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AN INVESTIGATION INTO THE EFFECTS OF WATER SCARCITY ON HOUSEHOLD LIVELIHOODS: A CASE STUDY OF WARD 3, CHITUNGWIZA.

BY

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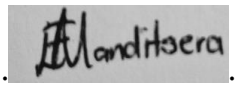
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The undersigned certify that they have read and recommend to the Bindura University of Science Education for acceptance, as a dissertation entitled: An investigation into the effects of water scarcity on household livelihoods: a case study of ward 3 Chitungwiza.



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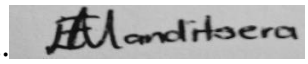
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I Esther Mazvita Manditsera (B221907B) hereby solemnly declare that this research is my own work and is not reproduction of someone else's work, unless otherwise acknowledged.

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DEDICATION

I dedicate this dissertation to my late father, whose love, guidance, and sacrifices continue to inspire me every day. Although he is no longer here to witness this achievement, his values, encouragement, and dreams for my future gave me the strength to persevere throughout this journey. May his soul continue to rest in peace. I also dedicate this work to my beloved family for their unwavering financial assistance, endless encouragement, prayers, patience, and emotional support throughout the four years of my degree studies. Your belief in me gave me the courage and motivation to overcome every challenge along the way. This accomplishment is as much yours as it is mine. Thank you for standing by me and being my pillar of strength throughout this academic journey.

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To the residents of Ward 3, Chitungwiza, who willingly participated in the survey and generously shared their experiences and perspectives, this research exists because of you. Your voices are at the heart of this work and I hope it contributes, in some measure, to addressing the challenges you face daily.

Finally, to my family, I owe an immense debt of gratitude for your patience, moral support and encouragement throughout this journey. Your belief in me kept me motivated during the most challenging moments of this research.

ABSTRACT

This study investigated the effects of water scarcity on household livelihoods in Ward 3, Chitungwiza, Zimbabwe. Despite constitutional guarantees to clean and safe water, over 70% of households in the ward experienced piped water supply interruptions more than five times per month, with approximately one-third having no functional piped water supply at all. Guided by the Sustainable Livelihoods Framework (SLF), the study employed a mixed-methods case study design, combining structured questionnaires administered to 343 households with 10 key informant interviews and 3 focus group discussions involving 24 participants.

The findings revealed that water scarcity imposes severe multidimensional burdens on household livelihoods. Economically, households spent between 20% and 30% of their monthly income on water procurement, far exceeding the internationally recommended threshold of 3–5%, while water-dependent informal enterprises reported significant productivity losses. Health impacts were alarming, with 57.7% of households reporting diarrhoea and 25.4% reporting typhoid in the preceding twelve months. Gender disparities were pronounced, with women and girls bearing over 90% of the water collection burden, limiting their educational participation and economic engagement. Household coping strategies, though innovative, were largely unsustainable, and municipal institutional responses were rated poor or very poor by 89.2% of respondents.

The study concludes that water scarcity in Ward 3 is a structural crisis rooted in ageing infrastructure, fiscal constraints, and institutional failure. It recommends urgent infrastructure rehabilitation, gender-responsive water governance, and increased national budgetary allocations to urban water and sanitation to safeguard household livelihoods in Ward 3 and similar urban communities across Zimbabwe.

This study investigated the effects of water scarcity on household livelihoods in Ward 3, Chitungwiza, Zimbabwe, where, despite constitutional guarantees to clean and safe water, over 70% of households experienced piped water supply interruptions more than five times per month, with approximately one-third having no functional piped water supply at all; guided by the Sustainable Livelihoods Framework (SLF), the study employed a mixed-methods case study design, combining structured questionnaires administered to 343 households with 10 key informant interviews and 3 focus group discussions involving 24 participants, and the findings

revealed that water scarcity imposes severe multidimensional burdens on household livelihoods, with households spending between 20% and 30% of their monthly income on water procurement, far exceeding the internationally recommended threshold of 3–5%, while water-dependent informal enterprises reported significant productivity losses; health impacts were alarming, with 57.7% of households reporting diarrhoea and 25.4% reporting typhoid in the preceding twelve months, and gender disparities were pronounced, with women and girls bearing over 90% of the water collection burden, limiting their educational participation and economic engagement; household coping strategies, though innovative, were largely unsustainable, and municipal institutional responses were rated poor or very poor by 89.2% of respondents. The study concludes that water scarcity in Ward 3 is a structural crisis rooted in ageing infrastructure, fiscal constraints, and institutional failure, and it recommends urgent infrastructure rehabilitation, gender-responsive water governance, and increased national budgetary allocations to urban water and sanitation to safeguard household livelihoods in Ward 3 and similar urban communities across Zimbabwe.

ACRONYMS

Acronym	Full Meaning
APA…	American Psychological Association
BSA…	British Sociological Association
CBO…	Community-Based Organisation
DFID…	Department for International Development
FAO	Food and Agriculture Organisation
FGD	Focus Group Discussion

GIS ..... Geographic Information System

KI ..... Key Informant

KII ..... Key Informant Interview

NGO… ..... Non-Governmental Organisation

NVivo ..... Numerical Vivo (Qualitative Data Analysis Software)

SDG ..... Sustainable Development Goal

SLF ..... Sustainable Livelihoods Framework

SPSS ..... Statistical Package for Social Sciences

UN ..... United Nations

UNDP… ..... United Nations Development Programme

UN-Habitat… ..... United Nations Human Settlements Programme

UNICEF ..... United Nations Children's Fund

UN-Water ..... United Nations Water

USD ..... United States Dollar

WASH ..... Water, Sanitation and Hygiene

WHO ..... World Health Organisation

ZIMSTAT… ..... Zimbabwe National Statistics Agency

ZINWA… ..... Zimbabwe National Water Authority

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CHAPTER ONE

1.1 Introduction

Water is a key element of life, health and dignity, and is vital for sustainable livelihoods, particularly in urban areas where access to clean water is seen as a basic service. But there are lots of people in Zimbabwe, particularly in the dense urban centers, who cannot easily access water. Water deficits have been recurring because of aging infrastructure, to erratic rain. This chapter investigates the significance of the ongoing water shortage on the livelihoods of the households in Ward 3 of Chitungwiza, a problem faced by the country at large. It discusses the impact of water scarcity on livelihoods, the economy, food and nutrition security, health and hygiene and mental health. The chapter provides background information on the study and outlines/defines the major problem, the research objectives and key concepts important for the study. An important goal of the study is to address the lack of understanding of urban water insecurity and its relevance to sustainable development through investigations of the experiences of water-stressed households. In addition, it seeks to sensitize policies that promote equitable access to water, provision of infrastructure and community-based approaches to water issues towards Zimbabwe's urban planning processes.

