperate in order to regulate and oversee the use of natural resources. In unplanned settlements, there is need to organise and coordinate the people to manage the water supply and sanitation provision in a sustainable manner. Additionally, the idea of the Common Pool Resources (CPR) self-governing method was developed in an effort to address the misuse of water resources. The fundamental tenet of the CPR, according to Anabo (2013), is that various stakeholders have a stake in the efficient management of natural resources and will cooperate to do so.

Another foundation for this study was Maslow's Hierarchy of Needs. This idea holds that people can achieve a state of self-development and advance society at the same time when demands are continuously met (Robert and Jennifer, 2013). The demands are categorized into five hierarchical groups that advance from lower level demands to higher level wants: basic demand, safety demand, social demand, esteem demand, and self-actualization demand. The next higher level need takes over as the primary driver of human activity once the lower level demands have been met. During this process, a person's motivation is fully activated, and they will continuously engage in practical, goal-oriented activities and endeavors to satisfy the stated need.

Maslow's Hierarchy of Needs theory reflects the common laws among human behavior and psychological activities. In general, this pattern is consistent with the demand-related developmental rules (Hou et al., 2014). Based on Maslow's hierarchy of needs, this study evaluated the availability of sanitation and water services in informal settlements and examined how well they met the needs of the local population. This will therefore persuade accountable authorities to take unplanned settlements into account when allocating, planning, and managing water and sanitation resources.

Other scholars have reflected on models of policy making and implementation in water and sanitation provision. According to Brynard (2007), the state places a strong focus on regulatory compliance and achieving its intended outcomes when using the top-down policymaking model. To provide a grassroots viewpoint to government processes, some scholars have rejected the top-down model and chosen the bottom-up strategy instead (Ashipala and Armitage, 2011; Taing et al., 2014). Municipalities

were cited, for example, for failing to comply with federal laws and policies, mismanaging their affairs, or misinterpreting them (Schaub-Jones, 2010). This study took into consideration the interplay between actors (consumers and utilities) and evaluate the effectiveness of policy, institutions and legal frameworks on water supply and sanitation services provision in unplanned settlements. This study evaluated the efficacy of institutions, policies, and legal frameworks on the provision of sanitation services and water supply in unplanned settlements, taking into account the interactions between consumers and utilities.

1.9 Scope of the study

The study dealt with assessing the water supply and sanitation challenges and opportunities in unplanned settlements of Monze urban unplanned settlements of Freedom A, Freedom B and Zambia Compound within Monze town as well as strategies and suggestions for improvement.

1.10 Operational Definitions

Sanitation: the maintenance of hygienic conditions, through services such as garbage collection and wastewater disposal. It focuses on management of waste produced by human activities (WHO, 2018).

Infrastructure: the basic physical systems of a place and includes transportation, communication, sewage, water and electric systems (Miller, 2021).

Unplanned settlements: any uncoordinated settlement on land without reference to any predetermined standards of planning (Gredelj, 2015).

Water supply: refers to the water available to a community (Taljaard, 2015).

Improved toilet: Facilities that hygienically separate human waste and human contact apart. These include flush or pour-flush to piped sewer system, septic tank pit latrines,

ventilated-improved pit latrines, or pit latrines with slab or composting toilets (WHO/UNICEF, 2017a).

Unimproved toilet: facilities used by the public or shared not regarded as improved. Additionally, bucket latrines, hanging latrines, open defecation, pit latrines without slabs or open pits, flush or pour-flush to another location (WHO/UNICEF, 2017a).

1.11 Layout of the thesis

This thesis comprises six chapters as follows:

Chapter 1 – Introduction: Focuses on the background of the study, the statement of the problem and the purpose of the study. It also outlines the research objectives, research questions, significance of the study and theoretical framework. The chapter closes with definitions of terms.

Chapter 2 – Literature Review: Presents a detailed review of literature according to subsections of the research objectives. This chapter reviews numerous works done by scholars and researchers which are directly related to this research work. The literature review also brings out research gaps relevant to the study.

Chapter 3 – Research Methodology: describes the research design, the study sample, and the tools and procedures that were used. It also explains how data was collected and analyzed; the validity and reliability of the research instruments and ethical considerations.

Chapter 4 – Results: This chapter presents the findings of the study in line with the outlined objectives.

Chapter 5 – Discussion: Presents the discussions of the findings of the study. The discussion is done according to the main themes of the study.

Chapter 6 – Conclusions and Recommendations: The chapter presents general conclusions of the study in line with the research objectives. The chapter finally presents recommendations and suggestions for future research.

1.12 Chapter summary

This chapter focused on the background to the study, the statement of the problem and the purpose of the study. It has outlined the study objectives, study questions, significance of the study and definitions of key terms. The next chapter presents the literature review.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter reviews some of the numerous works done by scholars and researchers which are directly related to this research work. The literature was reviewed according to research objectives.

2.2 Water supply and Sanitation-A global perspective

Unplanned settlements often lack adequate water and sanitation infrastructure (UN-Habitat, 2016). In these cases, residents rely on a combination of market solutions to fulfill their basic water and sanitation needs (Pierce, 2017). These small-scale providers are generally unregulated and their operations may be illegal (Subbaramanetal, 2013). The resulting access may not be adequately safe, reliable, affordable, or dignified. Besides, residents of unplanned settlements rely on shared infrastructure. For instance, the number of households using a block of toilets or a stand pipe can vary widely with consequences (Corburn and Karanja, 2016).

Where sanitation facilities exist, excreta may not be properly managed by separating it from human contact and treating it in a suitable facility. In a study of 12 low- and middle-income cities, 98 percent of households used toilets, but only 29 percent of faecal waste was safely managed (Blackett et al. 2014). Pit latrines are perhaps the most common form of sanitation in informal settlements, but space limitations, among other factors, create barriers to latrine replacement as well as to safe and hygienic pit-emptying (Chipeta et al. 2017).

The 2010 United Nations report on the state of water and sanitation in the world's cities found that water distribution systems in many cities in the developing world are inadequate, typically serving the city's upper- and middle-class neighborhoods but not rapidly expanding settlements on the urban fringe (UN-HABITAT, 2010). The large projected increases in the numbers of urban residents in the developing world over the next 20–30 years implies that municipal authorities responsible for these sectors face very serious challenges in the years ahead (UN DESA, 2022). Improving public sanitation is another major urban environmental challenge that needs to be immediately addressed in virtually all cities in the developing world. Using this

criteria, the United Nations estimated that in Africa about 150 million urban residents representing 50 percent of the urban population do not have adequate water supplies, while 180 million, or roughly 60 percent of people in urban areas lack adequate sanitation (UN-HABITAT, 2014).

According to Cohen (2006), over the last 20 years, many urban areas have experienced dramatic growth, as a result of rapid population growth and as the world's economy have been transformed by a combination of rapid technological and political change. Given that cities serve as major centres for both production and consumption in the global economy, the fast rate of urban expansion is severely outpacing most cities' ability to offer appropriate services to their residents (Farrell, 2018). According to GIZ (2019), the coverage of water supply and sanitation in Africa is the lowest as compared to other regions in the world. Records from Kenya indicate that only 27 percent of the urban populations and 32 percent of the rural population in Kenya had access to private and improved sanitation (UNICEF/WHO, 2013). In the urban setting 51 percent of the populations shared pit latrines while in the rural setting open defecation was still practiced by 18 percent of the population (AMCOW and WSP, 2010).

2.3 Water Supply and Sanitation- A local perspective

Zambia is faced with two challenges regarding provision of water and sanitation services to the urban areas, the first being meeting the high demand for clean, safe and portable water and the second being providing adequate and decent sanitation facilities (Hubbard et al. 2020). Access to adequate water and sanitation for most Zambians is still a challenge as the coverage is still low especially in unplanned settlements. At the national level, the percentage of people who could obtain water services by 2002 was 64 percent, 88 percent for urban areas, and 48 percent for rural areas (GRZ, 2005). The existence of these problems and the inertia in solving them could have been the concern of the United Kingdom's Department for International Development (DFID), which was working in Zambia in 2012 to support the Zambian government to improve its systems and skills, use its resources to deliver better services, beat corruption, and increase transparency and accountability to its citizens (DFID, 2012).

The demand for water and sanitation services has surpassed the supply hence putting a strain on service providers. At least 56 percent of the population in unplanned

settlements has no access to safe water supply while 90 percent have no access to proper sanitation services (Hopewell and Graham, 2014). However, in trying to meet this demand, the utility firms and local authorities continue to face shortfalls. A study by Siyeni (2008) on service provision of water and sanitation to peri-urban areas of Lusaka by the utility and small-scale providers revealed that the municipalities and councils lacked the resources and the management skills to operate and maintain the water and sewerage systems resulting in continuous deterioration in the infrastructure.

The trend of water supply in unplanned settlements is that extensions of water are distributed mainly through kiosks and community taps while stand-alone boreholes specifically supply unplanned settlements (Corburn and Karanja, 2016). Other areas are supplied by the community managed water schemes called Water Trusts (WT) who mostly supply through kiosks. However, the standards of water in terms of water quality, price of water and pressure at taps are minimal (Omer, 2020).

Siyeni (2008) also found the utility companies were managing in areas where there is already a service while struggling to extend the services to unplanned settlements. This scenario coincides with the findings in the study carried out by Mitlin and Walnycki (2020) where it was found that the services provided by most providers' favour those who are already connected but fail to increase coverage to cater for the unserved. The major factor alluded to the inadequate coverage by the utility is the failure to cope with the increasing population and lack of financial capacity to extend the service (Salehi, 2022).

Scholars have stated that population growth and urbanization in urban centers cause many service provision problems (Chitonge, 2011). These are amplified by poor governance aspects of land allocation that promote the mushrooming of peri-urban areas. For instance, more than 60 percent of the population of Lusaka resides in areas that were constructed by residents illegally because of the failure of the formal land delivery practices (Simukonda et al. 2018).

2.4 Status of Water Resources in Zambia

Zambia is situated on a high plateau with major relief features found where river valleys and rifted troughs dissect its surface. The country experiences an average mean annual rainfall of 1,020 mm with variations from the south to north (WMO, 2020).

The flow of river waters experiences seasonal variations with high peaks between the rainy season and the lowest flows being experienced between in summer (Tumbare and ZRA, 2004). The country's surface water is mainly found in the Zambezi and Congo River Basins (Figure 2.1). Although there is plenty of water resources, consistent dry spells and floods, hydrological changes and occasional water deficiencies, intensified by developing water shortages seriously affect access to water in the both urban and rural areas.

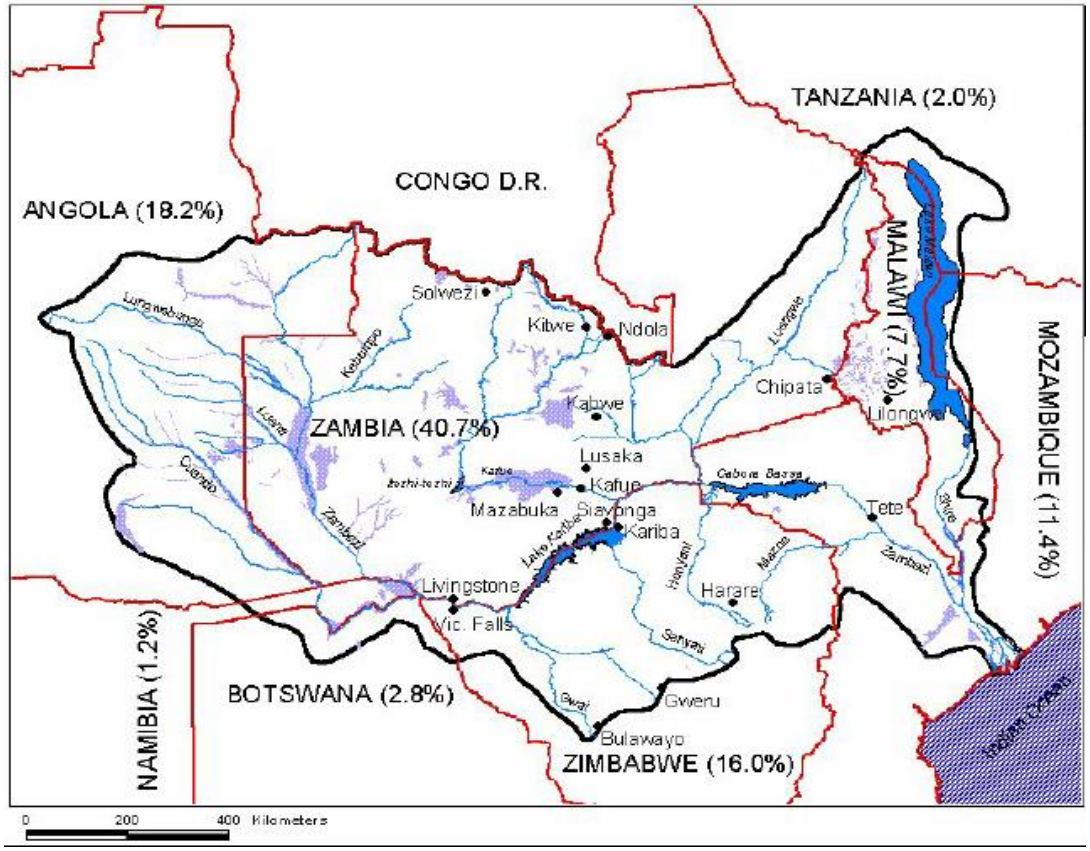

Figure 2.1: Zambezi and Congo River Basins (source: Tumbare and ZRA, 2004).

It has long been believed in Zambia that the country has an abundance of water resources. It is said that there is enough water to meet national demand even in a drought year (GRZ, 2010). However, water resource depletion has affected water supply since 2013 (Simukonda et al., 2018). This, coupled with the low water levels in key hydropower production reservoirs in 2015, has changed the perception. The need to manage water resources has become clear but many factors make it difficult. It is known, for instance, that land use practices contribute significantly to hydrologic regime changes, land covered with forests helping to sustain stream base flows (Mishra et al., 2007). In Zambia, deforestation for settlement, agriculture and energy

(charcoal) is rampart, and contributes to the reduction of both surface- and ground-water quantity and quality. Due to illegal land allocations, many water supply facilities have also been encroached (Ndongwe, 2013), and the Zambian government is trying hard to address the problem although the process is very slow. This is demonstrated, for instance, by location of the economic facility zone in south-eastern Lusaka (local forest No. 27), an area known to be a recharge zone for the Lusaka aquifer (Bäumle and Nkhoma, 2008; International Water Stewardship Programme, 2016).

2.5 Water supply and sanitation service provision in unplanned settlements

The better social and economic amenities taking place in towns has led to overpopulated areas with increasing demand for water and sanitation services. The growth of the population in urban areas has in turn posed challenges on local authorities to plan how people can be settled. Consequently, unplanned settlements in cities have mushroomed without right or legal land titles (Njoh, 2017). According to Marx (2015), residents in these settlements claim land not through legal rights but through negotiations and political connections. However, some residents with no land documentation have occupancy certificates (Sommerville et al., 2017).

Peri-urban areas in Zambia, like in many developing countries, lack water supply and sanitary facilities (GRZ, 2017) because utilities or governments are unwilling to provide services in them (Chitonge, 2011). Moreover, because there is no order in the alignment of plots and structures, service provision is difficult (LCC/ECZ, 2008). Due to lack of waste disposal facilities, peri-urban areas also contribute heavily to both ground- and surface- water resource contamination (GRZ, 2011; International Water Stewardship Programme, 2016).

Due to the rise in urban population and the economic growth experienced in urban areas, the demand for quality water and sanitation has continued to rise. Accelerating urbanization will continue to widen the gap between the demand for water and available supply especially in urban areas, and disproportionately affect unplanned settlements, where the majority of urban population resides (Dos Santos et al., 2017). Muller (2016) has stressed that poor quality water resources in urban areas is due to poor sanitation, lack of water treatment facilities, as well as mismanagement. This situation will affect unplanned settlements where the majority of people dwell.

2.6 Availability of skilled manpower in the water supply and sanitation sector

The sixth goal of the SDGs guarantees that everyone has access to and can sustainably manage water and sanitation systems (UN, 2015). Therefore, the placement of professional and competent manpower for efficient water supply and sanitation services delivery is indispensable to the attainment of the SDGs. Without adequate measures to select, train, and effectively manage skilled labour to provide water supply and sanitation services, government resources and stakeholder support can have little effect. It has been evidenced that poor workmanship in water and sanitation sector frustrates the efforts of governments and the international community in the achievement of the SDGs on water and supply provision (Weststrate et al., 2019).

Accoriding to Obeng and Filho, (2010) it was established that the manpower structure of the sanitation sector shows deficiencies at all levels of political administration. In the Democratic Republic of Congo, there is a lack of well-trained managers and skilled professionals in the water and sanitation sector who can reliably perform management and technical tasks (GIZ, 2016). According to UNICEF (2019), limited human resource capacity in urban water engineering and financing affects service delivery. Therefore, there was need to ensure that experienced staff are rightly placed to delivering the appropriate interventions in water and sanitation (UNICEF, 2021) . This is in line with efforts to increase the staff's ability of local service providers through specialized training on maintenance, cost-recovery, and consumer interaction issues (World Bank, 2015).

2.7 Consumer's unwillingness to pay water bills

In Zambia, utility firms are affected by consumer's unwillingness to pay water bills, which contributes to the self-reinforcing intermittence mechanism (GRZ, 2010). Stallard (2004) further explains that for cost recovery to be achieved the tariff has to be sufficient to facilitate long term economic sustainability. In the long term the revenue collected should be able to cater for maintenance and replacement of the assets. For the water and sanitation delivery to be sustainable the consumers should be provided with the services they want and willing to pay for and the management of these activities should take place at the lowest appropriate level (Zvobgo, 2021). The ability of the utility to continue providing water and sanitation services over a long

period of time is combination of managerial, social, financial and technical issues and the capacities of the institutions and infrastructure designed to support the community (Tessema, 2020)

The failure by the water utility to meet the demand in the provision of water and sanitation to the local areas has greatly affected the aspect of the cost recovery. The erratic water supply was attributed to the unwillingness to pay on the side of the consumers (Chimangeni, 2019). Without finances the provider will not be able to maintain the system adequately, quality of services deteriorates, finally the system collapses, people drink unsafe water or pay more to vendors while the rich receive more water at subsidized rates (Savenije and van der Zaag, 2000). This notion is further expressed by Cardone and Fonseca (2003) who emphasizes that without cost recovery, a financially crippled utility will be unable to provide funds to be used in the expansion of the network in the peri-urban areas or to maintain the existing services adequately. Where cost recovery is not fully achieved water is wasted, utility fails to maintain the infrastructure and this poses health risks for the community as they resort to drawing water from unsafe sources thereby being affected by the outbreak of diarrhea diseases.

2.8 Effectiveness of policy, legal and institutional frameworks on water supply and sanitation services provision in unplanned settlements

According to the WHO/JMP (2017) more than 2.1 billion people worldwide face a challenge of lack of clean water and sanitation facilities. In attempting to resolve these challenges, governments have put in place legal and policy frameworks that would govern the water and sanitation service delivery. The Organization for Economic Cooperation and Development (OECD) has defined water governance as the range of political, institutional, and administrative laws and procedures that influence decision-making, allow stakeholders to express their interests and concerns, and hold decision-makers accountable for water management (OECD, 2015).

2.8.1 Policy frameworks and strategies on water supply and sanitation services in Zambia

The World Health Organization, (2018) defines policies as mechanisms that provide the basis for programmes or services. Policies are considered critical for creating an

enabling environment for improving the supply of water and access to sanitation services (Ekane et al., 2016).