1.2 Background of the study

Water crisis is a huge concern all over the world and has been influenced by various factors like structure, economy and environment. This is particularly bad in countries like Zimbabwe where they experienced colonialism, several economic crashes, hyperinflation, and political instability that have had a significant impact on the delivery of public services, Moyo (2019). These various problems have all been compounded over the last 20 years, leading to a situation of neglect in the water and sanitation sector, and accelerating the decay of old water and sanitation infrastructure. For example, such facilities as Morton Jaffrey Waterworks that supplies vital water for major cities such as Harare and Chitungwiza are now obsolete and have huge non-revenue water losses exceeding 60% (NhaNhapipi and Hoko, (2017).

Unplanned urbanization, particularly in Chitungwiza which was to alleviate congestion in Harare city, has exacerbated the issue of water in Zimbabwe at regional level. The municipality has now increased its population to more than 400 000, but infrastructure had been designed for smaller part of the population. Chitungwiza Municipality, 2022, notes that over 400 000 people live in the municipality which was designed for a smaller population. Their capacity to continuously supply water is affected by the water contaminated by the Lake Chivero and by the frequent lack of electricity in the area, Mkandla et al., (2021) also note that scarcity of water

treatment chemicals is affecting their ability to meet the demand for water. The city in Zimbabwe is also further defined by its lack of water security, which is a driver of diarrheal diseases, and frequent cholera and typhoid outbreaks which are a public health challenge (UNICEF, 2022).

The urban poor are especially hard hit as their livelihoods are for the most part informal. Pottes (2018) points out that a city's livelihoods are highly reliant on the continuous provision of city services. Water scarcity also affects small business and urban agriculture and home industries, leading to reduced city household incomes and urban poverty, Moyce (2018). Moreover, women and children are usually tasked with fetching water, which negatively impacts their health, safety, education and further fuels the gender imbalance (Cleaver, 2017).

For example, Ward 3 in Chitungwiza is one of the examples of these national issues and the extent to which these neighborhoods and infrastructures are deficient are not uniform. The residents in one of the oldest suburbs in Chitungwiza according to their Chitungwiza Municipality Internal Report (2021) experience frequent bursts in their pipes, as a result of corrosion of the old pipes, resulting in huge losses of water in the Municipality. In communities that are at a higher elevation, insufficient water pressure can result in several weeks' worth of water not being provided by the municipality. The residents and their children spend up to 40% of their daily income on water that they buy from the vendors, and/or treatment of water borne diseases, putting a strain on their economy.

In Banga, a thriving informal settlement water system failures and underperformance related to non-permissive connections and tampering with the formal systems impact negatively on the legal users of the water system (Kamete, 2019). Functional communal boreholes become 'hot spots' during peak periods and queues cause social tensions, particularly if the communal borehole might fail. These shortages also affect livelihoods of those operating food stalls and other small food service businesses, as they often have to sell food at a loss during a long dry spell.

Chibuku is a combination of formal and informal housing and is a typical example of an issue of service exclusion. According to Mudzengerere, (2022), many of the slum dwellers have no formal water connections and hence they are not visible in municipal plans. Access to water may be through informal arrangements with neighbors or through access to shallow wells that could be contaminated from pit latrines of neighboring households particularly during rainy seasons, thus creating public health risk.

This further complicates it in Section 3 where some of the lowest water pressure points are located and some issues with gravity in the system due to water lost by larger commercial users. Additionally, households also have to choose between buying water and other household necessities as they excessively rely on water vendors, as mentioned by Dube and Moyo (2023).

The infrastructural dysfunction, dense population and socio-economic issues are a dangerous mix in Ward 3 with water scarcity being a pivotal factor in the lives of the people and the opportunities available to them, which point to major gaps in research. There is a need to strengthen the understanding of the impacts of informal water procurement processes on livelihoods in urban communities, the health impacts of the long-term lack of water and the implications for institutional reforms to enhance water service provision in these precarious places. This research can contribute to the improvement of water management in thea more sustainable way and can help in making better water related policies with focus.

1.3 Statement of the problem

Safe and readily available water is an important issue in most cities in the world including Zimbabwe. Despite the above constitutional guarantees, many communities have suffered chronic water shortages, which are in contradiction with the constitutional right to clean water and potable water. For some residents of Chitungwiza, they are only able to access water for a few days in a month as the remaining days are dry (Ward 3, Chitungwiza Municipality (2022)). This lack of access to water compels households to resort to unsafe and polluted water sources which puts them at risk of contracting water borne diseases including cholera and typhoid Community Water Alliance, (2023).

Failure to address this issue could result in serious problems such as an increase in poverty, health crisis and social unrest. The current studies are mainly on a macro level water issue, in Zimbabwe, and there is a great lack of information on how water scarcity in particular impacts on household livelihoods at the ward level.

Given this context, this study aims to gain a deeper understanding of the complexity of access to water and to uncover gaps in current knowledge that could be leveraged to design effective solutions that can contribute to the resolution of national and international water access goals in Ward 3.

1.4 Research aim

The aim of this study is to investigate the effects of water scarcity on household livelihoods in Ward 3, Chitungwiza.

1.5 Research objectives

1. To identify the major causes of water scarcity in Ward 3, Chitungwiza.

2. To examine how water scarcity directly affects households in Ward 3, Chitungwiza. Is the issue of livelihoods lost significance.

3. To explore community coping strategies in Ward 3, Chitungwiza.

1.6 Research questions

1. What are the major causes of water scarcity in Ward 3, Chitungwiza?

2. How does water scarcity directly affects households in Ward 3, Chitungwiza?

3. What are the community coping strategies in Ward 3, Chitungwiza?

1.7 Justification of the study

Today, access to safe and reliable water is a basic human right and vital element for health, dignity and economic productivity. Despite the constitutional and international arrangements including the United Nations Sustainable Development Goal (SDG) number 6 that links Zimbabwe with the water issue, the communities in Zimbabwe are still grappling with severe challenges of water scarcity particularly in the town of Ward 3, Chitungwiza town.area. This research aims to investigate the problems, effects and solutions of the existing water-access situation of the community.

The current water shortage in Ward 3 is a critical issue which impacts the day to day life of the local people, involving thousands of people. This study will provide an occasion to have a deep knowledge of the factors involved in water shortage and therefore solving the need of the community Masocha, (2020). To understand these dynamics is important to create intervention that will be effective locally.

The consequences of inadequate access to clean water are great, such as water-borne diseases and other health problems. Poor access to water sources has been seen to have a correlation with community incidence of disease outbreaks, WHO (2017). The findings of this research will expose the links between water scarcity and community health consequences, and so drive a sense of urgency for action and attention.