The success of the water sector has been as a result of a well organised policy framework. From that basis, the World Health Organisation (2019) conducted case studies on water and sanitation policy and planning frameworks in some countries including Zambia. A model for policy frameworks was devised as depicted in Figure 2.2

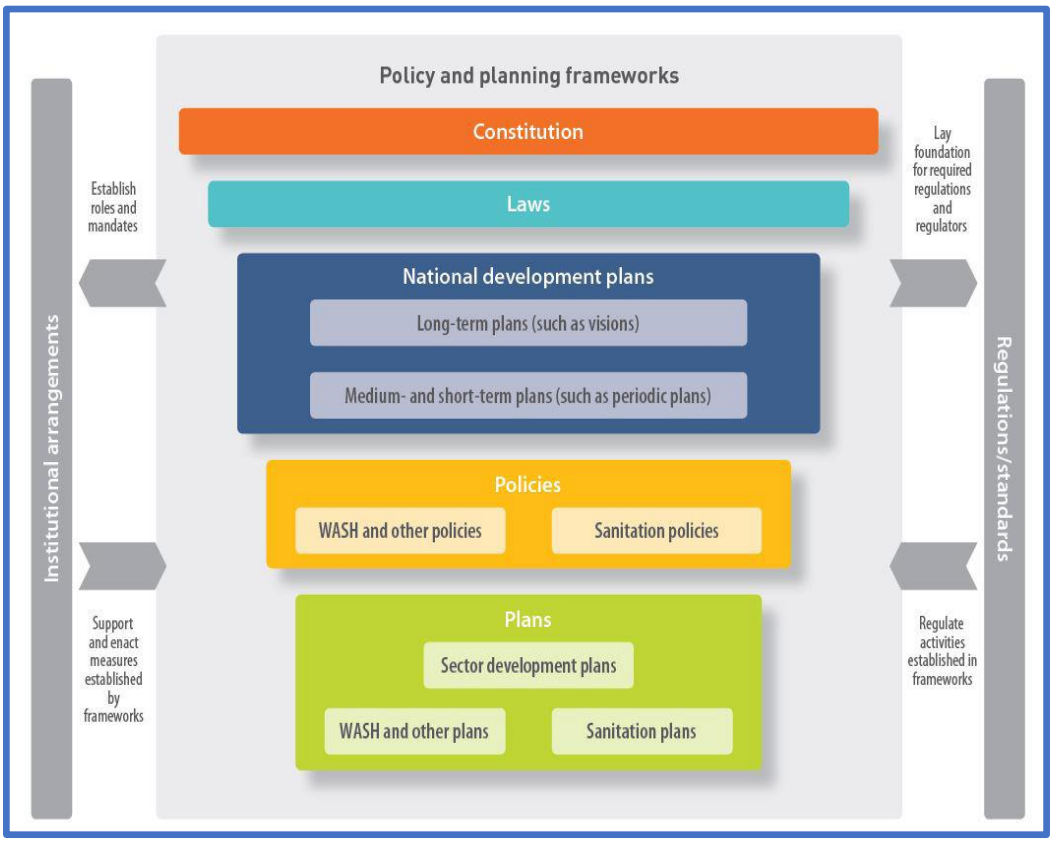

Figure 1.2: Water and sanitation policy framework (Source: WHO, 2019).

The above framework provides guidance to policy-makers on how to develop effective water and sanitation policies. The guidelines were created in light of the fact that water and sanitation programmes have not been achieving anticipated objectives (WHO, 2019).

2.8.1.1 The 1994 Water Policy

The realisation of the importance of water in social economic development prompted the government to come up with National Water Policy whose emphasis was on water resources management, water use and private enterprise participation in the event of

the liberalisation (GRZ, 1994). The goal of the policy was to support the development of sustainable water resources to enable the equitable distribution of sufficient quantities and quality of water for all consumers at an affordable cost (GRZ, 1994). In order to implement the policy, government embarked on an institutional and legislative framework for the efficient management of water resources as well as taking a holistic approach to water management.

2.8.1.2 The 2010 Water Policy

The implementation of the 1994 water policy faced some setbacks that due to the growth of urban population, the country had challenges with managing and developing their water resources to keep up with rising needs. Therefore, the Zambian government established the 2010 National Water Policy to improve the management of water resources and sanitation services (GRZ, 2010). Throughout the policy, sanitation is approached through the lens of household uses of water. However, Uhlendahl et al., (2011) registered their concerns that the policy would not be tenable because of lack of human and financial support. Through Integrated Water Resource Management (IWRM), the policy implementers were required to create a legal, institutional, and regulatory framework (GRZ, 2010). Additionally, policies were established to encourage the delivery of affordable water supply and sanitation services while taking environmental protection into consideration.

2.8.1.3 National Water Supply and Sanitation Policy of 2020

In order to hasten universal access to clean, safe water and sufficient sanitation in Zambia, the National Water Supply and Sanitation Policy was created (GRZ, 2020). This policy was established to achieve the sustainable development goals, specifically goal number 6. The vision of the National Water Supply and Sanitation Policy is to provide sustainable and equitable access to clean water, proper sanitization, and better services for all citizens of the nation (GRZ, 2020). Additionally, the policy encourages the sustainable implementation of measures related to water supply and sanitation. Unlike the 1994 water policy, the 2020 document specified the institutional framework covering the roles and interrelationships of all stakeholders key players in order to improve water security and sanitation provision (GRZ, 2020). It was also clearly voiced that financial resources were to be mobilised so as to scale up service delivery.

2.8.1.4 National Development Plans (7NDP & 8NDP)

The national development plans have been the cornerstones for achieving access to water and sanitation for the general populace. The 7th National Development Plan (7NDP) 2017 – 2021 in its third objective provides for the achievement of improved access to water supply and sanitation (GRZ, 2017). Following this plan, the proportion of people with access to improved water supply and sanitation rose to 72.3 percent and 54.4 percent in 2018 respectively (GRZ, 2022). With the implementation of the Eighth National Development Plan (8NDP), the Government aims to improve access to improved sanitation from 77.7 percent in 2018 to 90 percent in 2026, while increasing access to clean and safe water from 91.8 percent in 2018 to 98 percent by 2026 for urban areas (GRZ, 2022). These developments can be reached through maintenance of water supply infrastructure, strengthening sewerage and solid waste management.

2.8.1.5 Vision 2030

The Vision 2030 is the country's long-term plan which expresses the aspirations of the Zambian people to be accomplished by the year 2030. According to GRZ (2006), it was pronounced that the Vision 2030 would help the country to achieve access to water and sanitation at 90 percent by 2030 in both urban and unplanned settlements. By strategically allocating domestic revenue to enhancing access to clean water and renovating sewer treatment systems in all urban towns, the government hopes to attain this goal (GRZ, 2016). The end result will be that everyone, in both urban and rural areas, will have access to water sources and better sanitation facilities.

2.8.2 Legal frameworks on water supply and sanitation services in Zambia

According to the 2010 national water policy, the supply of water and sanitation provision is to be complemented by several pieces of legislature (GRZ, 2010). These are summarized below.

2.8.2.1 The Water Act of 1948

The water Act of 1948 states that the ownership of all water resources is vested in the President of Zambia. The Act was put in place to control the use of all surface water resources in the country by allocating water rights to different users. The Act also

clearly distinguishes between primary, secondary, and tertiary uses of water as well as between public and private sources of water (GRZ, 1994).

2.8.2.2 The National Water Supply and Sanitation Act No. 28 of 1997

The National Water Supply and Sanitation Act No. 28 of 1997 is the primary piece of legislation governing sanitation in Zambia. The statute designated NWASCO as the supervisory body for Zambia's water supply and sanitation laws in both urban and rural settings. In order for municipal authorities to be able to provide water supply and sanitation services within their respective jurisdictions, the act establishes NWASCO and outlines its duties in addition to establishing water supply and sanitation utilities as commercial enterprises (GRZ, 1997).

The implementation of the 1997 Water Act faced some challenges. According to the Global Analysis and Assessment of Sanitation and drinking-water (GLAAS) (2018), government failed to offer a well-managed and organized water supply to the majority of the nation; as a result, water crises continue to loom in urban and peri-urban areas. It has been stipulated in the Act that a utility shall build and maintain facilities within its service area to the customer's property boundary (GRZ, 2011).

2.8.2.3 The Local Government Act Cap 281

In 1991, government enacted the Local Government Act Cap 281. In line with the constitution, this piece of legislation gives local authorities the responsibilities for providing water and sanitation services with support from government grants (GRZ, 1991). Consequently, local authorities were able to establish commercial utilities (CUs) were established to offer services. However, the local authorities have a very poor service history, and their levels of coverage are actually dropping (United States Agency for International Development (USAID, 2008).

2.8.2.4 The Environmental Management Act No.12 of 2011

The Environmental Management Act No.12 of 2011 was passed to regulate wastewater. The Act also mandated local authorities to treat or modify waste effluents so as to comply with prescribed standards (GRZ, 2011). The Implementation of this Act has been slow as evidenced by Sambo et al. (2020) because the role of local authorities has been reduced to waste collection and disposal to dump sites.

2.8.2.5 Resources Management Act No. 21 of 2011The Water

The Water Act of 1949 was repealed and replaced with the Water Resources Management Act No. 21 of 2011. The Water Resources Management Authority (WARMA) was created, and its responsibilities were outlined. The Act also addresses how the water supply and its ecosystems should be managed, developed, conserved, protected, and preserved (GRZ, 2011). Further it guarantees that the vulnerable and underprivileged citizens have access to a sufficient supply of water without cost.

2.8.3 Roles and responsibilities of institutions in water supply and sanitation services in Zambia.

An organized institutional framework is important because it is within it that water utilities can develop strategies and plans to provide better services for the expanding urban population, which usually includes unplanned settlements. These frameworks are important in creating enabling environments to promote the supply of water and delivery of quality sanitation.

2.8.3.1 Programme Co-ordination Unit (PCU)

The institutional frameworks on the water sector reform in Zambia started in 1993 under the auspice of the Programme Co-ordination Unit (PCU), an inter-ministerial committee made up to make recommendations on the reorganisation of the water supply and sanitation sector. In order to restructure the water sector, the PCU was therefore guided by some of the principles of: separation of water resources functions from water supply and sanitation; devolution of authority to local authorities and private sector and achievement of full cost recovery for the water supply and sanitation services in the long run through collection of user charges (MOFNP, 2006).

2.8.3.2 The National Water and Sanitation Council (NWASCO)

After the achievement of the set objectives the PCU was then transformed into a statutory body now called the National Water and Sanitation Council (NWASCO) which also happens to be the regulator of water and sanitation provision in the country (NWASCO, 2006). As an independent regulator, NWASCO's primary responsibilities are the regulation of water and sanitation services providers through licensing, tariff setting and inspections. Figure 2.3 depicts a summary of NWASCO functions.

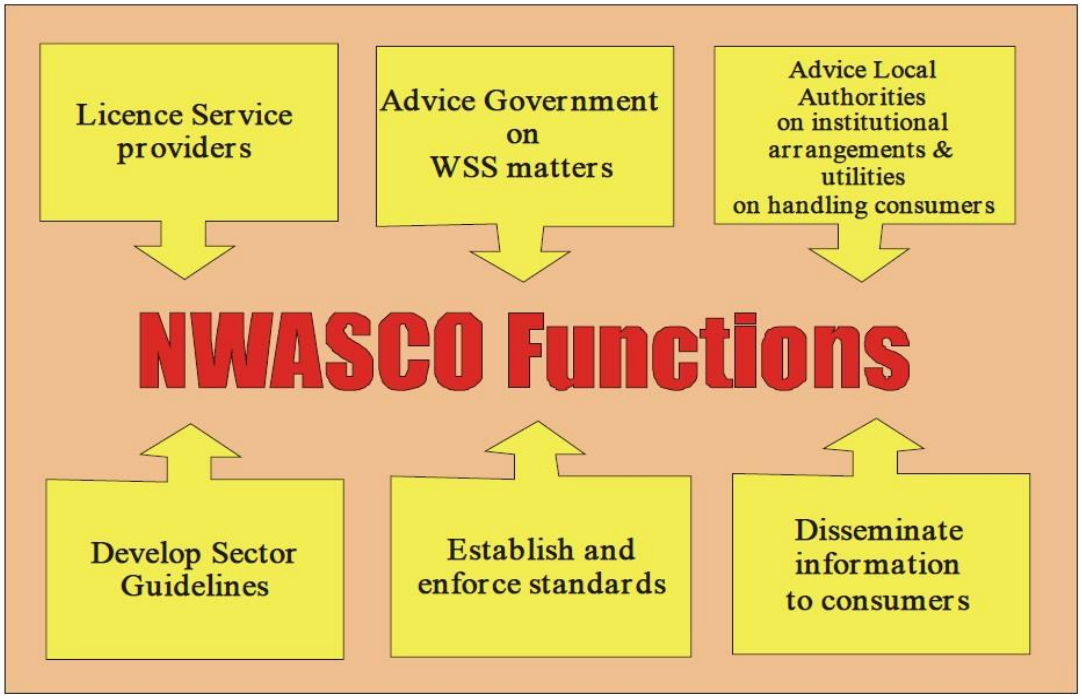

Figure 2.3: Summary of NWASCO functions. (Source: NWASCO, 2010).

2.8.3.3 Ministry of Water Development and Sanitation

The Ministry of Water Development and Sanitation was formerly known as the Ministry of Water Development, Sanitation and Environmental Protection. The Ministry's responsibility is to offer policy direction for the water industry. It is accountable for the creation and management of water resources, as well as for ensuring everyone has access to clean water and adequate sanitation.

2.8.3.4 The Zambia Environmental Management Agency (ZEMA)

The Zambia Environmental Management Agency (ZEMA) is another institution which plays a key role in the water and sanitation sector. Under the Environmental Management Act of 2011, the agency promotes monitoring initiatives in accordance with norms and guidelines for water quality (GRZ, 2011).

2.8.3.5 Local Authorities

As discussed in section 2.8.2.3, the local authorities are obliged to provide water supply and sanitation services within the district boundaries. In partnership with local authorities, the management of water and sanitation in peri-urban areas are carried out by Residents Development Committees (RDCs), which establish Community Based Organizations (CBOs) (Resnick et al., 2019). In rural areas, the government co-

ordinates a multi-sectoral approach in the planning and implementation of water projects through committees known as District Water, Sanitation and Hygiene Education (D-WASHE) Committee. This trickles down to the village level in Village Water, Sanitation and Hygiene Education Committees (V-WASHE) where communities get involved in the implementation and maintenance of the water projects and facilities.

2.8.3.6 The Water Resources Management Authority (WARMA)

The Water Resources Management Authority was created in 2011. The Authority is in charge of fostering a multisectoral, integrated, and participatory approach to the management of water resources. According to the Water Resources Management Act No. 21 of 2011, the Authority's primary responsibilities are to locate and safeguard possible sources of freshwater supply, conserve, preserve, and protect the environment, and consider climate change and its difficulties (GRZ, 2011). Additionally, it establishes rules and principles for use in a catchment's management and development of its water resources.

2.8.3.7 The international community and NGOs

The international community has also been very supportive in the financing and technical support to Zambia's water and sanitation sector. The institutions like the DFID and World Bank through direct funding and technical help, have covered more than 90 percent of the overall expenditures of all significant programs during the last ten years (DFID, 2011). Besides, there are a number of NGOs involved in both the water supply, sanitation and hygiene provision services. Figure 2.4 depicts a summary of roles of different instititutions in water and sanitation sector.

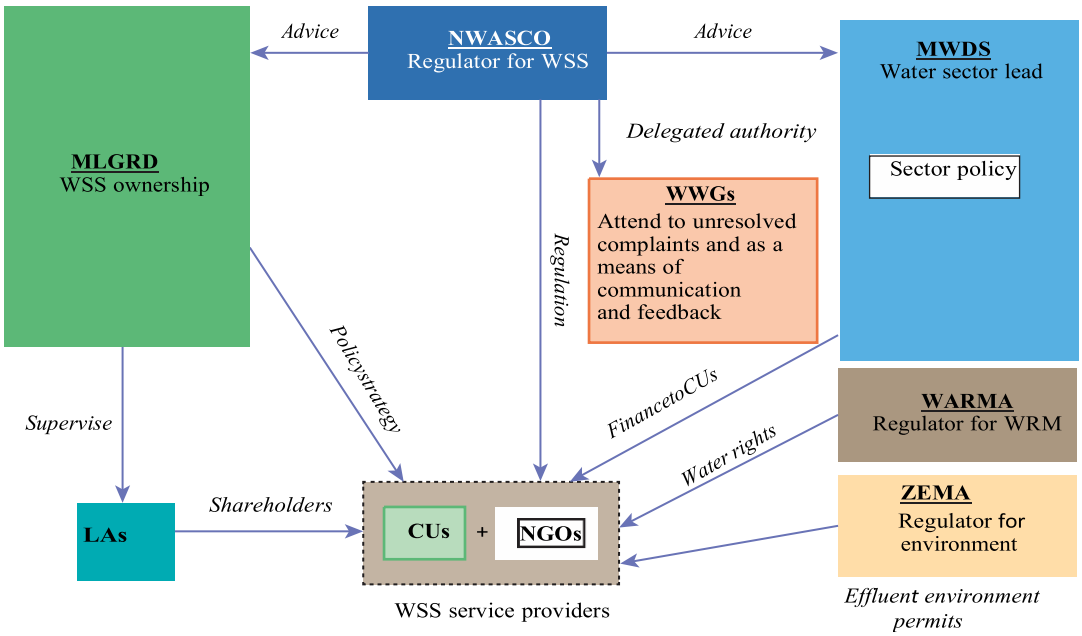

Figure 2:4: Summary of institutions in water and sanitation. (Source: World Bank, 2020).

2.9 Opportunities of water supply and sanitation in unplanned settlements.

Many communities in developing countries lack better access to water supply and sanitation (Weststrate et al., 2019). With several challenges that affect the service provision, the opportunities can still be enhanced to provide quality water and sanitation.

2.9.1 Market-driven sanitation services

In order to benefit from the water and sanitation services, business houses have endeavoured to improve water and sanitation service delivery in local communities leading to opportunities and prospects from the national to the community level (Okeyo, 2021). Regional and local studies have provided various supporting arguments towards these opportunities. A study in Nairobi, Kenya by O'keefe et al. (2015) on opportunities and limits to market-driven sanitation services established a new market-based approach in certain informal settlements in Nairobi, developed by a social enterprise, Sanergy, which is responsible for the construction of facilities and the collection and treatment of wastes. The system improves user satisfaction, community wellbeing and environmental quality, pointing to a clear opportunity for

such market-based interventions where a customer base already pays for sub-standard services.

However, the challenge for the Nairobi approach is to scale up the system to different areas and sell more toilets to different market segments. A report by Northover et al., (2014) highlighted that none of these new initiatives was profitable. This requires the creation of dedicated pro-poor providers that have a clear institutional mandate and resources to increase access for low-income residents (Dagdeviren and Robertson, 2011). Besides, the development of pro-poor units that serve people in informal settlements requires significant political will as these are not the most profitable markets to enter (Adams et al., 2019).

2.9.2 Commercial sustainability of Utilities

In order to effectively increase quality service delivery, the CUs must overcome significant obstacles including operational inefficiencies and scarce financial resources such as non-revenue monitoring. The Government of the Republic of Zambia (GRZ) has carried out a number of reforms over time in an effort to boost financial investment and the performance of the WSS sector (USAID WASH-FIN, 2020). These initiatives have had varying degrees of success, though, as the majority of CUs continue to perform poorly operationally and have not been able to get sizable outside investment. Chimangeni (2019) established that the best opportunities of addressing these challenges can come through the promotion of commercial sustainability of Commercial Utility companies (CUs). This will lead to utility companies being able to get enough revenue equivalent to the amount of water that is produced. Consequently, some CUs have embarked upon the provision of water trusts and water kiosks in compounds. For instance, Kayaga and Franceys (2004) observed that the Lusaka Water and Sanitation Company (LWSC) was providing services in some areas. However, the services were below par and little progress has been scored especially in terms of water availability and distribution especially in unplanned settlements (Dos Santos et al., 2017).

2.9.3 Private Sector Partnership (PSP)

One way of improving access and service to the poor is through Private Sector Partnership (PSP). The PSP basically entails involving local businesses and

entrepreneurs. Though the PSP approaches have not been universally successful, studies have shown that in some areas they have led to efficiency improvement mostly through cost reductions, improved collections and improvement in quality and reliability of services like in Argentina, Bolivia, Buenos Aires, Gabon and Guinea (Blackett et al., 2014). However, sometimes PSP is affected by poor project designs, lack of regulation and lack of commitment by the operators and the failure may result in the customers incurring high costs while service coverage may be stagnate (Adams et al., 2019).

The mounting pressure for the utilities to increase service provision calls for sound management approaches which sometimes leads to contracting out the services to other operators. Remington et al. (2018) suggest that contracting out of service through service and management contract between the utility and the private operator has the potential to deliver the benefits.

2.9.4 Utilisation of Urine-Diverting Dry Toilets (UDDT)

The current dominant paradigm shift in service provision for the poor settlements is the construction of sustainable facilities through the development of affordable sanitation technologies (OECD, 2013). One of these technologies according to Nyambe et al. (2010) is the Ecological Sanitation (EcoSan) which is a new sanitation model that views domestic wastewater and human waste as resources. Related to the EcoSan is the UDDT, an on-site toilet with a separator to allow the user to easily divert the urine away from the feaces (Roma, et al. 2011). Additionally, Muench and von Winker (2011) indicated that main places where UDDTs work well are those with high average temperatures, lengthy dry seasons, brief wet seasons, or desert climates with high evaporation rates. According to Roma et al. (2011), the choice of UDDT was made owing to financial considerations and the environmental impact compared to open defecation and the flush toilet. Figure 2.5 below depicts UDDTs.

Figure 2.5: Urine-Diverting Dry Toilets. (Source: CREPA, 2007)

2.9.5 Stakeholder partnership

Further, Hushie (2018) suggests that water and sanitation services can reach the people if there is strengthened collaboration between various stakeholders. The partnership between government and other organisations is becoming more widespread in the water and sanitation sector as a way to increase service coverage for the marginalized groups. It is very important for governments and civil society organizations increase access to equitable, safe drinking water and sanitation facilities for underprivileged communities (Hushie, 2018).

According to Wibowo and Kochendoerfer (2011), the ineffectiveness of governance institutions and low budgetary allocation to the water and saniatation sector have led to obstacles in service provision. In order to address the basic problems linked to insufficient finance, planning, capability, and governance of water and sanitation services, it is necessary for the input of all stakeholders through a strong partnership (United Nations, 2018).

2.9.6 Improved water supply and sanitation provision

Improved water supply and sanitation provision can be achieved if governments prioritize this sector into socio-economic planning. With support from international corporations, the Zambian government has made concerted efforts to ensure that its citizens have access to water supply and sanitation services (GRZ, 2022). For instance,

the World Bank had come on board with investments to Zambia to expand access to water and sanitation services. The Water Sector Performance Improvement Project (WSPIP) (2007-2013) provided US$33 million to scale up the water project in Zambia (World Bank, 2016). The bank supported the government's ongoing commitment through enhancing the accessibility and sustainability of water deliver and sanitation for consumers in some informal settlements in Lusaka such as John laing, Bauleni and Kalingalinga. This helped Zambians particularly the welfare of women and children by relieving them of the responsibility of obtaining water from dangerous sources (World Bank, 2016).

The Eighth National Development Plan (8NDP) articulates government strategizes to improve access to clean and safe water supply and improved sanitation by promoting investment and financing in the water and sanitation sectors (GRZ, 2022). In the 8NDP, government has recognized the inadequacy of water and sanitation in unplanned settlements. Therefore, efforts should be heightened to improve the provision of these amenities to unplanned settlements (Nyambe et al., 2020).

2.10 Research gaps.

Due to increased population and inadequate funding for operation and maintenance of water supply and sanitation provision, this has made it extremely difficult for most of the utilities to cope with the growing demand for water and sanitation services among others. Within the main towns the populations in the unplanned settlements have received little attention from the institutions that are expected to serve them with services.

The provision of water and sanitation by utility companies is a challenging issue in most unplanned settlements. The utility firms do their level best to invest in the management and provision of water and sanitation. However, this effort being put in by the local authorities seems not to work effectively. Some of the research works cited above have not specified the local situation of Monze in as far as water and sanitation is concerned; the research design in some studies such as the case study methodology used by Shaw (2012) were incapable of providing generalised conclusion while some sample size was too small (Shaw, 2012; Ojo, 2021). The research was conducted in the rural areas of Monze and only targeted handpumps. In

another study, the methology had some gaps in which the sample was restricted to homes where the primary caregiver had a functional cell phone (Hitayezu et al., 2018). The sample did not accurately reflect the total number of households that were too impoverished to possess or use a cell phone, as well as the households in unplanned settlements. In order to attend to the gaps, this study considered households of different socio-economic backgrounds.

Further, business opportunities emanating from water supply and sanitation provision have not been fully explored in Zambia. While the effectiveness on implementation of policy, legal and institutional frameworks on water supply and sanitation services provision has been monitored in urban areas, little has been done in unplanned settlements. On the other hand, approaches to community and private management models were not explored in relation to unplanned settlements. Therefore, this study will bridge the gaps by targeting a large sample size and utilize a descriptive survey design which accurately and systematically describes a population, situation or phenomenon.

2.11 Chapter summary

In this chapter, the researcher reviewed the existing and related literature in line with the research objectives. The next chapter presents the methodology of the study.

CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter describes the study design, the study sample, and the tools and procedures that were used. It explains how data was collected and analyzed; the validity and reliability of the research instruments and ethical considerations.

3.2 Study Area

Monze is a small town in the Southern Province of Zambia and is about 180 km south-west of Lusaka. It's geographical coordinates are 16° 19' 0" South, 27° 11' 0" East. The town is named after Chief Monze, widely acknowledged as the spiritual leader of the Tonga people who inhabit the district. The town is divided into neighborhoods known locally as 'compounds'. Monze is a rapidly urbanising town with growth extending along the railway lines and T1 highway. This has attracted more population in the area thus straining most of the available public utilities including water and sanitation.

Monze District's population as of 2022 census was 268,432; the political ward Manungu where the unplanned settlements are located had a population of 38,590. The ward was selected because it is the highest populated area in Monze urban with most unplanned settlements. The study focused on Zambia Compound, Freedom A and Freedom B. The researcher chose the area because of her familiarity with the region. It is an ideal setting for the researcher's interest, easily accessible and allows good rapport with the participants for easy data collection. Figure 3.1 shows the map of the study area.

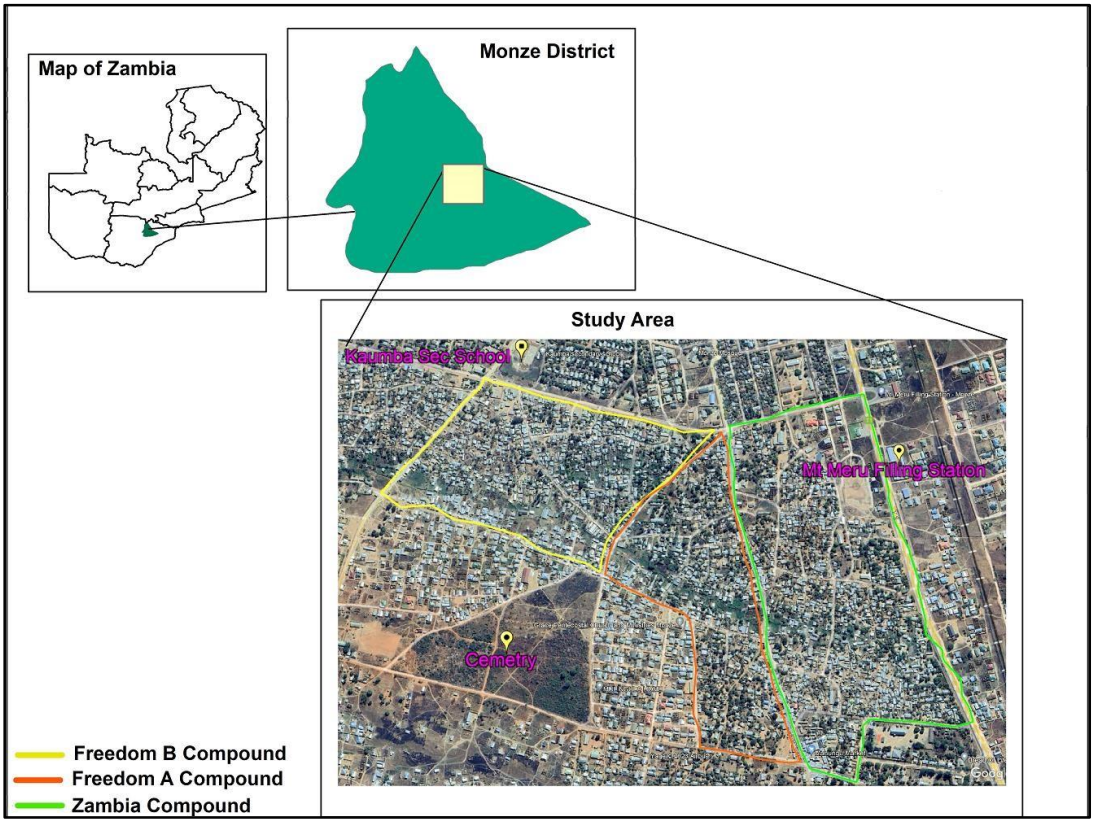

Figure 3.1: Map of the study area. **(Source: *Field data, 2022*)**

3.3 Research design

This research was a descriptive survey. Descriptive research design is a type of research design that aims to obtain information to systematically describe a phenomenon, situation, or population. More specifically, it helps answer the what, when, where, and how questions regarding the research problem. The strength of this design lies in the fact that it enables the researcher to develop an in-depth understanding of the topic or subjects in a natural setting (Sharma, 2019). To achieve the objectives of this study, both quantitative and qualitative data was collected.

3.4 Target population

The study targeted SWSC personnel, Monze Town Council officers in charge of water and sanitation, Neighbourhood Health Committee (NHC) Members, Environmental Health Technician (EHTs), civic leaders and households from Zambia, Freedom A and Freedom B compounds of Monze town.

3.5 Study Sample and Sample Size

In this study, a sample of 206 participants was drawn from the study area comprising 196 households, three SWSC personnel, three council officers in charge of water and sanitation, two Neighbourhood Health Committee (NHC) Members, one Environmental Health Technician (EHTs) and one civic leader.

The study used Daniel (1999)'s formula to come up with the sample size for the 196 households.

$Z^2xPx(1-P)/m^2$ …… **Equation 3.1**

Whereby;

Z= 1.96 @ 95% confidence interval

P=population proportion = 0.5

M=margin of error = 0.05

Therefore;

1.96x0.5x (1-0.5)/0.05^2 = 196

In order to get the equal allocation of the sample from the compounds, the following formula was used

$n_1 = \frac{n}{k}$ …… **Equation 3.2**

Whereby n_1 is the large sample size, n the sample size and k the number of strata.

Where

$n_1 = \frac{196}{3}$ = 65.33

=65 households to be sampled from each compound.

3.6 Sampling Techniques

In this study, purposive sampling was used to select all respondents from institutions. The compounds chosen (Zambia, Freedom A and Freedom B) where purposively selected. This sampling method was chosen in order to select institutional staff that are most likely to yield appropriate and expertise knowledge concerning water and

sanitation. These compounds are highly populated compared to other settlements in the town. For the community members, stratified random sampling was employed to ensure adequate spatial coverage.

3.7 Methods and tools

Discussed below are the methods and tools that were used in the study

3.7.1 Methods

The methods for data collection were in-depth interviews, field surveys and obsevations. These are considered as primary data sources (Creswell and Plano, 2011). The data in this case was background characteristics of the respondent, challenges faced in water supply and sanitation service provision. Additionally, secondary data for the research was obtained from the literature review and other sources such as; the public documents such as National Water policy, books, past researches and the internet on water and sanitation services. The secondary data collected included policy and legal frameworks in water supply and sanitation services in Zambia. It is from secondary data that the background of the study was developed and the areas that needed improvement identified.

3.7.2 Tools

Under the field survey, both qualitative and quantitative data was collected from the field using household questionnaires. In-depth interviews by semi-structured interview schedules, and observations through observation checklist. The instruments supplemented each other to close the gap which might be left out if one instrument only was used. The study was guided by the research objectives when constructing research tools.

3.7.2.1 Interview schedule

The semi-structured interview schedules were used in this study to collect data and provide a clear understanding of the respondents' view. These tools were administered to the Council officers and Civic leaders (Appendix C and D), SWSC personnel (Appendices E). The processes of interviewing involved asking questions, listening, recording the answers and then posing additional questions to clarify or expand on a particular issue. The respondents were encouraged to express themselves freely and responses were recorded and later transcribed.

3. 7. 2.2 Household Questionnaires

A total of 196 household questionnaires (Appendix B) were distributed to the household members through the compound chairpersons. During collection of the questionnaires, some respondents who could not complete some sections were helped through further clarification and translating the questions in a language they could easily understand as depicted in Figure 3.2.

Figure 3.2: Questionnaire administration (Source: Field data, 2022)

3.7.2.3 Observation Checklist

Physical inspections were carried out during field obervations. The observation checklist (Appendix F) was used to assess and observe the availability, functionality, and condition of the water whether good or poor in terms of covering of drinking water and presence of garbage around the water point area. Similar observations were made on sanitation facilities.

3.7.2.4 Instrument return rate

The instruments were returned as shown in the tables 3.1, 3.2 and 3.3.

Table 3.1 Household Questionnaire instrument return rate

Sample	**Sample size**	**Received**	**Return rate (%)**
Household questionnaires	196	171	87
Total	**196**	**171**	**87**

Source: Field data (2022).

Table 3.2: Interview Guide Instrument return rate (officials from SWSC, NHC, EHT,Council and Civic leaders

Research tool	**Sample size**	**Administered**	**Return rate (%)**
Interview schedules	10	5	50
Total	**10**	**5**	**50**

Source: Field data (2022).

Table 3.3: Overall instrument return rate

Research tool	**Sample size**	**Administered**	**Return rate (%)**
Household questionnaires	196	171	87
Interview schedules	10	5	50
Total	**206**	**176**	**85.44**

Source: Field data (2022).

Details from Table 3.3 indicate that during data collection, out of 196 household questionnaires only 171 were returned giving 87 percent return rate. On the other hand, Table 3.3 shows that out of the 10 intended interviews, only five were administered yielding 50 percent return rate. This low response rate can lead to a biased sample as only a specific subgroup of the population participates. Findings may not be representative of the larger population, thus, reducing the study's external validity. In general, 176 out of 206 respondents participated in this study, giving 85.44 percent return rate.

3.8 Data Analysis procedures

Data analysis in this study was conducted for qualitative and quantitative data.

3.8.1 Qualitative data

The data collected from the interview schedules and observation guide was coded and analyzed thematically. The process of coding involved grouping the non-numerical items with similar meanings. These were condensed into sub-themes, then sub-themes into themes.

3.8.2 Quantitative data

Data collected from questionnaires was edited and coding was done to translate question responses into specific categories. Code numbers were assigned to each answer of survey question and from these a coding list was obtained. This was done to organize and reduce research data into manageable summaries. The coded items were analyzed with the aid of computer software Statistical Package for Social Sciences (SPSS) version 21. Quantitative analysis was done to present statistical data in form of frequency distribution tables and graphs whose explanations were mainly descriptive.

3.9 Validity and reliability

In order to test the reliability of the research instruments, the household questionnaires were pre-tested to four section leaders in Manungu extension compound who were not to be included in the main study. This was to help the researcher know whether the questions in the instruments were clear. Apart from ensuring that, validity was addressed through member checking, depth, richness and scope of the data. In order to establish content validity in this study, the supervisor was consulted in constructing and revising the research tools. The supervisor offered input, and the final questionnaire included his suggestions.

3.10 Ethical Considerations

Ethical concerns were taken into consideration throughout the study. The information collected was strictly confidential and the names of participants were not be recorded. The researcher will inform the informants about freedom to withdraw from the study once they feel to do so. Consent was sought from the respondents to participate in the study. The respondents were earlier informed that there would be no specific benefits

accrued to participants by virtue of participating in this study. Consent forms were signed by participants who indicated their willingness to participate in the study. The study was subjected to ethical considerations according to the University of Zambia research guidelines and the clearance and approval letter was given by the University of Zambia Ethics Committee (Appendix A).

3.11 Chapter Summary.

This chapter looked at the methodology used in the study. It described the research design and where the research took place. It further explained how the data was collected and analysed. The following chapter presents the results of the study.

CHAPTER FOUR: RESULTS

4.1 Introduction

The previous chapter presented the methodology used in this study. This chapter presents the findings of the study obtained from the field. The purpose of this study was to assess the challenges and opportunities of water supply and sanitation in unplanned settlements of Monze urban in Southern Province of Zambia. The presentation was in accordance with the main themes embraced in the research objectives. These objectives were to: assess the water supply and sanitation service provision in unplanned settlements; evaluate the effectiveness of the policy, legal and institutional frameworks implementation on water supply and sanitation services provision in unplanned settlements; and establish the opportunities of water supply and sanitation in unplanned settlements of Monze.

4.2 Background characteristics of the respondents

In this section, the participants were asked questions on their gender, age, residential area, education level and monthly income. The findings were as presented in the sections below.

4.2.1 Place of residence

The respondents were also asked to provide data concerning their places of residence. The findings are presented in Table 4.1.

Table 4.1: Place of residence for respondents.

Compound		**Frequency**	**Percent**
Valid	Freedom A	51	29.0
	Freedom B	61	34.7
	Zambia	59	33.5
Total		**171**	**100.0**

Source: Field data (2022).

In Table 4.1, it can be seen that the majority of respondents (34.7 percent) lived in Freedom B compound, followed by those who live in Zambia compound at 33.5

percent and Freedom A compound at 29 percent. These findings indicate that the respondents reside in the actual study area and represent the other locals facing challenges of water supply and sanitation provision in unplanned settlements of Monze urban.

4.2.2 Gender of the participants

The study examined and described the gender details of the respondents as presented in Table 4.2 below.

Table 4.2: Gender characteristics for respondents

		Frequency	**Percent**
Valid	**Female**	116	65.9
	Male	60	34.1
	Total	**176**	**100.0**

Source: Field data (2022).

Table 4.2 revealed that 65.9 percent of the respondents were female while 34.1 percent were male. Since the researcher conducted the research during week days, the majority of most men than women in these compounds left the houses to work or partake in other income-generating activities, leaving the women to take care of household tasks. Based on gender roles in the setting, women in this society are more familiar with concerns related to home water and sanitation than their male counterparts.

4.2.3 Age of the respondents

The study obtained details about the age groups of the community members for purposes of understanding their age. Details of the findings are shown in Figure 4.1 below.