The provision of water is critical for livelihoods. To support policy and stakeholder efforts to intervene in the economy to address the effects of water scarcity it is important to better understand the effects on local businesses and informal economies, (Dube and Moyo (2023). The findings from the present study will be useful to local entrepreneurs as well as government

agencies who are interested in promoting sustainable economic development by giving them actionable information.

Women and girls are often the primary collectors of water, affecting their time and education, and opportunities to make a living. Water collection is associated with school absenteeism and further deepens inequities, particularly for girls, who are shown to be at higher risk of missing school if they spend a lot of time collecting water, Moyce (2018). The research will provide insights into the impact of gender on water collection, which will help support the development of policies and initiatives that are gender-responsive to ensuring access to water.

This study will seek to engage the community (including the views and experiences of local people) in the act of participating. Engaging research participants in the research contributes to improving the quality of the research and allows them to play a proactive role in delivering their solutions to address their water concerns, Community Water Alliance (2023).

Research findings will be shared with local policy makers and NGO and community organizations with research informed recommendations. The identification of challenges and their solutions then can inform the design of effective water management strategies and policies that are aligned with national and global water access and equity commitments, Governments of Zimbabwe (2013).

Generally, very little localized groundwater studies have been carried out in Zimbabwe particularly at the Ward level, e.g. Ward 3. This research will contribute to the body of knowledge and detail the experience of residents and challenges that can help fill a vacuum in the academic research.

There is a valid justification for this study as it looks to tackle a very important problem faced by people in Ward 3, having a product that will contribute to improving the health of the people, their economy and the community's resilience. The study will not only provide input at academic level, but also serve as a valuable source for local players seeking input to Water access augmentation interventions for urban Zimbabwe.

1.8 Limitations of the study

There are a number of limitations that need to be recognized in this study. Firstly, the results are relevant only to Ward 3 in Chitungwiza, and may not be easily extrapolated to other urban and peri-urban settings in Zimbabwe. Besides, the period of data collection could also bring a seasonal bias in as it may be during the dry season when water is scarce. This timing can exacerbate water deficits and miss seasonal variations in access to and coping with water.

A further limitation is the access to the municipal records of Chitungwiza Municipality which included the maps of infrastructure, water supply schedules and maintenance records. There is no good official data which may affect a detailed technical analysis. Besides, have some issues due to respondents' memory and honesty in the use of self-reported information in household surveys and interviews. Such as when the topics of water use, income, health, etc. are covered, they may be under-reported or misreported, leading to recall bias or social desirability bias.

Lastly, resources may be limited, including the number of samples, how often samples can be taken in the field and how multiple data collection methods are used (e.g. water quality testing, GIS mapping).

In this aspect, some solutions have been included in the implementation of the study which can be used to overcome the problems. Geographic limitation: This will be discussed in relation to the local situation but comparisons will be drawn with similar urban environments to draw some general conclusions. Data collection has been agreed at different times during the year, where possible, to minimize the seasonality and provide a better understanding of the access dynamics of water.

Local government records have been used to supplement data where possible and alternative sources of data (community reports, expert interviews) have been used to provide additional sources of data. Aiming to gain more credible data from the surveys, the surveys will have clear explanations of the purpose of this research and assure respondents to confidentiality in order to get honest responses. Lastly because of limited resources, key data and data collection methods will be emphasized and partnership with community organizations will be examined as a way to reach more persons and determine additional data that might be collected. This study will be cognizant of these limitations and the solutions to be provided will seek to mitigate the impact of these limitations and enhance the findings of the study.

1.9 Definition of key terms

In this study, a few terms are defined, as they are key to the research. Water scarcity can be defined as the lack of availability, or the volatility of, safe and adequate and acceptable water supplies for drinking, sanitation and livelihoods, including both physical scarcity (when the natural water supply is less than the demand) and economic scarcity (when water is available but inaccessible because of inadequate infrastructure or investment) (FAO, 2012; Molden, 2007). A household is a group of people that live together, share resources like water, food and income and make decisions to survive and care for each other's well-being together (United

Nations, 2017). Household livelihood is a broad term that encompasses the capacities, assets and activities that enable a household to live, and which can not only resist stress and shocks but can also build their capacities over time, such as in the face of water scarcity (Chambers and Conway, 1992; Scoones, 2009). Coping strategies are short term, reactive responses to the immediate effects of sudden shocks like acute water shortages, which may involve buying water from vendors, rationing or seeking water from unsafe sources, but are typically unsustainable, and can create new vulnerabilities (Maxwell, 1996; Berman et al., 2012). Lifestyle adaptations would involve diversification of income or permanent change in water use patterns required to cope with chronic stressors like persisting water scarcity, as opposed to adaptation strategies which would be longer term structural changes in livelihoods activities to make the household more resilient to changes in water availability (IPCC, 2014; Scoones, 2009). Water vendors are private providers or informal water companies that provide water to households for a price that is several times as high as the price of the formal water supply companies, and represents a regressive poverty penalty, which urban poor people are affected most (Kariuk and Schwartz, 2005; UN-Habitat, 2016). Finally, a borehole is a small vertical tunnel dug into the earth to exploit the underground water from an aquifer; the absence of water from the municipality is a significant reason for having so many communal boreholes in Ward 3; however, the many communal boreholes may create sustainability challenges with the aquifer as well as contamination risks in highly populated urban areas (Foster and Chilton, 2003; Ncube et al., 2019).

1.10 Summary

At the end of the first chapter it has laid the background to the problem which is the water scarcity in urban Zimbabwe particularly in Ward 3, Chitungwiza where the water supply is not reliable and the facilities are in bad condition. The chapter outlined the research problem and showed that although the lack of water is clearly visible, how the lack of water affects household livelihoods in terms of health, income, social relationships and how they cope with the lack of water is not well documented in this peri-urban context. The objectives of the research were: To document the impact of water scarcity; To document the causes of water scarcity; To document coping mechanisms used by households. Moreover, Chapter One highlighted the importance of the research to the local policy makers and urban planners, and ended with a discussion of key terms and a focus on Ward 3. Chapter Two looks at a critical literature review that seeks to conceptualize water scarcity and household livelihoods in the Sustainable Livelihoods Framework (SLF), has a global perspective as well as African

perspective on documented impacts from water scarcity, outlines the Zimbabwean context on the urban water crisis and the research gap that this study will address.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The chapter presents a critical review of available literature pertinent to this study on the impact of water scarcity on the livelihoods of households, in this case Ward 3, Chitungwiza. The primary objective of this review is to place the present research within the context of other research, to identify key concepts, theories and empirical evidence and to highlight the need for the present research to address the research gap. It begins with an understanding of the fundamental concepts about water scarcity and household livelihood. It then explores the theoretical approaches which are often used to understand the link between environmental resources and human lives with special attention to Sustainable Livelihoods Framework (SF). The review is then followed by a quest into the various effects of drought on livelihood asset (human, social, financial, physical and natural) from published literature in both the global and African context. It then looks at the particular urban water crisis in Zimbabwe, and gives some background and present view on Chitungwiza. A summary of the literature and an integration of the literature was used at the end of the chapter to identify the research gap and this was followed by a conceptual framework for the empirical study.

2.2.1 Defining water scarcity

A scarcity of water (and water shortages) is a problem with many dimensions and is far more than just a shortage of water. It's a broad, and understood as the time when the cumulative impacts of all users impact the availability or quality of the water supply, so that the needs of all sectors, including the environment, are not fully met (FAO, 2012). According to Molden, (2007) there is a difference between the physical water scarcity and economic water scarcity. Physical water scarcity is when the supply of water to meet all demands, including environmental flows is insufficient and occurs typically in dry or semi dry regions. However, economic water scarcity is where water is available but no longer accessible due to a lack of infrastructure, investment or human capacity despite the availability of sufficient water resources in the hydrological system.

In the Global South, water scarcity in urban households is often characterized as economic water scarcity, where poor infrastructure, governance and water utility management have the impact of scarcity Allen et al., (2017). In some instances, but in particular Zimbabwe, such an occurrence could be better termed as a “crisis of distribution” rather than scarcity of water because water is not always available or reliable (Manzungu, 2017). This study takes the integrated view and considers water scarcity to be a socio-political and economic condition which strongly affects household livelihoods.

2.2 Conceptual framework

This study is based on the concept of water security and its linkage with the livelihood of the households. According to Grey et al., (2023), water security is the ability of a population to ensure sustainable access to water of sufficient quality and quantity for livelihoods, human well-being, and socio-economic development. This is an important concept to study as it enables the understanding of the causes, effects and responses of water scarcity in Ward 3, Chitungwiza. This framework is based on the premise that water can be a socio-economic resource rather than just a physical resource, and that its presence or absence will have direct impact on the quality and sustainability of household livelihoods. When households lack access to reliable water, the impacts go beyond the lack of convenience in their daily household livelihoods to their health, income generation, food production, education and social lives (Armitage et al., 2017). The conceptual framework thus takes a holistic view of water scarcity and considers it a driver and a reflection of vulnerability in livelihoods, with the role of other drivers like poverty and infrastructure deficits exacerbating the impact of water supply failures on already vulnerable households (Nhapi and Bangira, 2018).

The framework also considers the vulnerability context, as the households within Ward 3 find themselves situated in a context of frequent drought, economic fragility, degraded municipal facilities and high population growth rate. These external stresses, together with the level of assets endowment of each household, shape the intensity of the water scarcity impacts and the scope and repertoire of coping options, as noted by Muller et al. (2015). The conceptual framework also considers the role of gender, recognising that women and girls are typically more affected than men by the burden of water collection and management, and this impacts their livelihoods in different ways (Mehta et al., 2019). The three objectives of the study are investigated within the framework of the three conceptual elements combined to form a structure where analysis can be undertaken.

2.3 Theoretical framework

This study was guided by a theoretical framework the Sustainable Livelihoods Framework (SLF), which has been widely adopted and developed in recent research on poverty and vulnerability and access to resources (Devereux and Sabates-Wheeler, 2015; Batterbury and Bebbington, 2020). The SLF was selected due to its people-centred approach that aims to improve understanding of how households build and maintain their livelihoods in the face of vulnerability, which is especially useful in analysing the impact of water scarcity on households in Ward 3, Chitungwiza. The SLF categorises livelihood assets into five capitals: human,

social, financial, physical and natural and explores how households access these assets in a vulnerability environment affected by shocks, trends and seasonality (Serrat, 2017). Water forms a fundamental basis of this framework. Water is an asset of natural capital and is essential for survival, agriculture production and earning income at home. It is a component of human capital and the lack of it creates physical incapacitation and diseases reducing the labour productivity and capacity of households (Prüss-Ustün et al., 2019). Deterioration of water supply systems is a dimension of physical capital, also documented, particularly in the Zimbabwean urban context by Tendai and Chirisa (2019), that when it degrades, it will impact livelihood outcomes as an infrastructural concern.

The framework also highlights institutional processes and structures which range from policies and legislation to the involvement of local authorities like Chitungwiza Municipality, that mediate household access to water, and influence the livelihood strategies adopted by affected communities (Alinovi et al., 2016). The SLF allows for an insight into the experiences of each household while also explaining why some are more vulnerable and why and how certain coping mechanisms are limited or possible (Dube and Mtapuri, 2019). The findings of this study on causes of water scarcity, impact of water scarcity on households' livelihoods and coping strategies utilised by the residents of Ward 3 are interpreted and analysed in the context of this theoretical framework.