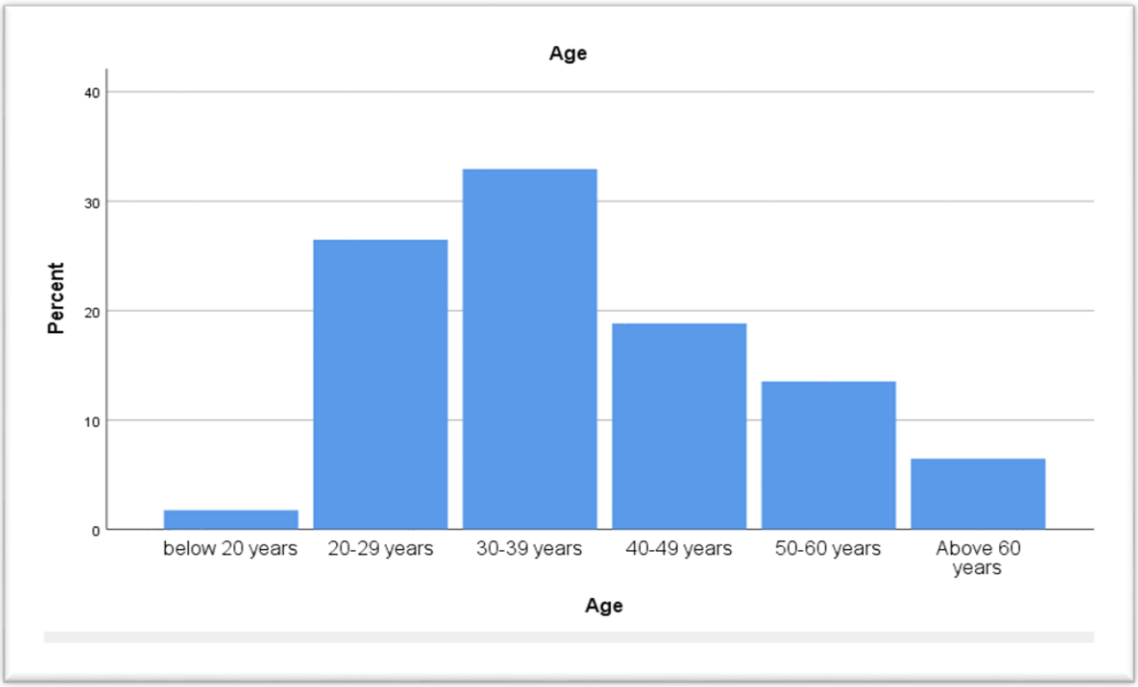

Figure 4.1: Age groups of Household members (Source: Field data, 2022)

In this study, the majority (32.9 percent) of the respondents belonged to the age group of 30-39 years. On the other hand, three percent were below 20 years. The trustworthiness of the information provided by the adults who made up a bigger share of the sample was enhanced by their apparent understanding of the circumstances and water conditions in the households.

4.2.4 Education Levels of the respondents

Details about the education levels of respondents were obtained and the results are revealed in Table 4.3 below.

Table 4.3: Education Levels of respondents

Level of education	**Frequency**	**Percent**
Non Schooling	5	2.92
Primary School	63	37.0
Secondary School	90	53.0
Tertiary Education	8	4.5
Professional certificate	1	0.5
Professional Diploma	2	1.2
Bachelor's Degree	2	1.2
Total	**171**	**100.0**

Source: Field data (2022)

In Table 4.3 above, it was revealed that 53 percent of the respondents had attained secondary school education level. However, five of the respondents representing 2.92 percent had not attended any formal schooling. The above results indicate that majority of the respondents were educated and could understand and answer the questions in relation to water and sanitation issues.

4.2.5 Employment status of the respondents.

Details of the employment status were captured during data collection. The Table 4.4 below shows the employment status of the respondents.

Table 4.4: Employment status of the respondents.

Employment status		**Frequency**	**Percent**
Valid	Employed	28	16.4
	Unemployed	79	46.2
	Casual Labor	34	19.9
	Business	30	17.5
Total		**171**	**100.0**

Source: Field data (2022)

From the responses, 46.2 percent of the respondents were unemployed while 19.9 percent were casual laborers and business people respectively. According to the findings, only 16.4 percent were employed. Unemployment in the study area is likely to affect the ability of households to afford quality water and sanitation services.

4.2.6 Household population.

Details about the household population of the respondents are presented in Figure 4.2 below.

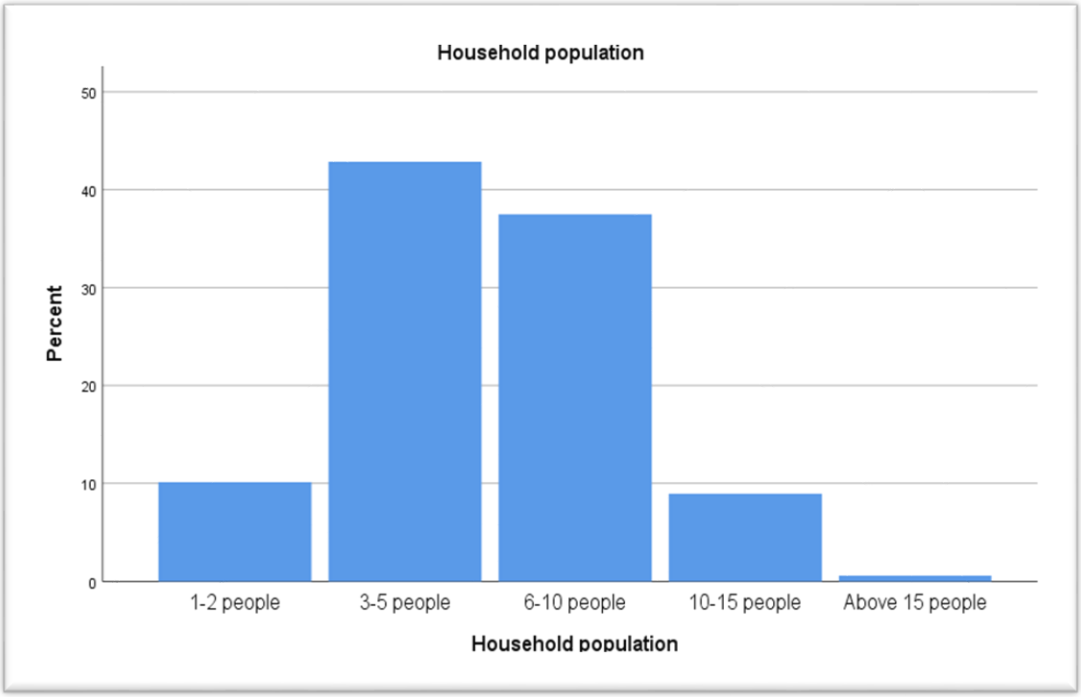

Figure 4.2: Household population. (Source: Field data, 2022)

According to Figure 4.2, the majority (42.5 percent) of the households had 3-5 people. On the other hand, 37.7 percent of the households comprised of 6-10 people. The fact that most households have more than 3 members has an impact on the demand and utilisation of water and sanitation facilities in the study area.

4.2.7 Monthly income

The respondents were also asked to indicate their monthly income to ascertain their potential to access quality water and sanitation. The details are shown on Table 4.5 below;

Table 4.5: Monthly incomes

Monthly income	Frequency	Percent
Below 1000	113	66.0
2000-3000	44	26.0
3000- 5000	9	5.0
Above 5000	5	3.0
Total	**171**	**100.0**

Source: Field data (2022)

Table 4.5 shows that the majority (66.0 percent; n=171) of respondents earn net average income below K1, 000.00 a month. About 26 percent earned between K2, 000.00 and 3, 000.00, followed by 5.0 percent who earned between K3, 000.00 and K5, 000.00. Three percent of the respondents earned above K5, 000.00. The low income for some of the households would barely sustain a family's basic requirements for a decent living and access adeaquate water and sanitation provision.

4.3 Water supply and sanitation service provision in unplanned settlements.

The results on water quality, supply and sanitation service provision in unplanned settlements are presented in ensuing sections.

4.3.1 Water Supply Service Provision

Several aspects of water supply service provision were looked at, such as sources of water, types of water points, condition of water points and distance to the water points.

4.3.1.1 Sources of water

There was need to identify the different sources of water in the research area. The results are depicted in Figure 4.3 below.

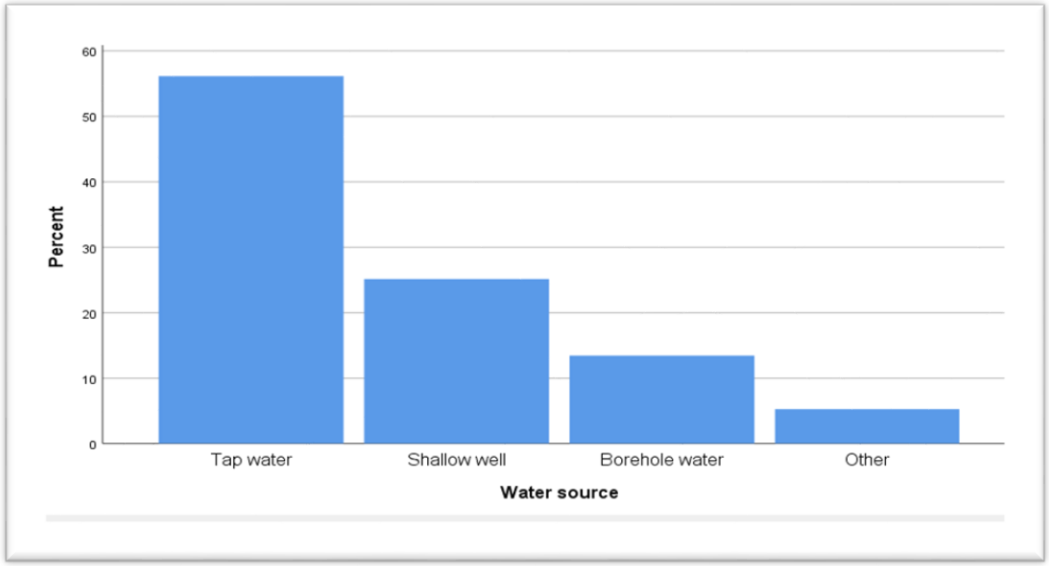

Figure 4.3: Water sources in the study areas (Source: Field data, 2022)

According to Figure 4.3 above, 57 percent of the respondents sourced water from taps while 25 percent drew water from shallow wells. On the other hand, 13 percent sourced water from boreholes, and 5 percent from other sources. Data collected through observations showed that there were four hand pumps in the community of which only three were functional. There were also five kiosks of which only three were working. Some captured water points have been shown below in Figure 4.3 below.

Figure 4.4: Type of water poins in the study area. (Source: Field data, 2022)

4.3.1.2 Condition of water point.

Access to good and safe water is essential for the wellbeing of human beings. This implies that the status of water points should be safe and clean for human use. Guidelines to ascertain the conditions of water points were accessed from the WHO/UNICEF, (2017). Bad/unimproved water points include piped water without slab or unprotected well; Fair/Basic water points include shared, borehole or vendor-provided water; and good/improved water points include protected wells, Kiosk or piped water with slab. Data from the households and institutional staff on the condition of water points was gathered and is presented in Table 4.6 below.

Table 4.6: Condition of water point.

Condition of water point		**Frequency**	**Percent**
Valid	Bad/unimproved (piped water without slab/drainage/unprotected well)	75	44.0
	Fair/Basic (shared, borehole, vendor-provided water)	5	3.0
	Good/improved (protected wells, Kiosk, piped water with slab	91	53.0
	Total	**171**	**100.0**

Source: Field data (2022)

Table 4.6 depicts that 53 percent of the respondents indicated that the condition of water points was good. Besides, 44 percent stated that the facilities were bad while 3.0 percent indicated that the water points were fair. However, assessment from the observations indicated that most of the water points such as kiosks were not functional. Out of the ten water kiosks, only 3 were operating. Some taps were not fixed in concrete slab, hence falling off. Figure 4.5 below depicts some water points in poor shape.

Figure 4.5: Condition of water points from the study area (LHS: A dug well; RHS: A tap). (Source: Field data, 2022)

4.3.1.3 Distance to water points.

Under this sub-section, data was collected on how far the water points were located from the households. The distance categories were structured by referring to the WHO guidelines, where the maximum permissible walking distance from the source to the household is 500 metres (WHO, 2018). The responses were indicated in Figure 4.6 below.

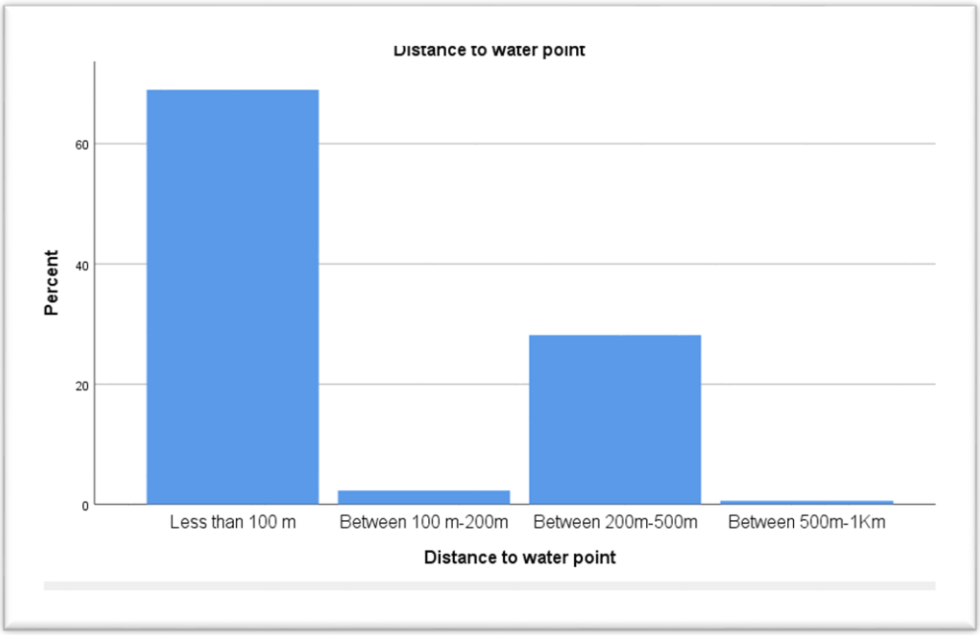

Figure 4.6: Distance to water points (Source: Field data, 2022)

According to the figure above, the findings indicate that 70 percent of the households access water at a distance less than 100 meters while 29 percent access the commodity between 200 and 500 metres. On the other hand, the minority (1.0 percent) accessed water from a distance of more than 500m -1Km. These findings indicate that the majority of the households in the research area accessed water nearby, implying that the distance to water points was not a challenge in as far as water supply is concerned in the study area.

4.3.1.4 Availability of water.

It was also necessary to establish how long water was availed to the community. The responses recorded were as presented in Table 4.7 below.

Table 4.7: Duration of availability of water

Availability of water	**Frequency**	**Percent**
40 minutes	1	0.58
1 hour	11	6.43
2 hours	33	19.30
3 hours	58	33.92
4 hours	30	17.54
5 hours	6	3.51
6 hours	2	1.17
Every time	15	8.77
Seasonal	15	8.77
Total	**171**	**100.0**

Source: Field data (2022)

According to Table 4.7, about 33.92 percent of the households accessed water for three hours in a day. Besides, 19.30 percent had water for only two hours daily, followed by 17.54 percent who accessed water for four hours while 8.77 percent had water on seasonal basis (rain season). From the above table, it was revealed that the majority of the respondents stated that water was available between three to four hours daily. This situation can lead to water scarcity, forcing residents to rely on alternative, often expensive and unsafe, sources. Not only that but residents may need to purchase water from private vendors, increasing their expenses and financial burden.

4.3.1.5 Water quality.

The quality of water with respect to its suitability for a particular purpose such as drinking was also assessed from the respondents' point of view. The responses from the Household respondents are presented in Figure 4.7 below.

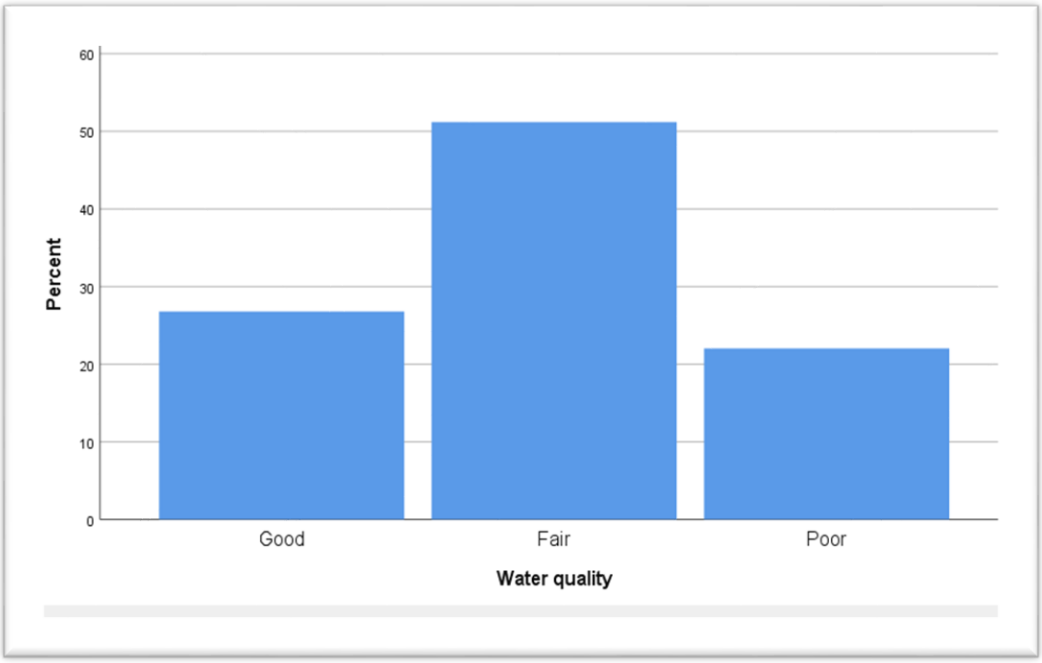

Figure 4.7: Water quality in the study areas. (Source: Field data, 2022)

Figure 4.7 presents that 51 percent of households held that the water quality was fair while 27 percent indicated that the quality of the water was good. However, 22 percent stated that the water quality was poor. Guidelines to ascertain the conditions of water points were accessed from the WHO/UNICEF, (2017). According to the guidelines, poor quality means unimproved water points include piped water without slab or unprotected well; Fair means water points which shared, borehole or vendor-provided water which might have unpleasant taste, odour or colour but was used for domestic purposes; and good/improved water points include protected wells, Kiosk or piped water with slab.

Government officials such Ward councilors and WASH coordinators were also interviewed about the water quality in the research area. It was established from the findings that the water was polluted due to short distance of water points from toilets. One of the civic leaders stated that "*the water quality was compromised due to improper planning of compounds*". When asked how this was possible, it was explained that due to overcrowding and lack of enough places for building, people were digging toilets anyhow sometimes near a water point. This can lead to the spread of waterborne diseases like cholera and diarrhea.

4.3.1.6 Water treatment.

Having collected data on water quality, it was essential to find out if water was treated before use and what method was used to treat water. Responses are recorded in Table 4.8 below.

Table 4.8: Water treatment table

Response	Frequency	Percent
Yes	96	56.14
No	67	39.18
Missing	8	4.68
Total	**171**	**100.0**

Source: Field data (2022)

According to the Table 4.8, about 56.14 percent were able to treat the water while 39.18 percent had not treated water. The common methods used to treat water was chlorination and boiling. However, 4.68 percent did not provide any responses. Without treatment, water sources are vulnerable to contamination and spread of waterborne diseases, posing significant health risks to residents.

Even though residents might not always boil water, it can take a long time to boil water, and household supplies like liquid or tablet chlorine can be costly. In addition, improper dosing of chlorine can result in harmful effects on users or ineffective disinfection due to a lack of knowledge or instructions. With these implications in mind, it is imperative to investigate sustainable and effective alternatives to traditional water treatment methods for informal settlements, such as community-scale treatment plants.

4.3.1.7 Southern Water and Sanitation Company connection

The respondents were also asked to indicate whether they were connected to SWSC. The responses are depicted in Table 4.9 below.

Table 4.9: SWSC connections

Response	Frequency	Percent
Yes	157	91.81
No	14	8.19
Total	**171**	**100.0**

Source: Field data (2022)

Table 4.9 indicates that 91.81percent were connected to SWSC and 8.19 percent of the households were not connected.