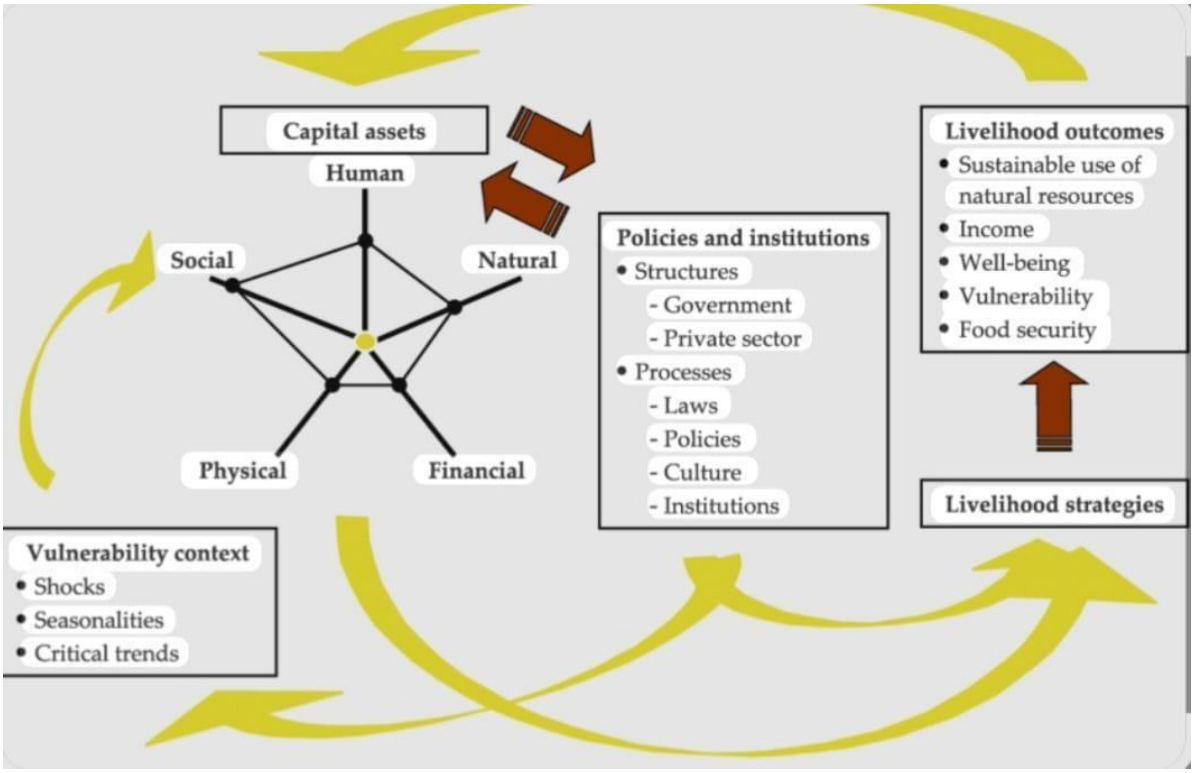


Figure 2.3.1: Diagram of sustainable livelihoods framework

2.4 Causes of Water Scarcity

It is important to comprehend the underlying factors that contribute to water scarcity for the purpose of developing interventions.

2.4.1 Global perspectives on the causes of water scarcity

Worldwide, a water shortage may be due to physical and economic reasons. Physical scarcity occurs when natural water supplies are inadequate to meet the needs and economic scarcity occurs when water facilities are not sufficiently financed although water is present (Molden, 2007). According to the World Water Development Report, Climate change, Population growth, Urbanisation and Un-sustainable water use are the four major issues that contribute to water scarcity globally (UNESCO, 2019). Of these, climate change is viewed as a more prominent factor. Climate change is also affecting the hydrological cycle, accelerating glacier melting, increasing droughts, and enhancing frequency and intensity of extreme weather events throughout the world (IPCC, 2022). By mid-21st century, the number of people suffering from water scarcity could increase globally by 40% due to climate change alone, as estimated by Schewe et al. (2014). Dry and semi-dry regions in Africa, Asia and Latin America, especially are vulnerable.

2.4.2 Regional perspectives on the causes of water scarcity in Sub-Saharan Africa and Southern Africa

Despite having only a small share of the world's water resources, Sub-Saharan Africa has some of the world's worst water problems, with physical scarcity, economic underdevelopment and poor governance as well as vulnerability to climate change. Increase in inter-annual rainfall variability is attributed to the region, and also frequent droughts, making water availability very unreliable for millions of households (Grey and Sadoff, 2007). The African Development Bank (2018) reported that in Sub-Saharan Africa only 36% of the rural population have safely managed drinking water services. The region of Southern Africa (including the countries under the Southern African Development Community (SADC)) is especially vulnerable to water insecurity. They also were badly hit by the 2015–2016 and 2018–2019 El Niño seasons, which caused significant drops in reservoir levels, river flows and losses in crops (SADC, 2020). Further adding to the challenges of equitable access are the shared Limpopo and Zambezi river basins with competing water demands and lacking transboundary water governance structures (Meissner et al., 2018).

One of the major reasons for the scarcity of water in urban areas in Southern Africa is rapid urban population growth that has come without adequate urban infrastructure development. Ezeh et al., (2017) noted that the urbanisation process in Sub-Saharan Africa is largely informal and that significant portion of urban residents reside in slums and peri-urban areas without piped water services. Urban water utilities in cities like Lusaka, Harare and Maputo are constantly under-funded, leading to pipeline deterioration, insufficient treatment capacities, and weak supply pressure (Dube and Mtapuri, 2019). The institutional weaknesses and governance failures are also mentioned in the regional literature in a prominent manner. Corruption, low cost recovery, weak regulation and political influence over urban water utilities are to blame for the problems in service delivery (Schwartz, 2008). Africa, in particular Sub-Saharan Africa, has an infrastructure deficit estimated by Foster and Briceño-Garmendia (2010) at $93 billion every year, with water and sanitation being a significant proportion of these deficits that are not being met.

2.4.3 Zimbabwe's water scarcity issues from a National perspective

The water situation in Zimbabwe can be attributed to a number of structural issues as well as more recent issues. At independence in 1980, the country was blessed with a fairly developed water infrastructure, but over years of economic disintegration, political turmoil and inadequate investments, much of this has been lost (Magaisa, 2020). The management of the water sector is delegated to Zimbabwe National Water Authority (ZINWA) and all the relevant urban local authorities, under the legal framework of the Water Act (Chapter 20:24) and Urban Councils Act (Chapter 29:15). Water infrastructure was severely affected by the collapse of the Zimbabwean economy, particularly during the 1990s and 2000s. In 2007-2008, hyperinflation reduced urban councils' capacity to afford to provide maintenance and development of water systems. In the Municipality of Chitungwiza, which encompasses Ward 3, there are repeated challenges of lack of operation of boreholes, broken and leaking pipes, failure to pay bulk water fees to ZINWA and consequently, there is interruptions in water supply to the Municipality which has been especially affected by budget constraints (Chirisa et al., 2013). There is a well-known vulnerability of Zimbabwe to climate variability. The position of the country is within the Southern African rainfall belt, where rains are extremely unpredictable and droughts occur once every 3 to 5 years (Mugandani et al., 2012). The water supply systems are under great stress due to Cyclone Idai in 2019 and recurring droughts associated with the El Niño event, particularly water sources in communities that depend on surface water, such as the Lake Chivero, which supplies water to Harare and Chitungwiza (Mushore et al., 2017).

Water demand has grown significantly with the rapid population growth and unplanned urban expansion in areas like Chitungwiza, however without commensurate development of water infrastructure. Chirisa (2010) states that Chitungwiza was established under Rhodesian colonialism as a dormitory town to house Harare's black African workforce, and lacked the complement of services that a self-sustaining town is expected to have. This initial infrastructural deficit has been compounded by population growth since independence, due to a combination of rural to urban migration and natural increase, to which the current water system was not designed.

2.5 The effects of water scarcity on household livelihoods

Water scarcity impacts household livelihoods in a multitude of ways, from health impacts and economic productivity to education, food security and social wellbeing. The literature shows that these impacts are disproportionately felt by the poor in urban and peri-urban areas.

2.5.1 Global Perspectives on the Effects of Water Scarcity on Households

The inaccessibility of clean water is having serious health implications globally, with the World Health Organization (WHO, 2019) estimating that some 2 billion people are currently using faecally contaminated drinking water, causing around 485,000 deaths due to diarrhoea each year, mostly among young children. Inadequate sanitation is directly associated with water borne diseases like cholera and typhoid. Also, water shortages lead to an economic loss of productivity such as the time spent by households without piped water and especially women and girls to fetch water. This has an impact on food security, especially in the case of those families who are based on subsistence agriculture and water-insecure households are more likely to experience nutritional deficiencies. Education effects are also visible as girls miss school because of their work with collecting water, continuing the gender gap with education. Moreover, water insecurity can be also linked with psychological distress and social conflicts, affecting the social cohesion and individual wellbeing, with families reporting higher levels of anxiety and depression when living under chronic water insecurity.

2.5.2 Householders' views of impacts of water scarcity in Southern Africa

A shortage of water has a substantial influence on the livelihoods of households in Southern Africa, particularly those living in informal settlements which are already struggling to cope with poverty and inequality. As reported in urban South Africa, Zimbabwe, Zambia and Mozambique, these households spend a large portion of their income on water supply from informal and high cost sources, and they spend less on water supply through formal piped water (Jacobsen et al., 2012). Health consequences are dire as evidenced by the devastating cholera

outbreak in Zimbabwe from 2008 to 2009 which stemmed from the collapse in municipal water and sanitation services, and caused more than 98,000 cases and more than 4,000 deaths (Mason et al., 2011). Diarrhoeal diseases remain a significant contributor to child mortality, especially in areas with poor water coverage (WHO/UNICEF, 2021). The inequalities are significant with women in urban Zimbabwe carrying out about 80% of the water collection, limiting their participation in income-generating activities and social interactions. Further, the poor communities in the region, where women are at the helm of household management, have suffered systematic discrimination in accessing water (UNFPA, 2020). Economically, households buying water from vendors end up paying 5-40 times more than formal water utilities leading to financial hardships and a "water poverty trap" preventing income to be spent on nutrition and education (Dagdeviren and Robertson, 2009). Furthermore, water scarcity has a direct impact on urban agriculture, an important livelihood strategy, as the gardens during the dry season or when water is unavailable produce less, which in turn impacts directly on urban household nutrition and dietary diversity, including in urban centres such as Harare, Bulawayo and Lusaka (Mubvami and Mushamba, 2006).

2.5.3 Zimbabwe National perspective on the impact of water scarcity in Zimbabwe

The impact of water shortages on household livelihood in Zimbabwe has been actively researched particularly in the context of the socio-economic crisis of the 2000s. Currently only 40% of the urban population is using safely managed water services and there are significant disparities between wealthier areas and low-income high-density suburbs, including Chitungwiza (JMP 2021). The health situation is seriously compromised: the country has suffered several cholera epidemics since 2008, which is a reflection of the fragility of water supply systems. Households in Harare and surrounding towns suffering from unreliable piped water are 3-5 times more likely to suffer from cholera than those with regular piped water, and outbreaks of typhoid are also prevalent in high-density neighbourhoods (Tendai and Chirisa, 2019; Mukaratirwa et al., 2020). The economic costs of water scarcity are particularly high on urban poor household income, with studies in Harare showing that the urban poor have to spend two to four hours a day fetching and treating water, thus further limiting an already restricted income in the context of high unemployment and informal employment (Manzungu and Chioreso, 2012). This falls largely on women and children who often have to go fetch water in the early morning resulting in poor sleep and an impact on school attendance and livelihood activities (Dube and Mtapuri, 2019). Furthermore, urban farming, which is another critical food security strategy such as in Chitungwiza, faces significant water shortages leading to increased

food insecurity, decreasing dietary diversity, and food assistance during the periods of severe shortage (ZimVAC, 2020).

2.6 Community Coping Strategies in the context of Water scarcity

Water insecurity is a chronic problem and households and communities develop various ways to get water to meet their domestic and productive needs. Literature in the coping field distinguishes between short term reactive coping strategies and long term coping (adaptive or transformative) strategies (Speranza et al., 2014). Knowing these strategies is key to informing policies and interventions that are based in local realities and capacities.

2.6.1 Community Coping Strategies around the World

In the world, when faced with failure in primary water sources a family's typical response is to resort to obtaining water from other sources such as shallow wells, boreholes, rivers, ponds, rainwater harvesting and purchasing from vendors (Hadley and Wutich, 2009). All these sources have their disadvantages, including contamination issues with nearby surface waters and shallow wells, as well as expense and availability issues with water purchased from vendors and seasonal variation of water availability for collection from rainfall. Another popular coping strategy is storing water when it is abundantly available for later use, but this can lead to problems if water is not kept in pristine conditions, as it may become contaminated with microorganisms and could pose a health risk (Thompson et al., 2001). Conservation measures such as bathing less frequently and reusing greywater also help households to save water, but can negatively affect hygiene and sanitation levels (Jepson, 2014). Collective action at the community level, through water committees and water-sharing arrangements, has been proven to work well to manage shared resources, especially where trust and good governance rules prevail (Ostrom, 1990) in low and middle-income countries. Additionally, rain water harvesting structures, such as individual tanks and public cisterns are becoming more recognized as a viable way to adapt in regions with seasonal rainfall but their use is limited by the consistency of rainfall events, the maintenance capacity, and/or the installation costs, especially where low-income households cannot afford to construct such structures without support.

2.6.2 Southern Africa: Regional perspectives on coping strategies

Household coping mechanisms to water shortages in Southern Africa are similar to other parts of the world, but are heavily influenced by economic, social, environmental and institutionalized conditions in the region. Despite the high risk to health, many low-income households in peri-urban and urban areas depend on unimproved water sources such as

unprotected well, rivers and springs during disruption of piped water supply (WHO/UNICEF, 2021). In cities such as Harare, Lusaka or Maputo, informal water vending with handcarts, trucks or fixed outlets, is an important alternative source for the unconnected. But many may not be able to pay for such water and the quality is typically uncontrolled (Solo, 1999; Dagdeviren and Robertson, 2009). Social networks are also significant coping strategies, as neighbours, relatives, and community groups help to fetch water and share stored water, as well as pooling funds together to buy water from water vendors. Social capital, defined here as the networks, trust, and norms that facilitate collective action, is an important source of social support for water insecure households (Moser, 1998). Other groups such as religious institutions, non-governmental organizations and community-based organizations also often offer emergency water relief and hygiene education during crises, particularly when facilities and services are not available in the state (Dube and Mtapuri, 2019). Meanwhile, urban farmers have responded by planting with the rains, irrigating with drip and cultivating drought tolerant crops; however, with the changing nature of precipitation, longer dry periods, and poor infrastructure, measures are becoming less effective (Mubvami and Mushamba, 2006).