4.3.1.8 Water shortages

The households were also asked to indicate if they experienced any water shortages in the community. Table 4.10 presents the findings.

Table 4.10: Water shortages

Response	Frequency	Percent
Yes	157	91.81
No	14	8.19
Total	**171**	**100.0**

Source: Field data (2022)

Table 4.10 indicates that 91.81 percent of households experienced water shortages while 8.19 percent did not face any water deficit. When asked as to where they sourced water when there were shortages, the 91.81 percent indicated that they purchased water from community members who had boreholes. In unplanned settlements, the linkaage between water shortage and water supply is complex and interconnected. These areas experience rapid population growth, leading to increased demand for water. Consequently, water supply may be unevenly distributed, with some areas receiving inadequate or unreliable supply.

4.3.2 Sanitation Services Provision

The utility companies are charged with the responsibility of providing sanitation services to the residents within their jurisdictions. This section sought to assess the availability, types and status of sanitation facilities in the research area.

4.3.2.1 Availability of toilets

Details about the availability of toilets at household level were captured as shown in Table 4.11 below.

Table 4.11: Availability of toilets

Response	**Frequency**	**Percent**
Yes	159	92.98
No	12	7.02
Total	**171**	**100.0**

Source: Field data (2022)

It was established that 92.98 percent of the households had toilets while 7.02 percent did not have. However, limited availability of toilets leads to inadequate sanitation provision, causing health risks. By understanding the relationship between toilet availability and sanitation provision, stakeholders can develop effective strategies to improve sanitation services and health outcomes in informal settlements.

4.3.2.2 Types of toilets

There was need to identify the types of toilets used by households. Table 4.12 below highlights the findings.

Table 5 Toilet type

Response	Frequency	Percent
Chemical toilet	4	2.34
Bucket system toilet	2	1.17
Pit latrine toilet	149	87.13
Flushing toilet	5	2.92
Other	4	2.34
Missing System	7	4.10
Total	**171**	**100.0**

Source: Field data (2022)

Details from Table 4.12 above revealed that 87.13 percent of the households used pit latrines. Flushing toilets were used by 2.34 percent while chemical toilets and other methods were both used by 2.34 percent. Only 1.17 percent used the bucket system. Thus, the type of toilets used in unplanned settlements has a direct impact on sanitation provision, influencing factors like sanitation risks and maintenance costs. Figure 4.8 depicts some types of toilets available in the research area.

Figure 2 Types of toilets in the study area (LHS: Temporal pit latrine without concrete slab; RHS: Semi-permanet pit latrine with concrete slab). (Source: Field data, 2022).

4.3.2.3 Status in terms of toilet usage from the sharing perspective

When asked if the households shared the toilets with their neighbours, the responses were indicated as presented in Table 4.13.

Table 4.13: Status in terms of toilet usage from the sharing perspective

Is your toilet shared?	**Frequency**	**Percent**
Yes	115	67.25
No	50	29.24
Missing System	6	3.51
Total	**171**	**100.0**

Source: Field data (2022)

From Table 4.13, it was revealed that 67.25 percent of the household members shared toilets with neighbors while 29.24 percent did not. According to these results, the sharing of toilets by residents can lead to sanitation risks and conflicts among the users.

4.4 Challenges and opportunities faced in supplying and accessing water and sanitation in unplanned settlements

In determining the challenges and opportunities of supplying and accessing water and sanitation, the household members and officials were asked to state their views. The findings are presented in the sections below.

4.4.1 Challenges faced in supplying and accessing water and sanitation in unplanned settlements

The findings in relation to the challenges faced in the provision and access to water and sanitation services were collected and are presented below.

4.4.1.1 High water connection charges

It was established that most of the households complained that connecting water to SWSC was costly. During data collection, sources from SWSC revealed that connection fees for a household was costing One Thousand Three Hundred Fifty Kwacha (K1350.00).

4.4.1.2 High tariffs

Several concerns were also raised with regard to high water tariffs where some households complained that some of the SWSC field officers manipulate the figures when taking meter readings compared to what the users expect. However, these assertions were refuted by the SWSC officials. On the other hand, one of the respondents suggested that if prepaid water meters were introduced, there can be transparency in the billing process. Most of the residents were on fixed charge which was pegged at Two Hundred Kwacha (K200.00) per month. As a result, some households were disconnected by the utility company because they could not pay for the services.

4.4.1.3 Delays in connecting water

The other challenge noted was on the time taken to connect households to the SWSC system. When asked on how long the SWSC takes to connect water for the clients who have paid? The officer from SWSC responded that once payment is made, water can be connected within ten (10) working days, but when asked for any document available for evidence, the officer had none on the table. However, one of the

households lamented that "*even when payments are done, it takes about three months to be connected with water.*"

4.4.1.4 Expensive materials

The findings from some households indicated that there was high cost of plumbing materials in the area. In as much as they wished to access piped water, the materials required by SWSC were difficulty to purchase due to some required specifications. It was established in Zambia that utility companies do not have the necessary equipment to connect water to households. It is the duty of residents to buy their own materials. The company just comes to install the materials and connect water. When it comes to sanitation materials, very few households had flushable toilets due to the cost of constructing septic tanks and soak-ways. The utility company does not offer any sanitation services at the moment but there are efforts being made such as introducing the bucket emptying system. This will help to empty the full toilets so that they can continue being used.

4.4.1.5 Main pipes are too far

It was also established that residents had challenges with connecting water because the main supply pipes were far from the houses, approximately 500 meters. This challenge according to one of the informants was due to unplanned buildings which made it difficult for the utility company to lay the pipes in residential areas.

4.4.1.6 Poor infrastructure

The supply of water to the households was hampered by pipes which were old and unrepaired. This dilapidation of infrastructure led to water leaking and hence less supply to the users. The old pipes were earlier supplied by SWSC and were galvanized and asbestos pipes which had rust all over. It was for this reason that the new applicants were required to buy Poly pipes for new connection. Figure 4.9 depicts the phased pipes and the recommended ones.

Figure 4.9: Types of pipes in the study area (LHS: Asbestos pipes; RHS: Poly pipes). (Source: Field data, 2022).

4.4.1.7 Low water level in the dam

The households also experienced low pressure from the taps. This was attributed to low water levels in the dam. According to NWASCO (2021), the maximum acceptable water pressure proportion should be <5% of connections in a service area with water flow rate of less than 7 litres per minute. One of the residents said "we have low pressure because the *dam is too small to serve the people due to climate change".* Observations in the field revealed that indeed there was low water pressure from the taps. When contacted as to what contributed to the low water pressure, SWSC personnel refuted that there was low water level in dam because the dam capacity (6.4 million m^3) was enough to supply water to the residents. What contributed to low water pressure according to SWSC officers was leakages to water pipes and high demand. The initial demand is 40 litres of water per person per day. However, due to densely population in the study area and pipe leakages, the demand has risen to more than 40 litres per day.

4.4.1.8 Short hours of supply

From the few yard taps that were installed in the community, it was established that the duration of water supply was very limited. As presented in section 4.2.1.4, water was available for only three hours per day. This water would usually be fetched early

in the morning. In other words, women and girls wake up early in the morning to queue up for the commodity.

In addition, SWSC and local authority personnel pointed out various challenges faced on their side. The following were noted;

4.4.1.9 Vandalism and illegal connections

From the data collected in the field, vandalism of company property was rampant. This posed a challenge to fix and replace worn out pipes. Some officials complained that metal water metres and galvanized pipes were stolen. Added to this was illegal connections that were done by some community members. One of the council officers said: "*illegal connections happen because of poor residential planning*". The Figure 4.10 below illustrates some vandalised facilities.

Figure 4.10: Vandalised facilities in the study area (LHS: A tap; RHS: Underground water pipe). (Source: Field data, 2022).

4.4.1.10 Lack of resources and equipment

The lack of resources and equipment for water and sanitation connection was another challenge. One of the officials said: "*even when applications for water connections were approved, some houses are put on fixed charge because we do not have water meters*". The other officer said the emptying of toilets was difficult because in the

whole country the company only has one vacuum tank which makes it very competitive to access the vehicle.

4.4.1.11 Lack of funding

The other setback recorded was inadequate funding for procuring materials for water and sanitation supply. The respondents stated that it was difficult to operate without enough funds. For instance, one of the officers said they took long to connect residents to the water system because funds were not enough to procure the necessary materials like pipes and water treatment requisites. The problem of insufficient funding also hampered monitoring the water lines against vandalism and illegal connections.

4.4.1.12 Lack of stakeholder participation

It was also reported that there was lack of coordination with stakeholders in the supply of water and provision of sanitation in unplanned settlements. Some residents who are close to the main pipeline are not willing to let others connect from their pipes because the supply becomes low on their taps. Even when there was participation from other partners, the officials complained that some Non-Governmental Organisations (NGOs) did not participate as needed due to different guidelines from their donors. For instance, one of the named NGO was involved only in rural areas where boreholes were being drilled because that is what their guidelines stipulated, leaving out unplanned residential areas like where this research was being conducted. One of the civic leaders explained that: "*in as much as the policy mandates that every citizen should have sustainable water and sanitation services; other stakeholders feel that by providing these services to the people in unplanned settlements you are encouraging more unplanned residential settlements but instead take such projects to rural areas to discourage more upcoming unplanned settlements."*

4.4.2 Opportunities of supplying and accessing water and sanitation in unplanned settlements

Having presented the challenges in Section 4.4.1, the study sought to establish the opportunities of water supply and sanitation in unplanned settlements of Monze. Therefore, findings were presented below.

4.4.2.1 Subsidized connections fees

Findings from the household members revealed that the supply of quality water and sanitation provision to all sections of the settlements would see the reduction in connection fees to SWSC. When probed as to how possible this could be, it was established that the fact that the unplanned settlements were occupied by people of low socio-economic status, the utility company could consider subsidizing connection fees so that residents could access the services at a cheaper cost.

4.4.2.2 Continuous water supply

In relation to the above item, household members expressed their optimism that the provision of water in unplanned settlements would enhance the continuous supply of water to the compounds. This was raised after the respondents complained of 3-4 hours of water supply. With continuous provision of the commodity, water blues would be a thing of the past. Some of the households explained that if industrial boreholes were drilled in the area, they could help to improve the problem of water supply.

4.4.2.3 Improved health

It was revealed from the study that the availability of better water and sanitation facilities such as clean water and improved toilets would significantly improve health and lower the incidence of waterborne infections. Households also stated that having better latrines available would make the environment cleaner.

4.4.2.4 Improved types of toilets

Findings from the study revealed that the need for improved toilets was paramount in as far as good sanitation and health is concerned. The types of toilets available in the compounds as depicted in Figure 4.8 were pathetic and posed a threat to the health of the users. Some respondents opted for improved toilets such as UDDTs because they offered more advantages as compared to ordinary pit latrines. However, observations revealed that the installation of these types of toilets can be successful if proper community sensitization and collaboration is properly done. Collaboration between the utility company, stakeholders and the local community is very important because fecal sludge management involves a system which should be put in place starting from containment through to treatment. The Figure 4.11 depicts the only UDDT captured from the research area which was not used due to lack of community sensitization and education.

Figure 4.11: Improved type of toilets in the study area (LHS: Front view of the UDDT; RHS: Rear view of the UDDT). (Source: Field data, 2022)

4.4.2.5 Provision for Water schemes

It was also gathered that since there was only one utility company (SWSC), the supply of quality water and sanitation provision was below standard. With this status quo, residents thought the provision of services would be better if water schemes were provided. This was seen to be an opportunity as it would enable people have improved access, quality and clean water, continuous supply and better sanitation services.

4.5. Effectiveness of the policy, legal and institutional frameworks implementation on water supply and sanitation services provision in unplanned settlements.

The second objective of this study was to evaluate the effectiveness of the policy, legal and institutional frameworks on water supply and sanitation services provision in unplanned settlements. Policy, legal and Institutional frameworks on water supply and sanitation are important for implementing government programs so that all citizens have access to quality and adequate water and sanitation services. Without proper implementation of programs there is biasness towards one particular group over the other.

4.5.1 Awareness of water and sanitation policies

The institutional staff were asked if they were aware of any policies that guide the supply of water and sanitation provision in the country. The responses from officials were as follows on Table 4.14.

Table 4.14: Awareness of water and sanitation policies by SWSC and technical officers.

Are you aware of policies governing water and sanitation provision?	**Frequency**	**Percent**
Yes	2	40
No	3	60
Total	**5**	**100.0**

Source: Field data (2022)

From Table 4.14, it was established that three officials representing 60 percent were not aware of any policy that governs water and sanitation provision while 40 percent were aware of the policies. The lack of awareness of policies in water and sanitation by officers can have significant implications, including inadequate implementation leading to poor water and sanitation services. Besides, without knowledge of policies, officers may not be held accountable for their actions or inactions.

When asked about which policy was known, the SWSC officials mentioned about the NWASCO policy. However, this was not the correct position because the water supply and sanitation in Zambia is governed by the 2010 National Water Policy. One of the council officials was fully aware of the policy and was able to point out some of the hurdles in terms of implementation such as; *most of the activities are directed for urban and rural areas of which the unplanned settlements are in between or in the middle and in most cases they miss out in terms of service delivery.*

4.5.2 Implementation of water and sanitation policies in unplanned settlements

The officials were also asked if the policies in question were implemented in unplanned settlements. The feedback is summarised in Table 4.15 below.

Table 6 Implementation of water and sanitation policies

Response	**Frequency**	**Percent**
Adequate	1	20
Low	3	60
Unplanned areas are not usually attended to in the policy	1	20
Total	**5**	**100.0**

Source: Field data (2022)

According to the Table 4.15, 60 percent of the officials indicated that the implementation of the policy was low. It was also revealed that 20 percent believed that the implementation was adequate and others pointed out that unplanned areas were not attended to in the policy. One of the council officers mentioned that: "*even when the policy indicates that all citizens have the right to sustainable and efficient water and sanitation services; when it comes to implementation planned areas are usually prioritized over unplanned areas*." As reflected on Table 4.15, the implementation of the policy on water supply and sanitation provision in unplanned settlements was slow.

4.5.3 Legal frameworks on water supply and sanitation services provision

The effectiveness and implementation of water and sanitation policies usually takes place through the enforcement of laws to ensure compliance. Results from the institutional staff on the pieces of legislation that govern the provision of water and sanitation in unplanned settlements revealed that there exist legal frameworks which include;

- The National Water Supply and Sanitation Act No. 28 of 1997;
- The Water Resources Management Act No. 21 of 2011;
- The Local Government Act CAP 281; and
- The Environmental Management Act No.12 of 2011.

4.5.4 Institutions involved in the provision of water supply and sanitation services

Findings from SWSC and Local authorities on the institutions involved in the provision of water supply and sanitation services revealed the following;

National Water and Sanitation Council (NWASCO): regulates water and sanitation provision, issues licenses and establish guidelines and standards.

Ministry of Water Development and Sanitation: offers policy direction for the water and sanitation provision

Monze Town Council: Provides water supply and sanitation services in local premises, and carries out maintenance of water facilities within Monze Urban.

NGOs: Partners with government to provide water, sanitation and hygiene in residential areas.

SWSC: SWSC is the commercial utility available in the research area that provides water and sanitation services in Monze Urban. The Commercial Utility (CU) has its headquarters in Choma, where all operational directives are given.

Water Resources Management Authority (WARMA): Protects and preserves sources of water.

Zambia Environmental Management Agency (ZEMA): Monitors and ensures activities on the environment are done in accordance with guidelines for water quality.

However, the households stated that they were aware of SWSC and the local authority as these institutions were physically seen to operate in the community.

4.5.5. Areas of collaboration between institutions in water supply and sanitation provision in unplanned settlements.

The officials were also asked to specify the areas of collaboration among institutions in water supply and sanitation. Most responses anchored on;

- Water supply as evidenced by the installation of handpumps by Green Leaving Organisation with community involvement;
- Water quality testing by SWSC;

- Maintenance and repair of water kiosks and handpumps by the local authority and SWSC;
- Multi-sectoral and community partnership approach as evidenced in the set-up of V-WASHE committees.

4.6 Chapter Summary

In this chapter, the findings of the study obtained from the literature and the field were presented according to the research objectives. The next chapter presents the discussion of the findings.

CHAPTER 5: DISCUSSIONS

5.1 Introduction

The previous chapter presented the results of the study. This chapter discusses the results in accordance with the main themes embraced in the research objectives.

5.2 Water supply and sanitation service provision in unplanned settlements.

Water supply and sanitation provision is critical component in the livelihoods of the people. However, the situation has not changed with regard to better sanitation and water supply in the study area.

5.2.1. Water supply service provision

Findings on water supply service provision were categorised into sources of water, types of water points, condition of water points and distance to the water points.

5.2.1.1 Sources of water

Results on the sources of water revealed that 57 percent of the respondents sourced water from shared taps while the minority accessed water from shallow wells, water kiosks and hand pumps. About half of the water kiosks mounted by SWSC were not functional. This finding is in agreement with the UN (2013) report from Brazil's informal urban settlements where more than 80 percent of the country's population draw water from shared taps. In the same report, up to 10 percent of the population sourced their water from springs, wells or rainwater storage (UN, 2013). Habibian and Minaie (2018) also concur that in times of water shortages, a common alternative in peri-urban areas is to dig a well which may be close to a sewer pit, risking contamination and the transmission of waterborne diseases.

Similar to the above findings, a Nigeria field survey revealed that 82.4 percent of the households sourced their drinking water from water vendors, unprotected wells, surface and stored rainwater (Obeta, 2018). The situation of general poor access to piped drinking water in the sampled communities in Nigeria is related the prevailing situation in the unplanned settlements of Monze Urban. In contrast with the findings of this study where most households sourced water from fixed shared taps, shallow wells, water kiosks and hand pumps, Muzondi (2014) indicated that South Africa's informal settlements utilized temporary communal taps.

There are a number of historical, socioeconomic, and policy-related reasons why informal settlements in South Africa might have more community taps than those in Zambia, according to Enqvist et al. (2020). During the apartheid era, communal taps were a common feature in most South African townships, serving to restrict access to water and enforce segregation. In an attempt to rectify past injustices, there was a surge in funding for water infrastructure, including communal taps, following the end of apartheid. However, because of a greater emphasis on rural development and the government's preference for private connections over communal taps, Zambia's informal settlements might have more individual water connections (NWASCO, 2021).

Further, Phiri (2016) carried out a study in Makululu compound of Kabwe District-Zambia. His findings revealed that 61 percent of the community members used shallow wells as the major source of domestic water. However, this does not agree with this study because the majority of the households sourced water from taps. This is because in the study area there were a number of households with taps therefore residents purchased water from them. Phiri (2016) and Ndhlovu (2022) also reported that the water kiosks erected by Utilities in Kabwe and Lusaka respectively, were not reliable. This agrees with the findings of the study because most of the water kiosks mounted by SWSC were not functional.

5.2.1.2 Condition of water points.

The high growth of population in towns has impacted on the conditions of water points and related facilities. Findings on the condition of water points revealed that 53.0 percent of the respondents indicated that the condition was good. However, observational assessments showed that most water points were poor. These results are consistent with the United Nations (2015) report that 32 percent of the population in sub-Saharan Africa is dependent on unimproved drinking water sources.

Similarly, Angoua et al. (2018) assessed the ability of the poor to access water and sanitation in unplanned settlements of Abidjan. It was found that 11 percent of households surveyed still use unprotected wells due to ongoing water shortages. In the town of Sikaso, the scenario turns out to be different. Adams (2018) also concurs with the findings in this study that water supply kiosks in Malawi were often out of stock and broken. Besides, the observations of damaged water facilities are similar with the

findings of Oskam et al. (2021) who revealed that communities with few drinking water supplies are a sign of poor drinking water infrastructure. The fact that most water points in the study area were in a deplorable condition means that households would use a few available facilities leading to misuse and pressure of water infrastructure.