2.6.3 National perspectives on coping strategies in Zimbabwe

Households experiencing water insecurity in Zimbabwe have resorted to a variety of coping strategies as water insecurity persisted, particularly following the major cholera outbreak of 2008 – 2009 which led to water insecurity being a topical issue both within the government and the community (Mason et al., 2011). The main methods are the drilling and repair of boreholes, community-based water management and informal use of alternative sources of water. One of the key government and NGO measures to alleviate urban water supply failures since the 2000's has been the installation of boreholes; however, problems associated with maintenance and lack of spare parts and technical skills limit their effectiveness (Chirisa et al., 2013). In high-density urban centres such as Chitungwiza, water is accessed through informal queues which could also develop water disputes in the absence of sufficient water supply (Manzungu and Chioreso, 2012). Though the government and NGOs have promoted the use of rain water collection, relatively small number of households make use of it due to installation cost and policy limitations (Kahinda et al., 2007). Household level water treatment techniques such as boiling and chemical are also used, but are often not done consistently due to the cost (Ndlovu, 2020). Finally, in the event of a major water shortage, some city dwellers relocate temporarily to rural areas, but this is increasingly difficult because of jobs, and the quality of rural water points (ZimVAC, 2020).

2.7 Research gaps

Despite the existing literature on water scarcity and livelihoods is very good, there are some gaps which this study will address. Firstly, much of the studies pertaining to urban water scarcity in Zimbabwe have concentrated on Harare (the capital), so that the empirical research in the study has given less consideration to the particularly peri-urban conditions of a town such as Chitungwiza with its own municipal structure, but hydrologically and politically linked to Harare. Secondly, although the overall impact of water scarcity is presented, there has been insufficient recent research to quantify and qualify the impact of water scarcity across different socio-economic groups in a defined area of high density, such as Ward 3. Previous research tends to be done on either the health or economic dimensions but not in combination on all five capital assets as suggested by SLF. Finally, coping literature frequently reports coping patterns without critically exploring the sustainability and role those coping patterns play in vulnerability reduction or escalation. This study aims to address these gaps by offering a contemporary, nuanced and asset-based analysis of the impacts of water scarcity on household livelihoods in a particular and under-researched urban ward in Zimbabwe.

2.9 Chapter Summary

This chapter has surveyed the literature on the causes of water scarcity and its impact at the household level on livelihoods, at the regional and national levels on communities' coping strategies. Water scarcity is caused by climate change, population growth and urbanisation, as well as unsustainable use and access, at a global level. These are exacerbated by factors such as governance failures, economic underdevelopment and rapid informal urbanisation in Southern Africa. Particularly in Zimbabwe, years of crisis have severely affected the water infrastructure, and Chitungwiza is one of the worst hit urban areas. Water scarcity has impacts that are widespread and deep, impacting health, economic productivity, food security, education and social wellbeing. The poor, women and children suffer most. In turn, affected households and communities resort to various coping mechanisms such as alternative water sources, domestic storage, community-based organisation of collective water supplies as well as mobilisation of neighbouring water users in social networks. Although these strategies do work in the short term, they pose health risks, economic costs and are not adequate in the long-term. The literature review provides a theoretical and empirical basis for the empirical work done in Ward 3, Chitungwiza, by locating the local study within patterns and processes of water insecurity. The results of this research, to be discussed in upcoming chapters, will add to the evidence emerging on urban water scarcity in Zimbabwe and evidence based policy and planning responses.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

A methodology that was employed in attempting to understand impacts of water scarcity on household livelihoods in Chitungwiza's Ward 3 is offered by the chapter. Research design, study area, population and sample, instrument of data collection and data analysis are described in this chapter. It also explores the ethical issues that arose during the study and the possible limitations which could have influenced the results. The research decisions in this study were made depending on the problem of the study, research objectives and research philosophy.

The problem of water scarcity is complex and may manifest itself in various ways in various communities, households and individuals. Ward 3, Chitungwiza, is one of the densest-municipalities in Zimbabwe where water has become a way of life for many of its households in the urban residential part. A systematic and culturally and socially aware approach to research is needed to comprehend the lived experience of the residents that have been impacted by this crisis. Hence, in this chapter, a mixed methods approach is deemed appropriate to examine water scarcity both qualitatively and quantitatively.

3.2 Research Design

The type of research was case study and the research method used was a combination of quantitative and qualitative research. Based on the above discussion, the case study design was found to be the best one for this study as it enables one to study one bounded social unit (in this study, Ward 3 of Chitungwiza) and collect several pieces of evidence to enhance the understanding of the study Yin, (2018). Case study method can be used in case when the research has a goal of understanding the phenomenon in its real life, particularly when the phenomenon cannot be clearly separated from its context of the phenomenon, such as understanding the phenomenon of society.

Household structured questionnaire was used to carry out a quantitative survey in Ward 3 representative sample of households. This allowed to collect quantitative data regarding the frequency and duration of water supply cuts, how households spend money on water, coping strategies they use and the impact this has on their incomes. The researcher could draw patterns, trends and any relationship between variables in quantitative data to provide a general overview of the magnitude and type of the impacts of water scarcity on livelihoods Bryman (2016).

The qualitative methods used were the community key informant interviews, as well as the focus group discussion (FGD) with the community key informants and local authorities. The

qualitative data was then used with the quantitative data to provide rich contextual information of lived experience of water scarcity by the households and social and psychological understandings which were collected in the quantitative data Flick (2018). Both were used for triangulation and as such, provided more reliable and comprehensive results (Denzin and Lincoln, 2017).

Case study method is appropriate for interpretivist paradigm as they believe that the social reality is subjective and context dependent Bryman (2016). In this study, positivist concepts are also employed in its quantitative dimension, as most of the study is actually carried out on the test of measurable relationship between the results of livelihood and water scarcity. It's a pragmatic approach, and focuses on the research question instead of any particular paradigm (Creswell and Creswell, 2018).