The observation made in this study revealed that most of the shalllow wells had neither concrete slab nor lids for covering. Phiri (2016) also noted similar findings that the wells were not covered thereby forcing community members to draw unclean water. The assessment of other studies and that of Monze, therefore, reveal that most water points are unreliable, offering unsafe and insufficient water to the people. To be helpful, there is a need to increase the number of water points putting into consideration the populations that are present in the locality.

5.2.1.3 Distance to water points.

The findings from this study revealed that 70 percent of the households in the unplanned settlements of Monze accessed water at a distance less than 100 meters. This agrees with Ndhlovu (2022) who found that 95 percent of residents in Lusaka walk within an average of 100 meters to access drinking water from a water station. The above findings are in comformity with the WHO guidelines where the maximum permissible walking distance from the source to the household is 500 metres (WHO, 2017).

The Vision 2030 emphasises the importance of access to clean water as a measure of development (GRZ, 2016). On the contrarly, 60 percent of households in similar settings of Ethiopia walked more than 500m to get water (Anthonj et al. 2018). While households in this study drew water within 100m distance, findings in Thlabanello informal settlement in Windhoek travel up to two kilometers to obtain water for use in their homes (Aihuki, 2020). The service level of water provision and delivery according to Howard and Bartram (2003) highlights that in instances where households access water more than 1 km or more than 30 minutes, then there is no access. Therefore, according to this observation, residents in the study area had access to water.

5.2.1.4 Hours of water availability.

The time required to access water is critical to a household. Findings from this study revealed that households had access to water for 3 hours a day usually available early in the morning. This is related to a study by Zozmann et al. (2022) in five informal settlements in Pune, India which showed that water was provided daily for one to three hours in the morning. Ndhlovu (2022) found similar results in her study in George compound in Lusaka, where residents could collect water from water stalls once a day from 05:00 to 08:00. However, the duration of water accessibility was a bit longer in the informal settlements of Dar es Salaam as Dakyaga et al. (2018) revealed that tap water was accessed between the period of 7 hours per day. In a similar study in Malawian informal settlements, Price et al. (2021) established that public taps were only available for 12 hours per day.

5.2.1.5 Water quality.

Results on the quality of water from the study area revealed that the water from wells was compromised due to improper planning of compounds. Similarly, Ndlovu (2022) indicated that the shallow wells and the pit latrines were extremely close together which made the water quality poor since there was seepage from the pit latrines to shallow wells. Researchers have argued that good water quality is mostly favouring the formal planned areas to at the expense of unplanned settlements (Kyessi, 2011; Osei et al. 2015). This is due to overpopulation and limited public water infrastructure.

On the other hand, 51 percent of households in the study held the view that the water quality was fair in that the consumption of the water might have unpleasant taste, odour or colour but was used for domestic purposes. In support of these findings, Dakyaga et al. (2018) reported that in the informal Settlements of Dar es Salaam the water was moderately good for consumption.

5.2.1.6 Water treatment.

Results on water treatment revealed that 56.14 percent of households were able to treat the water. The common methods used to treat water was chlorination and boiling. This is comparable to a research from India, where households purify their drinking water with chlorine to address the issue of water purity (UN-Water, 2007; Subbaraman 2015). Similar findings were noted by Hubbard et al. (2020) in their research in peri-urban areas of Lusaka where it was established that 13 percent of the households

treated the water by chlorinating, boiling and filtering. In another study in Dar es Salaam, similar findings revealed that majority of households either boil or filter their water before using it for domestic purposes (McGranahan, 2016).

Although the utility company provided treated water to the households in this study area they still chlorinated it before use on a daily basis. The implication of this is that the water is likely to produce diarrhoeal disease and affect the health of the people if it is not treated.

5.2.1.7 Water shortages

Results on households' experiences of water shortages revealed that 91.81 percent of households faced water shortages. When asked as to where they sourced water when there were shortages, the respondents indicated that they purchased water from community members who had boreholes. Despite the abundance of water resources in Zambia, households according to this study frequently have water outages, leading them to draw unclean water. This trend has also been reported from Accra and Lusaka informal settlements where some people take advantage of situations of water shortages by selling water to troubled residents (Tutu and Stoler, 2016; Ndlovu, 2022).

The challenge of water shortages in the study area forced households to draw from unprotected water sources such as uncovered wells. These findings are not new; Adeleye et al. (2014) reported that many water supply systems in informal settlements of Nigeria and Niger had closed leading to water shortages. This scenario forced residents to draw water from unsafe streams and rivers. Tutu and Stoler (2016) held a similar view in their study that erratic water supply in informal settlements led to reliance on water sources that pose health hazards for the inhabitants.

Respondends in this research alluded that sometimes water shortages are as a result of climate change which agrees with Melore and Nel (2020) who opined that advanced climate variability in terms of unequal rainfall distribution, drought, and inadequate water resource management can cause water shortages. The water problem in Monze Urban is strikingly similar to that of other cities in third world countries, where it is claimed that inadequate spatial planning and integrated urban planning are to blame for the water scarcity (Jacobsen et al. 2012; Nairizi, 2017). As reflected in the theoretical framework of this study, the urban planning theory outlines how issues of

sanitation and water supply can be resolved using the philosophy of designing and constructing cities (Cao, 2013). This requires proper urban design for the provision of water and sanitation in Monze's unplanned settlements.

5.2.2 Sanitation services provision

Access to sanitation is recognized as a human right. Poor access to clean and adequate sanitation is one of the major cause of deaths in both rural and urban areas and one of the main risk factors for diarrheal illnesses. It is the mandate of utility companies and those charged with community development to provide sanitation services within the localities. Results on the sanitation service provision were revealed through the four sub-themes. These include: availability, types and status of sanitation facilities as well as status in terms of toilet usage from the sharing perspective.

5.2.2.1 Availability of toilets

Results on the availability of toilets revealed that 92.98 percent of households had toilets. This finding is similar to a study by Hubbard et al. (2020) who stated that the majority of households in the peri-urban of Lusaka had access to toilets. Muanda et al. (2020) argued that despite the presence of sanitary facilities, access to daily sanitation in informal communities varied depending on the time of day and location. Findings from the study also indicated that 7.02 percent households did not have toilets. In line with these revelations, a study held in Abijan found that eight percent of the surveyed households had no latrines and open defecation was common among households in informal settlements (Angoua et al. 2018). Similarly, the United Nations report shows that over 65 percent of residents in informal settlements lack access to appropriate sanitation facilities (UN-Habitat, 2014). This is an indicator that there is need to step up in terms of sanitation services provision.

5.2.2.2 Types of toilets

Results on the types of toilets used by households in this study revealed that 87.13 percent used pit latrines. Flushing toilets were used by 2.92 percent, 1.17 percent used the bucket system while 2.34 percent used other methods. In a related study of Kabwe's informal settlements, Phiri (2016) found that 99 percent of families used pit latrines while the remaining 1 percent practiced open defecation. Additionally, in Lusaka, the majority of households mostly utilized pit latrines (70 percent) while18 percent had access to flush toilets and 1% were linked to a network that was sewage-

fed (Hubbard et al. 2020). Angoua et al. (2018) also agrees that pit latrines were the most seen sanitation facilities in the informal settlements of Ethiopia.

While the majority of households in this study used pit latrines, however, a recent study in the informal settlements in the Western Cape disagreed that most households used the communal flush toilet and other facilities (Muanda et al. 2020). This disparity maybe that the informal settlements of Western Cape had good infrastructure available. Due to the poor structure of the pit latrines as observed in the study, some contemprary studies have added that sanitation facilities in most unplanned settlements were of low standard because they lacked sewer connections (Shiras et al. 2018; Tidwell et al. 2018).

5.2.2.3 Status in terms of toilet usage from the sharing perspective

Results on the status in terms of toilet usage from the sharing perspective revealed that 67.25 percent of the household members shared toilets with neighbours. This finding is in agreement with Hubbard et al. (2020) who reported that a fifth of households (21 percent) in the peri-urban of Lusaka shared toilets with other neighbours. The situation was worse as about eighteen (18) people used the same toilet. The sharing of toilets in unplanned settlements poses health risks on the users. It has been established that using a heavily shared toilet and living in an area with inadequate sanitation facilities increase the risk of contracting waterborne diseases (Duncker, 2014; Anthonj et al. 2018). Unplanned settlements frequently have high population densities, which makes individual toilets impractical. In addition, residents may not have control over land or enough space for private restrooms, contributing to the widespread occurrence of shared toilets in these types of settlements (Chipungu et al., 2019).

Additionally, a report by the World Health Organisation (2015) agrees with this study which indicated that in Zambia, 24 percent of toilets in informal settlements are used by multiple households on a single residential plot. This report was further confirmed by Chipungu, et al. (2019) where landowners and tenants in Bauleni-Lusaka primarily shared pit toilets on the same residential plot. Equally, strangers and passer-by also used the latrines due to a lack of physical boundaries. A study on determinants of quality of shared sanitation facilities in informal settlements of Kenya revealed similar results that pit latrines were shared by averagely eight households (Simiyu et al, 2017). It is for this reason that the Joint Monitoring Program (JMP) of the World

Health Organization and the United Nations Children's Fund do not recognise shared toilets as safe facilities because of issues with, among other things, upkeep and cleanliness (UNICEF/WHO, 2008).

5.3 Challenges and opportunities faced in supplying and accessing water and sanitation in unplanned settlements

The provision of water and sanitation in unplanned settlements comes with its own challenges but with potential opportunities. Results on the challenges and opportunities faced in supplying and accessing water and sanitation in unplanned settlements of Monze Urban have been presented and discussed as below.

5.3.1 Challenges faced in supplying and accessing water and sanitation in unplanned settlements

Results on the challenges faced in the provision and access to water and sanitation services have been presented and discussed under the following sub-headings:

5.3.1.1 High water connection charges

One of the findings on the challenges of access to water and sanitation in unplanned settlements revealed that connecting water to the households in the study area was expensive (K1350.00). These findings concur with Mitlin and Walnycki, (2020) who reported that prices paid by households for public water provision in informal settlemets of Blantyre and Dar es Salaam were exhorbitant (US$28). Studies have also shown that because of their remote location and physical state, connecting water to informal settlements in sub-Saharan Africa comes at a high upfront expense (Dos Santos et al. 2017). The World Bank, (2015) has also added that in most developing countries, the majority of households have expensive water and sewer connection fees in comparison to their income. Ndhlovu (2022) claims that a number of factors can be attributed to high cost of water connections in unplanned settlements. These include a lack of economies of scale where informal settlements frequently consist of a small number of households. this makes it less economical for water utilities to provide connections, leading to higher costs.

5.3.1.2 High water tariffs

The second challenge emanating from the results was high water tariffs (K200.00) per month charged on the households. More specifically on fixed water tariffs since most household in the research area were not provided with water metres. As a result, some

households were disconnected by the utility company because they could not pay for the services. In line with these findings, Dos Santos et al. (2017) stated that households in informal settlements frequently pay more for water services than city dwellers in developed areas. Contrary to this statement, the World Bank (2014) reported that households were able to pay for the water tariffs, but the level of subsidy reaching the poorest was very low. However, Dagdeviren (2008) argued that since water access in informal settlements is poor, utilities must increase rates even further to cover operating and service expenses. If this view is to be followed in unplanned settlements, it will be difficult to achieve access to safe drinking water for all citizens as targeted by the United Nations (Zvobgo, 2021).

5.3.1.3 Delays in connecting water

Findings on the challenges to access water and sanitation services revealed the time taken to connect households to the SWSC system was too long(about three months). However, SWSC staff responded that once payment was made, water can be connected within ten (10) working days. The concerns raised by the respondents are in agreement with Dos Santos et al. (2017) and Pierce (2017) who attributed that delays to connect residents was due to utilities failures. It has been argued that connecting informal settlements to the water supply may result in a change in the geography of demand away from established distribution hubs and may have an impact on the quality and regularity of the supply in addition to raising the amount of water needed (Dos Santos et al. 2017; Pierce, 2017).

Responses from SWSC officials in the study area attributed the delayment of connecting water to unplanned settlements to demographic and technical challenges. Sinharoy et al. (2019) agree to this assertion in that the characteristics of unplanned settlements complicates the provision of water due to high population density and unstructured buildings. Kavish (2021) also agrees that in such haphazard settlements, it is difficult to connect water pipelines because they were built illegally on both public and private lands. Infact, Hawkins et al. (2013) comfirms that utility companies may find it challenging to reach certain households due to narrow streets.

5.3.1.4 Lack of infrastructure and low water pressure

The findings from some households indicated that the cost of plumbing materials where very high in the area. Added to this problem was the dilapidation of

infrastructure which led to water leaking and hence less supply to the users. Chan (2012) found similar results in some developing countries where the poorest communities' access to water and sanitation services was restricted by a lack of facilities. Even though there are plenty of water resources available in the current study area, it argued that adequate infrastructure is still lacking to distribute this water in similar localities (Muanda et al. 2020). Therefore, extending service infrastructure to these areas can be costly because utilities may not have the required tools (Dos Santos et al. 2017).

Some households lamented that they experienced low pressure from the taps which was attributed to dilapidated water infrastructure. This compares to results reported by Chabe (2018) who found that due to poor infrastructure, water pressure has drastically dropped in Lusaka's informal settlements. As observed by Carlsson et al. (2010), the lack of adequate water infrastructure in Kenya, Tanzania, and Ethiopia caused low water pressure from the household taps in informal settlements. Utility companies in these nations struggle with serious shortcomings brought on by the use of outdated and deteriorating infrastructure (Pavelic et al. 2012; Marks et al. 2013).

5.3.1.5 Vandalism and illegal connections

Findings from the SWSC staff and observations revealed that there was vandalism and illegal water connections. These findings are consistent with NWASCO (2015) report which highlighted that most of the water and sanitation networks in peri-urban settlements are dilapidated due to vandalism. This situation has led to pollution in the water and reduced water flow from the household taps (UN-Habitat, 2007). The situation in the study area is related to the scenario observed by Ndhlovu (2022) who noted that in order to obtain the water they require, some community members deliberately destroyed water pipelines that are visible from the surface.

Moreover, Hadley and Wutich (2009) observed that due to inadequate water, households find alternative water sources such as groundwater wells and private vendors to acquire water. Some residents of the settlement occasionally turn to vandalism of water pipes (see figure 17) as a means of obtaining water due to the inadequate and limited access to water there. This trend was also common in similar localities of Malawi (Adams, 2018; Omarova et al. 2019).

Illegal water connections were also observed in the study area. In a related study, Meehan (2013) asserts that since most unplanned settlements are affected by the lack of water due to the illegal connections, water shortages have become the order of the day. This illegality has been attributed to unwillingness or failure by households to pay for water bills (Madlala and Rawlins, 2014; Mlaba, 2020).

5.3.1.6 Lack of funding

The other setback emanating from the findings was inadequate operational funding for the utility company and this challenge hampered monitoring of water lines against vandalism and illegal connections. A related study established that municipalities charged with the responsibility of providing water and sanitation services fail to do so because they frequently lack the financial resources (Cairncross et al. 2010). This is in line with the arguments made by Chaplin (2011) and Sinharoy et al. (2019), who claimed that governments have been less willing to engage in sanitation infrastructure than in water even when funds have been made available. Fears surrounding cost recovery, particularly the idea that residents of informal settlements may be unwilling or unable to pay enough to cover the investment and maintenance costs of services, may be a barrier to government investment in water and sanitation (Dos Santos et al. 2017; Pierce, 2017).

In the 2023 budget, the Zambian government allocated K2.3 billion (1.37 percent) for various water supply and sanitation projects out of K167.3 billion total National budget (GRZ, 2023). These funds are inadequate to provide water and sanitation to all citizens especially those living in unplanned settlements. However, the lack of funds to manage water and sanitation services in unplanned settlements has been caused by poor financial management and corruption by management (Muller, 2008). Consequently, water supplies will remain severely constrained if infrastructure is not built and maintained or if money is constantly misappropriated by officials with impunity.

5.3.1.7 Lack of stakeholder participation

The findings on stakeholder participation revealed that there was lack of coordination with stakeholders in water and sanitation sector in unplanned settlements of Monze Urban. Communities are without doubt the main and most significant stakeholders in the delivery of water supply and sanitary services. Adom and Simatele, (2022)

described stakeholders' engagement in water governance as a variety of political, institutional, and administrative laws formally and informally established procedures for making decisions and carrying out policies. Similar to findings in this study, Brown (2013) who argued that although community and stakeholder involvement in water resource management is mandated by law and has strong support in theory, policy, and principle, engagement has not been successful. Grzybowski et al. (2019) added that despite the recommendations made in global and national frameworks on stakeholder participation at all levels of water management and governance, many nations hardly take public participation into account. This is especially true when it comes to the stakeholders' participation in prioritization, planning, decision-making, and execution.

Additionally, the gaps in water policies have made it difficult for communities and civil society to participate in meaningful ways in water and sanitation programs in unplanned settlements (Akhouch and Correia, 2016). For instance, the majority of stakeholder engagement assessments have not been able to advise future engagement programs or give policymakers the knowledge and experience they need. According to Azizi et al. (2009), stakeholder participation initiatives frequently fall short of what local communities anticipate or are merely put aside to the detriment of the people in the localities. In order to ensure that there is stakeholder participation in water supply and sanitation provision in unplanned settlements, government and utility companies should create a consultative platform to discuss important problems and determine the main obstacles to providing services to the poor.

5.3.2 Opportunities in supplying and accessing water and sanitation in unplanned settlements

Results on the opportunities in the provision and access to water and sanitation services have been presented and discussed under the following sub-headings:

5.3.2.1 Subsidized connections fees

The findings on the opportunities in the provision and access to water and sanitation revealed that households were looking forward to seeing the reduction in connection fees to SWSC. This is in agreement with the Water and Sanitation Program (WSP) (2002) report in Côte d'lvoire where government through a utility firm called Société de Distribution d'Eau de la Côte d'Ivoire (SODECI) subsidised household connections

in informal settlements. The household connections are subsidized through a surtax on water bills that is managed by a public-sector fund. It applies to low-income regions in both the big cities and the small towns that SODECI supplies water to.

Beard and Mitlin (2021) also agree that households have no access to piped water because the cost of water connection is unaffordable. In Southern Province, customers applying for new connections must meet the cost of 12m poly pipe, associated fittings and connection fee of K1500.00 ($75) (NWASCO, 2020). However, in Mzuzu-Malawi and Nairobi piped water costs are lower between 75 cents and $2.50 per cubic meter for residents in informal settlements (Beard and Mitlin, 2021; NCWSC, 2023). UNICEF/WHO (2019) concludes that there is a continued need for channeling some form of public subsidy to poorer and more vulnerable households to ensure that informal settlements have access to water and sanitation.

However, some scholars contradict with the findinigs in this study concerning subsidizing water connection to unplanned settlements. It has been argued that governments may not be willing to subsidise water and sanitation connection because residents of informal settlements may fail to pay enough to cover the investment and maintenance costs of services (Dos Santos et al. 2017; Pierce, 2017). Kayaga and Franceys, (2007) have noted that it can be challenging to provide subsidies to unplanned settlements in some low income settlements.

In most cases, informal settlements do not contribute to the tax base and these areas may not then be considered when decisions are made about the allocation of resources (Kariuki et al. 2003). In cities such as Kano, Nigeria and Addis Ababa, Ethiopia where land tenure and legal constraints do not create blockages, the utilities have financed 100 percent of the costs of network expansion and standpipe installation in informal settlements (Kariuki et al. 2003). Therefore, formal investment in water and sanitation is often targeted at planned areas where legal status is clear and investment risks are low.

5.3.2.2 Continuous water supply

Other findings on the opportunities revealed that the provision of water in unplanned settlements would enhance the continuous supply of water to the residents. Similar to these findings, Petersen-Perlman et al. (2012) observed the availability of quality

water to the residents will greatly help to reduce scarcity of water when the right quantities of water are delivered at all times. It can also be argued that better water availability improves the quality of life in informal settlements and lowers morbidity and mortality (Muzondi, 2014). However, the numbers of people living in slums who do not have access to clean water continue to increase at an alarming rate (WHO/UNICEF, 2017). If concerted efforts are put together, it will be easier to achieve sustainable development goals on water supply and sanitation provision (Sinharoy et al. 2019).

The continuous supply of water requires necessary facilities and infrastructure to be put in place. In peri-urban settlements, infrastructure related to water is indispensable for the provision of quality water (Habibian and Minaie, 2018). One of the cheapest and most common water points that can carter for more households are water kiosks and as observed in this study. However, Adams (2018) countered this claim by arguing that water kiosks and communal taps frequently fail to function due to the high dependency ratio which results in inconsistent water delivery.

5.3.2.3 Improved types of toilets

The study's results showed that in order to maintain good sanitation and health, improved toilets were absolutely necessary. The kinds of toilets present in the compounds were a health risk to the locals. The residents proposed that UDDT or VIP were less expensive to construct and provided more benefits than typical pit latrines. The proposal is justifiable because there is inadequate water supply therefore, the UDDTs are suitable and sustainable option in such a locality for they do not require water to use. Additionally, results indicated that the by-products from UDDTs would provide manure that could be used in the gardens and maximize on crop production. In line with these findings, Gensch et al. (2010) highlighted that pit latrines can be replaced with urine-diversion dry toilets in informal and emergency settings.

The method of using UDDTs generates the most profit for the households living in low income settlements. This was made feasible by the creation of fertilizer for use in backyard gardens (Conroy et al. 2022). Numerous papers have a great deal of evidence supporting the use of treated urine as a fertilizer in plant production (Gensch et al. 2010; Rieck et al. 2011). Evidence suggested that urine is a balanced, nitrogen-rich

fertilizer that can substitute chemical fertilizer in crops and provide equivalent yields (Gensch et al. 2010).

Despite the benefits advanced by the respondents in this study, the adoption of UDDTs has not always been successful in unplanned settlements (Roma et al. 2013; Conroy et al. 2022). According to a study conducted in the eThekwini Municipality, Mkhise et al. (2017) found that the facilities' acceptance level was poor and steadily declining. However, Roma et al. (2013) reported that users in the South African slums most frequently cited the odor, maintenance concerns, and excreta management as barriers to acceptance and successful use of the toilets.

Other academics have also refuted the assertion that UDDT construction is inexpensive as found in this study. A hurdle to UDDT adoption, according to Keraita et al. (2013) and Alemu et al. (2017), is the high capital cost of construction. Household members from underprivileged settlements were consequently less likely to embrace the technology. For instance, according to Chunga et al. (2016), community members in Malawi needed between MK70,000 and MK90,000 ($155 and $200) to buy a UDDT, whereas in Zambia, a facility of a comparable nature would cost about K4,500.00 ($225) (Nyambe et al. 2010). According to Tilley et al. (2008), the UDDT system works well in populated locations without access to mechanical emptying/trucks because the Product needs to be removed by hand. However, with effective community sensitization and adequate funding, UDDTs may be financially sustainable and environmental friendly. This would improve sanitation levels in unplanned settlements.

5.3.2.4 Improved health

Results on the opportunities of water supply and sanitation provision in unplanned settlements revealed that the access to improved water and sanitation facilities would greatly improve health and reduce waterborne diseases. Many cases of waterborne infections have been linked to the poor availability of drinking water and basic sanitation in unplanned settlements (Hemson, 2016). Accessing water from boreholes and shallow wells and the use of pit latrines are common practices that lack access to service delivery. Findings related to this study revealed that more than 80% of households believe that the presence of latrines contributes to a cleaner environment and better health (Anthonj et al. 2018).

In addition, better water supply and sanitation can greatly lower the incidence of water-borne illnesses (Armah et al., 2018). Therefore, drinking water must be treated in conformity with WHO/UNICEF (2017) drinking water recommendations. From the perspective of public health, it is essential to combine efforts for bettering water infrastructure with initiatives for bettering sanitation infrastructure (Armah et al., 2018). According to studies by Fuller et al. (2016), such integrated interventions can be implemented in unplanned settlements.

5.3.2.5 Provision for community Water schemes

Results indicated that the supply of quality water and sanitation provision would be improved if community water schemes were provided in the study area. These results are in line with a research by Mugumya (2013) and Katete (2017), which found that informal communities had benefited from the effectiveness of community water schemes. For instance, the Mulundu Community Managed Water Scheme in Luapula and Malota in Livingstone have seen a variety of successes, such as growing the number of taps and preventing any significant system failures (Ng'oma, 2015; Katete, 2017).

The viability of community-based water schemes was also witnessed in some Lusaka informal settlements, according to Nkonkomalimba and Mumba (2014). With the aid of CARE International, a water system was built after significant community and local government consultations. In terms of upkeep and minor repairs to the water system, as well as the collection of water fees, the system was administered and controlled by an Area Based Organization (ABO) (under the supervision of the RDC) (Nkonkomalimba and Mumba, 2014). Within the community, the majority of the families that are a part of the user plan pay for the water fees weekly.

In contrast to the study's findings, experts have noted difficulties in obtaining funding for large capital expenditures like tanks and backup pumps for community water systems (Lockwood and Smits, 2011; Mugumya, 2013). The water schemes in certain studies (Ng'oma, 2015; Katete, 2017) had skilled people to operate and perform maintenance work, but there were technical issues because the service facilities were few and practically dilapidated (Heikkila et al. 2012). According to NWASCO, there were issues with a lack of oversight in terms of the cost and quality of the water (NWASCO, 2009). Despite the fact that the programs were created to enhance the

availability of water in unplanned residential areas, Mweemba (2013) found that water was only available at certain hours. However, if water schemes were established in unplanned settlements, water difficulties would be lessened.

5.4 Effectiveness of the policy, legal and institutional frameworks on water supply and sanitation services provision in unplanned settlements.

Governments are usually responsible for drafting laws and regulations that expressly address issues of access to water and sanitation. In order to implement government programs and ensure that all citizens have access to good, sufficient, and clean water and sanitation services, policy, legal, and institutional frameworks on water supply and sanitation are crucial. Results on the effectiveness of the policy, legal and institutional frameworks on water supply and sanitation services provision in unplanned settlements discussed under the following sub-headings:

5.4.1 Awareness of water and sanitation policies

Findings on the awareness of water and sanitation policies revealed that 66.7 percent of the staff were not aware of policies that govern water and sanitation provision in unplanned settlements. This finding agrees with Muanda et al. (2020), who reported that service providers' familiarity with the current sanitation policies is little to non-existent. According to Pan et al. (2018), this ignorance may be the reason why sanitation services and facilities are not provided in a way that meets the demands of inhabitants in informal settlement.

On the other hand, Xabendlini (2010), argued that it is not only the staff who may be ignorant but communities also lack awareness of public policies, especially those that describe how to provide services to the public. This is demonstrated by the communities' unwillingness to take part in the projects and programs intended to deliver services in an effective and efficient manner. Small-scale systems thus frequently receive little policy attention and institutional support, leading to underfunding and minimal improvement activity (WHO, 2016). Therefore, it is important to raise awareness about the existence of relevant policy, legal and institutional frameworks on water supply and sanitation services provision in unplanned settlements so as to ensure timely implementation for the betterment of the community members.

5.4.2 Effectiveness of water and sanitation policies in unplanned settlements

According to the findings on the implementation of water and sanitation policies in unplanned settlements, 66.7 percent of the officials said that the policy was being implemented slowly. Others noted that unplanned areas were not addressed in the policy, while 16.7 percent thought the implementation was appropriate. In a similar study by the Overseas Development Institute (2017), it was established that the informal settlements face obstacles to the creation and implementation of WASH policies, including a lack of institutional requirements and a lack of cooperation between donors and government authorities. Even when policies are clear, problems with land tenure may prevent utilities from offering services in unplanned settlements (Subbaraman et al. 2013; Mcgranahan, 2015; Saravanan et al. 2016). Inconsistent regulations may prevent their implementation, especially in the absence of a larger policy vision, hence making the policies ineffective (Kariuki et al. 2003; Sinharoy et al. 2019).

Muzondi (2014) also agrees that the reason why water and sanitation policies take so long to be implemented is because they are merely blueprint dogmas that do not address the practical developmental challenges and issues that individuals face. According to a common premise (Ahkmat and Khan, 2011), developing countries frequently assign policy development experts who are unaware of what occurs at the local level. Evidently, there needs to be a paradigm shift on how to provide water and sanitation in unplanned settlements.

Furthermore, Kariuki, et al. (2003) asserted that the majority of water and sanitation policies are rather general, categorizing operations as either urban or rural, and neglecting to explicitly address those issues that impede service delivery to informal settlements. The needs of the impoverished are frequently believed to be satisfied in the same way as those of other urban or rural populations (Aihuki, 2020). However, given the fundamentally different nature of the locality as portrayed in this study especially unplanned settlements, this is rarely the case in actuality. This is because Zambia's policy reforms do not guarantee that utilities provide water services to the unplanned settlements (Chitonge, 2011; GRZ, 2011). This has resulted in a lack of clear direction for service delivery in unplanned settlements (Saravanan et al. 2016).

5.4.3 Legal frameworks on water supply and sanitation services provision

The findings on the legal frameworks on water supply and sanitation services provision have indicated that the there were pieces of legislation that govern the provision of water and sanitation in unplanned settlements. Notable among these were the National Water Supply and Sanitation Act No. 28 of 1997, the Water Resources Management Act No. 21 of 2011, the Local Government Act CAP 281 and the Environmental Management Act No.12 of 2011. However, it was realised from other technocrats that the mentioned legal provisions were not very clear on unplanned settlements.

This finding is in line with that of Greywoode (2021), who discovered that legal regulations on water and sanitation were applicable in Freetown, Sierra Leone's informal settlements. Similar findings that legal frameworks are vital in providing water and sanitation services to family units in informal settlements were also reported by Shezi (2017). For instance, according to a research by Tissington (2011), the main goals of the legal requirements are to protect people's rights to basic sanitation and access to a reliable water supply. Evidence from Sierra Leone, however, demonstrates that there are still shortcomings in the legal mechanisms to improve the provision of water supply and sanitation to informal populations (Greywoode, 2021). The legal structures, for example, did not provide clarity and strategies on how water supply to these communities would be done.

The Water Supply and Sanitation Act No. 28 of 1997, according to field evidence, was one of the laws that declared that water and sanitation would be provided to every area of the Zambian nation. When considering service provision to the unplanned settlements, the institutional staff lamented the Act's flaws. Water shortages in unplanned settlements have been observed, and Banda (2013) and Ndhlovu (2022) concurred that the Act has failed to ensure a well-organized and maintained supply of water to most sections of the country. When evaluated in the context of providing services to informal settlements, the act is consequently insufficient because it should have included some specific sections aimed to improve and pay particular attention to unplanned settlements (Banda, 2013). This problem, according to Monashane (2011), is due to lack of local government funding and infrastructure. This was earlier discussed in sections 5.3.1.4 and 5.3.1.6. In order for policies in Zambia to address water and sanitation challenges in unplanned settlements, there is need to involve

communities in planning and decision-making processes, and prioritize water and sanitation investments in low-income areas.

5.4.4 Institutions involved in the provision of water supply and sanitation services

Findings on the institutions and roles involved in the provision of water supply and sanitation services in unplanned settlements revealed that there were a number of institutions. Among them is the NWASCO, the Ministry of Water Development and Sanitation, Monze Town Council, NGOs etc. On the other hand, most households were aware of the utility company (SWSC) and the local authority **(**Monze Town Council) as these institutions were physically seen to operate in the community. These institutions play various roles to ensure that water supply and sanitation provision were enhanced in the community. Similar findings were made by Chimangeni (2019), who discovered that important institutions including the Ministry of Local Government and Housing (MLGH) now Ministry of Local Government and Rural Development (MLGRD) and the Ministry of Energy and Water Development (MEWD) now Ministry of Water Development and Sanitation provided the Water Supply Sanitation (WSS) in Chinsali.

It was also revealed in the study that the local authority was charged with the responsibility of providing water and sanitation within the district boundary. This is supported by the Local Government Act Cap 283, which assigns local authorities the primary duty of providing sanitary services and residential water supply to all places that fall within their jurisdiction (GRZ, 1991). The local government is given the jurisdiction by this Act to establish standards and bylaws for the delivery of services and for taking responsible decision on levels of water and sanitation services to ensure that they are both appropriate and affordable. Shezi (2017) concurs that the provision of water and sanitation services in unplanned settlements is first and foremost the responsibility of the local municipality. According to the Water Supply and Sanitation Act No. 28 of 1997 (GRZ, 1997), commercial utilities that are licensed and regulated by NWASCO are also permitted to provide urban Water Supply and Sanitation services on behalf of local authorities.

Further, findings indicated that SWSC as a recognized CU in Monze Urban supplies water and offers sanitary services. According to NWASCO (2009), the CUs were established when the transfer of water and sanitation services from local governments to CUs was expedited in 1999. Given the shift in the macroeconomic climate, wherein liberalization and private industry became the norm, the government saw the transfer of water supply and sanitation services as institutional reforms that were unavoidable (GRZ, 1994). This was caused by the local government's inability to deliver a reliable supply of water and sanitary services.

Despite the availability of a number of institutions in the study area, Chimangeni (2019) argued that there are currently no institutional structures in the nation that have been expressly designed to provide water supply services to the informal settlements. The results of this study also do not agree with those of Nkhuwa (2009) and Gutierrez (2007), who believed that the absence of sectoral coherence in investment plans is a tragic result of the confusion institutions in the industry have caused.

Additionally, the management and implementation of programs in the water supply and sanitation sector are hindered by insufficient coordination mechanisms, a lack of baseline data for planning purposes, and weak institutional and human capability; the data on water supply and sanitation is very scanty (GRZ, 2011). Even worse, unplanned settlements face a number of institutional obstacles to the creation and implementation of WASH policies, including a lack of clear institutional mandates, duplication of efforts in the sector, and a lack of policy coordination between donor institutions and government agencies (Mbilima, 2010; Overseas Development Institute, 2017). However, organizations in the water supply and sanitation sectors are essential means of delivering the required services in unplanned settlements.

5.4.5. Areas of collaboration between institutions in water supply and sanitation provision in unplanned settlements.

In order to effectively implement the water policy in the residential areas, particularly unplanned settlement, finding showed that there was some degree of collaboration among the institutions in water supply and sanitation. Institutional collaboration was reported on the installation and maintenance of hand pumps by NGOs with community involvement, and multi-sectoral and community partnership approach as evidenced in the set-up of V-WASHE committees. These results are comparable to those of Ananga

(2015), who noted a notable improvement in collaboration and partnership between water service providers in similar settings of Kenya's Kisumu County.

With the goal of enhancing service delivery, this partnership created a forum for stakeholders in the water business to share ideas and experiences. In agreement with this study, some studies in developing countries show that improving water and sanitation in informal settlements required a multi-sectoral approach (Mapunda et al. 2018; Christopher and Beal, 2021). According to this method, the community engages in high levels of advocacy collaboration with businesses, CBOs, and NGOs (Chase and Ngure, 2016).

When issues surpass the mandates and capacities of any one institution, Kimberly et al. (2022) further reinforced the study's conclusions that collaborative approaches are a potential strategy to strengthen Water, Sanitation, and Hygiene (WASH) service delivery systems. The best practices show that, in cooperation with other stakeholders, governments and institutions with official pro-poor policies are willing to commit funding and incentives to promote the enhancement of services in informal settlements (Sinharoy et al. 2019). Schwartz and Sanga (2010) conducted a similar analysis at Kampala City Water Corporation and discovered a city-wide sector approach that brought together all of the regional players and development partners operating in the informal settlements.

However, in this study there was no evidence of collaboration on sanitation service provision. In contrast, the Kenya case study demonstrated how the utility company, in partnership with local governments and private sector businesses, was able to manage faecal sludge along the entire sanitation chain (URT, 2019). As was previously mentioned in section 5.3.1.7, certain institutions did not engage with stakeholders. According to NWASCO (2012), the main objective of providing access to service provision has been unsuccessfully attempted in informal settlements due to the limited coordination in developmental planning among CUs, traditional and planning authorities. This issue impacts impromptu settlements. In terms of the institutional absence of engagement between Community-Based Organizations (CBOs) and the CU, Chimangeni (2019) also noted similar trends.

5.5 Chapter Summary

This chapter discussed the findings of the research according to the research objectives. The following chapter presents the conclusions and recommendations.

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This chapter presents the conclusion and recommendations drawn from the findings of the study. It also shows the generalization of the findings, a summary of the addition to the body of knowledge. The chapter concludes with suggestions for future research.

The purpose of this study was to assess the existing challenges and opportunities of water supply and sanitation in unplanned settlements of Monze urban in Southern Province of Zambia. There were three specific objectives in this study presented in section 1.5 namely;

i. To assess the water supply and sanitation service provision in unplanned settlements of Monze;
ii. To establish the challenges and opportunities of water supply and sanitation in unplanned settlements of Monze; and
iii. To evaluate the effectiveness of the policy, legal and institutional frameworks on water supply and sanitation services provision in unplanned settlements of Monze.

6.2 Conclusions

On the aspect of assessing the water supply and sanitation service provision in unplanned settlements, this study established that households rely on shared taps and shallow wells for water, compromising water quality and reducing access to three hours a day due to population growth. The utility company installed water kiosks in unplanned settlements, but most are unfunctional due to vandalism and lack of funds. Sanitation coverage has not improved, leading to households relying on pit latrines, potentially causing waterborne diseases, indicating slow infrastructural development in these areas.

On establishing the challenges and opportunities faced in supplying and accessing water and sanitation in unplanned settlements, Service providers faced difficulties with regards to insufficient finances while households encounter inflated water connection charges. Challenges encountered by service providers were with respect to inadequate finances and illegal connections. As a consequence, disruptions in water supply for the consumers occurred. Since the water supply was consistently

unpredictable, water bills were also contested if they were high for the majority of the time. These issues were noted as obstacles to better service delivery in the research locations.

Despite the challenges faced, opportunities can still be enhanced in as far water supply and sanitation provision is concerned in unplanned settlements. With adequate supply of water households in unplanned settlements look forward to continuous water supply and subsidized connections fees. However, with SWSC facing challenges in connecting all households to the main system, the provision of community water schemes can be of great help to supply water to the households. Possible interventions to address the problem of inadequate sanitation facilities is the installation of UDDTs in the settlements although issues of sludge management, funding and cultural aspects may impede the implementation. However, with effective community sensitization and adequate funding, UDDTs may be financially sustainable and environmentally friendly.

On evaluating the effectiveness of the policy, legal and institutional frameworks on water supply and sanitation services provision in unplanned settlements, progress in implementing water and sanitation legal frameworks has been made. However, the study has shown unclear application and less emphasis on unplanned settlements. Although the roles and responsibilities of institutions involved in water supply and sanitation provision have been highlighted, there is lack of guidelines for unplanned settlements. Thus the implementation of the policy has been slow. With weak collaboration between various institutions, the rights of people to quality water and sanitation in unplanned settlements would be a mere dream.

6.3 Contribution to the body of knowledge

This research sought to assess the existing challenges and opportunities of water supply and sanitation in unplanned settlements of Monze urban in Southern Province of Zambia. Thus, the research has achieved the following:

i. There hasn't been any research done so far to evaluate the prospects and challenges of water supply and sanitation in Monze urban's unplanned settlements in Zambia's Southern Province. This study has unearthed a number of challenges and opportunities and new knowledge that will be critical to improving the provision of water and sanitation in unplanned settlements.

ii. The research has highlighted the gaps that exist in the water supply and sanitation provision in unplanned settlements and the study has highlighted opportunities that can be enhanced if government and other partners can come on board to actualise these matters.

6.4 Generalisation

The research focused on Freedom A, Freedom B, and Zambia compounds of Monze Urban. This was because of their similar demographic and geographic characteristics to other unplanned settlements in Monze town. As a result, the findings of this study may be applied to other towns in Southern Province and to other unplanned settlements nationwide.

6.5 Study Limitations

The study posed the following challenges;

i. Due to the highly sensitive nature of the topic surrounding toilets in this study, several respondents did not feel comfortable discussing them openly.
ii. Some respondents were not willing to give out information because they were fed up with seeing field workers collecting information but no help was seen in the locality.
iii. Due to limited resources and the size of the area, only 206 respondents were included in the study.

6.6 Recommendations

Based on the major findings of the study, the following are recommended:

i. Addressing the issue of water supply and sanitation requires a multi-sectoral, community-based, and private public partnership approach in order to achieve SDG number 6. To ensure equal access to safe sanitation and clean water in all residential areas, stakeholders should work together to plan, finance, and oversee utility company operations.
ii. In order to reduce on water shortages and improve the quality of water, SWSC should maximise on water connections by identifying areas with high demand and potential for connections. The utility should also increase on hours of

supply and other stakeholders should come on board to provide community water schemes.

iii. Given the few number of toilets which are also on shared basis, the government and stakeholders should concentrate its efforts on planning for inclusive sanitation in unplanned settlements. This will lead to community-led projects to build and manage toilets, collaborate with private sector to finance and deliver toilet construction and promote affordable and sustainable toilet solutions.

iv. The local authorities should incorporate unplanned settlements into existing sector investment plans in order to provide water and sanitation services to these areas as well. This can be done by conducting thorough assessments to understand the settlement's demographics, infrastructure needs, and existing services; Integrate unplanned settlements into urban planning frameworks, including zoning regulations and land-use plans; and prioritise provision of basic services like water, sanitation, and electricity.

v. In order to improve water supply and sanitation coverage to unplanned settlements, the government should put stringent measures to ensure that the allocation of residential plots is done simultaneously with the provision of necessary services such as water and sewerage reticulation systems. This will also be in line with the Town and Country Planning Act Cap 283 of the Laws of Zambia.

vi. Since the national water policy has less emphasis on addressing the provision of water and sanitation in unplanned settlements, legislation supporting the same should be passed so that Local Governments and utility companies fulfil their duty for the development of unplanned settlements. For instance, inclusive definition of "water users" by expanding the definition to include informal settlement residents, recognizing their right to water services as well as incorporating alternative water sources, such as rainwater harvesting and greywater reuse, into policy frameworks.

vii. Coordination and collaboration among sector stakeholders must be regularised so that the Local Government together with the Utility Company improve on community engagement in unplanned settlements.

6.7. Suggestions for Further Research

The following observations were noted for further research;

i. Replicating similar research in other areas of Zambia could build a more comprehensive understanding of service provision in unplanned settlements.

ii. Technologies that can be put in place to improve the system of fecal sludge management.

iii. A study can be done to find out if there is an potential contamination of water at point source and point of storage in unplanned settlements. This is because this study did not delve much into the details of what compromised the quality of water.

iv. Conducting a study to explore socio-economic factors influencing water and sanitation behaviours in peri-urban areas.

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APPENDICES

APPENDIX A: ETHICAL CLEARANCE.

THE UNIVERSITY OF ZAMBIA
DIRECTORATE OF RESEARCH AND GRADUATE STUDIES

Great East Road Campus | P.O. Box 32379 | Lusaka10101 | Tel: +260-211-290 258/291 777 **Fax**: (+260)-211290 258/253 952 | E-**mail**: director.drgs@unza.zm | Website: www.unza.zm

APPROVAL OF STUDY

IORG No. 0005376

NASREC IRB No. 00006465

4th October, 2022

REF NO. NASREC-2022-JUL-019

Conceptor Siafwanzya

The University of Zambia

School of Mines

P.O. Box 32379

LUSAKA

Dear Ms. Siafwanzya,

RE: "CHALLENGES AND OPPORTUNITIES OF WATER SUPPLY AND SANITATION IN UNPLANNED SETTLEMENTS OF MONZE URBAN"

Reference is made to your submission of the protocol captioned above. The NASREC resolved to approve this study and your participation as Principal Investigator for a period of one year.

REVIEW TYPE	ORDINARY REVIEW	APPROVAL NO. NASREC-2022-JUL-019
Approval and Expiry Date	Approval Date: 4th October, 2022	Expiry Date: 3rd October, 2023
Protocol Version and Date	Version - Nil.	3rd October, 2023
Information Sheet, Consent Forms and Dates	□ English.	To be provided
Consent form ID and Date	Version - Nil	To be provided
Recruitment Materials	Nil	Nil
Other Study Documents	Questionnaire.	
Number of Participants Approved for Study		

Specific conditions will apply to this approval. As Principal Investigator it is your responsibility to ensure that the contents of this letter are adhered to. If these are not adhered to, the approval may be suspended. Should the study be suspended, study sponsors and other regulatory authorities will be informed.

CONDITIONS OF APPROVAL

- No participant may be involved in any study procedure prior to the study approval or after the expiration date.
- All unanticipated or Serious Adverse Events (SAEs) must be reported to NASREC within 5 days.
- All protocol modifications must be approved by NASREC prior to implementation unless they are intended to reduce risk (but must still be reported for approval). Modifications will include any change of investigator/s or site address.
- All protocol deviations must be reported to NASREC within 5 working days.
- All recruitment materials must be approved by NASREC prior to being used.
- Principal investigators are responsible for initiating Continuing Review proceedings. HSSREC will only approve a study for a period of 12 months.
- It is the responsibility of the PI to renew his/her ethics approval through a renewal application to NASREC.
- Where the PI desires to extend the study after expiry of the study period, documents for study extension must be received by NASREC at least 30 days before the expiry date. This is for the purpose of facilitating the review process. Documents received within 30 days after expiry will be labelled “late submissions” and will incur a penalty fee of K500.00. No study shall be

renewed whose documents are submitted for renewal 30 days after expiry of the certificate.

- Every 6 (six) months a progress report form supplied by The University of Zambia Natural and Applied Sciences Research Ethics Committee as an IRB must be filled in and submitted to us. There is a penalty of K500.00 for failure to submit the report.

- When closing a project, the PI is responsible for notifying, in writing or using the Research Ethics and Management Online (REMO), both NASREC and the National Health Research Authority (NHRA) when ethics certification is no longer required for a project.
- In order to close an approved study, a Closing Report must be submitted in writing or through the REMO system. A Closing Report should be filed when data collection has ended and the study team will no longer be using human participants or animals or secondary data or have any direct or indirect contact with the research participants or animals for the study.
- Filing a closing report (rather than just letting your approval lapse) is important as it assists NASREC in efficiently tracking and reporting on projects. Note that some funding agencies and sponsors require a notice of closure from the IRB which had approved the study and can only be generated after the Closing Report has been filed.
- A reprint of this letter shall be done at a fee.
- All protocol modifications must be approved by NASREC by way of an application for an amendment prior to implementation unless they are intended to reduce risk (but must still be reported for approval). Modifications will include any change of investigator/s or site address or methodology and methods. Many modifications entail minimal risk adjustments to a protocol and/or consent form and can be made on an Expedited basis (via the IRB Chair). Some examples are: format changes, correcting spelling errors, adding key personnel, minor changes to questionnaires, recruiting and changes, and so forth. Other, more substantive changes, especially those that may alter the risk-benefit ratio, may require Full Board review. In all cases, except where noted above regarding subject safety, any changes to any protocol document or procedure must first be approved by NASREC before they can be implemented.

Should you have any questions regarding anything indicated in this letter, please do not hesitate to get in touch with us at the above indicated address.

On behalf of NASREC, we would like to wish you all the success as you carry out your study.

Yours faithfully,

Dr.E. M. Mwanaumo

CHAIRPERSON THE UNIVERSITY OF ZAMBIA NATURAL AND APPLIED SCIENCES RESEARCH ETHICS COMMITTEE - IRB

CC: Director, Directorate of Research and Graduate Studies
Assistant Director (Research), Directorate of Research and Graduate Studies
Assistant Registrar (Research), Directorate of Research and Graduate Studies

APPENDIX B: HOUSEHOLD QUESTIONNAIRE

THE UNIVERSITY OF ZAMBIA

SCHOOL OF MINES

CHALLENGES AND OPPORTUNITIES OF WATER SUPPLY AND SANITATION PROVISION IN UNPLANNED SETTLEMENTS OF MONZE URBAN, SOUTHERN PROVINCE ZAMBIA

Dear respondent:

I am a student from the University of Zambia carrying out a study about the challenges and opportunities of water supply and sanitation in unplanned settlements of Monze urban, Southern Province, Zambia.

You have been randomly selected to participate in this research. Therefore, your full participation will be highly appreciated. I kindly request you to freely respond to all questions in the study questionnaire. All data collected will be treated with high level of utmost confidentiality and will only be used for research purposes.

Please respond to the following questions as truthfully as possible. Where there are options provided, select the appropriate response by putting a tick **[√]** in the box of your choice

SECTION A: GEOGRAPHICAL INFORMATION

Q. id	Question	Response	For official use
A1	Name of compound/township ……		

SECTION B: BACKGROUND CHARACTERISTICS OF THE RESPONDENT

Q. id	Question	Response	For official use
B1	Sex of the respondent 1. Female 2. Male		
B2	How old are you? (as at last birth day) 1. Below 18 years 2. 20-29 3. 30-39 4. 40-49 5. 50-60 6. Above 60		
B3	Highest level of education 1. No Schooling 2. Primary school 3. Secondary school 4. Tertiary education Literate		

B4	Occupation 1. Employed 2. Unemployed 3. Casual labor 4. Business 5. Others ……		
B5	Average monthly income 1. Below K1000 2. K1000-K3000 3. K3000-K5000 4. Above K5000.		
B6	Household population 1. 1-2 people 2. 3-5 people 3. 6-10 people 4. 10-15 people 5. Above 15 people		

SECTION C: WATER SUPPLY AND SANITATION SERVICE PROVISION.

C1	What is the source of water your area? 1. tap water □ 2. Shallow well □ 3. Stream/ River water □ 4. borehole □ 5. Other specify ……		
C2	Do you treat your water before use? 1. Yes □ 2. No □		
C3	If yes, what do use to treat water?		
C4	How far is your water point? 1. Less than 100 m □ 2. Between 100-200 m □ 3. 200-500m □. 4. 500-1Km □.		

C5	How is the water quality? 1. Good (no smell, acceptable taste, no residues) 2. Fair □ (no smell, has residues, acceptable taste, clear) 3. Poor □ (has smell, unacceptable taste, has residues)		
C6	How many hours is the water available? ……		
C7	Southern Water and Sanitation Company (SWSC) is the Company that is responsible to provide water supply and sanitation services in Monze, do you have SWSC connections in your community? 1. yes □ 2. No □ If your answer is No. go to question C11		
C8	If yes, where do you draw water from? 1) Kiosk 2) Stand pipe 3) Yard tap		
C9	What is the condition of water supply facility in C8 above? Good (slab around tap and water way, well raised above the ground and covered) Bad(no slab and no water way around tap, well not raised above ground, not covered)		
C10	What is your level of satisfaction on service provision by SWSC? 1. Satisfied □ 2. Fairly satisfied □□ 3. Unsatisfied □		
C11	If your answer to question 7 is No, has your community at any time engaged SWSC to bring water connection to your community? 1. Yes□ 2. No □		
C12	Apart from SWSC, what other institutions are involved in water and sanitation services in your community? Please name them. 1. ……. 2 ……. 3 …….		
C13	Do you experience water shortage in this area? 1 Yes □ 2 No□		

C14	If yes, for how long? ……		
C15	Do you buy water when there is no supply? 1.Yes □ 2. No □		
C16	What do you think are the major causes of water shortage in this area? ……..…… …… ……		
C17	What are the main challenges you face in accessing water through SWSC, if any? …… …… ……		
C18	Do you have a toilet? 1. Yes □ 2. No □		
C19	If yes, what type of toilet do you use? 1 Chemical toilet □ 2. Bucket System toilet □ 3. Pit latrine toilet □ 4. Flushing toilet □ 5. Other…….……...		
C20	Where is it located? 1. Inside the house □ 2 Outside the house □ 3. Other (eg, neighbour)…….		
C21	Do you share your toilet with neighbours? 1. Yes □ 2. No. □		
C22	Do you know what Ministry is responsible for water supply and sanitation service provision? 1. Yes □ 2. No □		
C23	If the answer to question C22 is Yes, what are your expectations about its role in providing water services to your community?		

C24	What are the opportunities in your community for water supply and sanitation services?		

SECTION E: MITIGATION MEASURES IN DEALING WITH THE CHALLENGES AND ENHANCING OPPORTUNITIES IN THE WATER AND SANITATION SUBSECTOR.

E1	What do you think should be done to improve the supply of water and sanitation services in your community? 1. …… 2. ……. 3. …….....
E2	How can collaboration between institutions, governmenrtand your community in relation to water and sanitation services provision be strengthened? 1. …… 2. …….. 3. ……. 4. …….....

Thank you for participating in this research!!

APPENDIX C: INTERVIEW SCHEDULES FOR CIVIC LEADERS/NHC MEMBERS

THE UNIVERSITY OF ZAMBIA

SCHOOL OF MINES

CHALLENGES AND OPPORTUNITIES OF WATER SUPPLY AND SANITATION PROVISION IN UNPLANNED SETTLEMENTS OF MONZE URBAN, SOUTHERN PROVINCE ZAMBIA

Dear respondent:

I am a student from the University of Zambia carrying out a study about the challenges and opportunities of water supply and sanitation in unplanned settlements of Monze urban, Southern Province, Zambia.

You have been purposively selected to participate in this research. Therefore, your full participation will be highly appreciated. I kindly request you to freely respond to all questions in the study questionnaire. All data collected will be treated with high level of utmost confidentiality and will only be used for research purposes.

Date: .....Time.....

1. Sex of the respondent: Male □ Female □
2. Name of the community_____
3. Ward_____
4. What is the source of water in your area?
5. How far do people in your jurisdiction travel to access water?
6. How is the water quality? 1. Good □ 2. Fair □ 3. Poor □
7. How is the service provision by Southern Water and Sanitation Company (SWSC)?
8. Apart from SWSC, what other institutions are involved in the provision of water supply and services in the research area?

9. How can you describe the engagement of these other water service providers with your community, are you in anyway part of the decision making process to extend these services to your community?
10. Has your community experienced water shortages?
11. What are the health challenges?
12. What are the main challenges faced by this community in accessing water and sanitation services?
13. What type of toilets do the locals use?
14. Are you aware of any existing policy that guides the provision of water and sanitation to your community?
15. Are the provisions of this policy implemented in water and sanitation provision to your community?
16. What opportunities do these policies provide both to the community and the utility companies?
17. What should be done by various stakeholders for water and sanitation services to be improved?
18. Is there any information I have not asked for which you would like to share with me on the subject of water supply and sanitation in your area? Or are there any questions you would like to ask?

Thank you for your time!

APPENDIX D: INTERVIEW SCHEDULES FOR COUNCIL WORKERS /EHT OFFICER

THE UNIVERSITY OF ZAMBIA

SCHOOL OF MINES

CHALLENGES AND OPPORTUNITIES OF WATER SUPPLY AND SANITATION IN UNPLANNED SETTLEMENTS OF MONZE URBAN, SOUTHERN PROVINCE ZAMBIA

Dear respondent:

I am a student from the University of Zambia carrying out a study about the challenges and opportunities of water supply and sanitation in unplanned settlements of Monze urban, Southern Province, Zambia.

You have been purposively selected to participate in this research. Therefore, your full participation will be highly appreciated. I kindly request you to freely respond to all questions in the study questionnaire. All data collected will be treated with high level of utmost confidentiality and will only be used for research purposes.

Date: .....Time.....

Sex of the respondent: Male □ Female □

1. Job description of the respondent _____
2. What is your highest level of education? _____
3. What is the role of the municipality on the concept of access to water and sanitation in the unplanned settlements?
4. Has there been any assistance rendered to the study area in the past?
5. Apart from SWSC, what other institutions are involved in the provision of water supply and services in the research area?
6. What is the current status on water quality on drinking water and domestic use unplanned settlements?

7. What are the main challenges are faced to provide water and sanitation services to unplanned settlements?
8. What are the health challenges?
9. What are the policies affecting water distribution and sanitation services in local authorities?
10. Are these policies implemented for water and sanitation provision to unplanned settlements?
11. What opportunities do these policies provide both to the community and the utility companies?
12. What other institutions are involved in providing water and sanitation services to the unplanned settlements?
13. If any, what particular roles do these institutions play in facilitating for water supply and sanitation services in unplanned settlements?
14. What is the policy on water supply and sanitation service provision?
15. Have these policies been effective in unplanned settlements?
16. Which pieces of legislation govern the provision of water and sanitation in unplanned settlements?
17. What should be done by various stakeholders for water and sanitation services to be improved?
18. Is there any information I have not asked for which you would like to share with me? Or are there any questions you would like to ask?

Thank you for your time!

APPENDIX E: INTERVIEW SCHEDULES FOR SWSC PERSONNEL

THE UNIVERSITY OF ZAMBIA

SCHOOL OF MINES

CHALLENGES AND OPPORTUNITIES OF WATER SUPPLY AND SANITATION IN UNPLANNED SETTLEMENTS OF MONZE URBAN, SOUTHERN PROVINCE ZAMBIA

Dear respondent:

I am a student from the University of Zambia carrying out a study about the challenges and opportunities of water supply and sanitation in unplanned settlements of Monze urban, Southern Province, Zambia.

You have been purposively selected to participate in this research. Therefore, your full participation will be highly appreciated. I kindly request you to freely respond to all questions in the study questionnaire. All data collected will be treated with high level of utmost confidentiality and will only be used for research purposes.

Date: .....Time.....

1. Sex of the respondent: Male ☐ Female ☐
2. Job description of the respondent _____
3. What is your highest level of education? _____
4. How many compounds in Monze are serviced by the Water utility?
5. What is the population for the utility service in unplanned settlements?
6. What is the general condition of these facilities?
7. How much is the new connection fee and what are the terms of payment?
8. Do people living in unplanned settlements afford these payments?

9. Are there other ways the water utility can improve and accelerate service provision to the unplanned settlements? Please elaborate
10. Does SWSC always provide water supply and sanitation services to unplanned settlements?
11. What other institutions are involved in providing water and sanitation services to the unplanned settlements?
12. If any, what particular roles do these institutions play in facilitating for water supply and sanitation services in unplanned settlements?
13. What areas do institutions collaborate in water supply and sanitation provision in unplanned settlements?
14. What is the policy on water supply and sanitation service provision?
15. Have these policies been effective in unplanned settlements?
16. Which pieces of legislation govern the provision of water and sanitation in unplanned settlements?
17. What opportunities can exist in water supply and sanitation provision in unplanned settlements?
18. What are the main challenges faced by the utility to provide water and sanitation services to unplanned settlements?
19. What should be done by the stakeholders in the subsector for services to be improved?
20. Is there any information I have not asked for which you would like to share with me? Or are there any questions you would like to ask?

Thank you for your time!

APPENDIX F: OBSERVATION CHECKLIST

THE UNIVERSITY OF ZAMBIA

SCHOOL OF MINES

CHALLENGES AND OPPORTUNITIES OF WATER SUPPLY AND SANITATION IN UNPLANNED SETTLEMENTS OF MONZE URBAN, SOUTHERN PROVINCE ZAMBIA

Water sources	**Available** **Yes/no**	**Functional** **Yes/no**	**Condition** **Good/poor**	**Comments**
Boreholes				
Communal taps				
Kiosks				
Communal toilets				
Sewer systems				