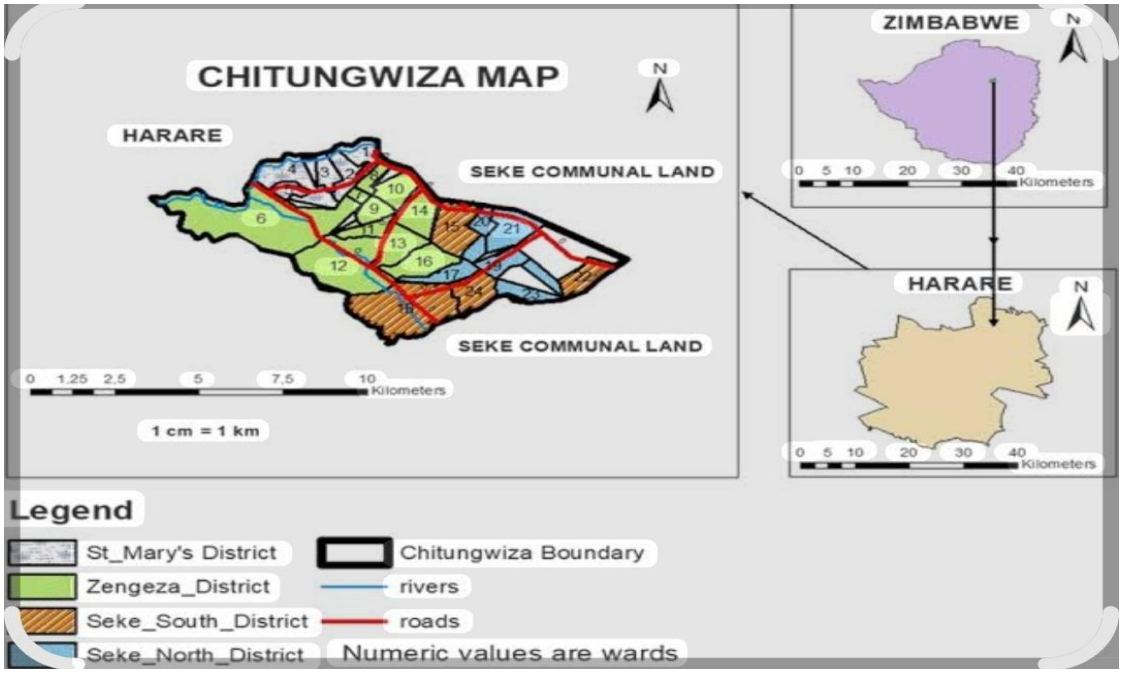
3.3 Study Area Description

Ward 3 falls in the satellite town of Chitungwiza which is about 25 kilometres South-East of the capital of Zimbabwe, Harare. Chitungwiza is a dormitory town built in the 1970s for all the black people who have been employed by Harare. The Zimbabwe National Statistics Agency (ZIMSTAT), 2022 estimates the population living in the city at over 380,000, making the city one of the most populated urban centres in Zimbabwe at present. Three major suburbs (St. Mary's, Zengeza and Seke) can be distinguished in the town, each also subdivided into administrative wards.

The ward is in the Zengeza suburb, and is marked by high population density, low income housing, and poor infrastructure and social services. The majority of the ward's people are working and living in the informal sector, involved in a variety of irregular activities in small businesses, piece work and cross-border trading. Water supply in Ward 3, as in the rest of Chitungwiza, has been affected by an ageing system as well as growing population and financial constraints to the Chitungwiza Municipality, hence the water supply challenge in the ward now is exacerbated (Manzungu and Chioreso, 2016).

Ward 3 water supply is controlled by Chitungwiza Municipality which receives water from Lake Manyame. However, over the years the municipality has not been consistent in its supply of clean water due to pipe bursting, equipment failure, power failures and shortage of chemicals. Piped water is often absent for days, weeks or even months, and residents are forced to use alternative sources of water, frequently unsafe sources like unprotected wells, boreholes

and water vendors Dzinamarira et al., (2020). Ward 3 is therefore a suitable site to study the impact of water scarcity on the livelihoods of households within a city in Zimbabwe.



3.4 Target Population

All the households in the Ward 3 Chitungwiza were targeted for this study. ZIMSTAT (2022) national census projections also estimate that there are 2400 registered households in Ward 3. The study also included local government officials including those from the Water and Sanitation Department and community health workers, ward councilors and leaders of Community Based Organizations (CBOs) in the ward.

Kumar (2019) said that the target population shall be the entire groups of persons/items from which the researcher may wish to draw conclusions. The household was regarded as the main level of analysis in this study since the impacts of water scarcity is directly experienced at this level (on domestic water use, food preparation, hygiene use, economic activities, and wellbeing of household members). Household-level information was supplemented with information from secondary informants, such as local officials and community leaders.

3.5 Sampling Procedures

3.5.1 Sample Size Determination

It was decided that a sample of the target population would be drawn, given the size of the population (2400 households) in order to make the study manageable, but at the same time

maintain statistical representativeness. Using Slovin's formula for determining the sample size, the size of the samples was determined:

$n = N / (1 + N(e)^2)$

In this equation, n is the size of the sample, N is the size of the population (2400) and e is the margin of error (0.05 or 5%). Substituting the values:

$n = 2400 / (1 + 2400 \times 0.0025) = 2400 / 7 \approx 350$ households

The numbers of households to be sampled for the quantitative part of the study were then 350 households. This sample size is representative of other studies in similar urban settings in Zimbabwe (Mafungautsi, (2019); Dzinamarira et al., (2020). Thirty key informants including 10 key informants that were purposively selected for in-depth interviews were also included along with 3 focus group discussions with 24 participants.

3.5.2 Sampling Techniques

This study adopted a mixture of samples in the form of a stratified random sampling and purposive sampling.

Stratified Random Sampling

The ward was subdivided into residential streets and zones for the household survey, which strives to ensure that every part of the ward has its share. Households were selected within each stratum by systematic random sampling, by selecting a household at regular intervals (every 7th household in this case). Stratified random sampling also promotes representativeness and minimizes sampling bias as it ensures the inclusion of key subgroups of the population in the sample, in proportion to their representation in the population (Kothari, 2017).

Purposive Sampling

Key informants were selected for interviews and individuals for the focus group discussion through purposive sampling. This method uses targeted selection of the participants for the study, according to their knowledge and experience and relevance with the research topic (Patton, 2015). Key informants comprised two Water and Sanitation officers from the Chitungwiza Municipality, two ward councilors, two community health workers, two WASH (Water, Sanitation and Hygiene) organizing NGO representatives and two gender focal persons with knowledge on the challenges women face in collecting water. Three focus group

discussions were held with women and girls (those mainly involved with water collection), men and youth and elderly residents.

3.6 Data Collection Instruments

3.6.1 Structured Questionnaire

A structured questionnaire was created to be the primary quantitative tool. The questionnaire was divided into five components: socio-demographic details of the household members, (ii) water access and availability situation, (iii) other water sources and coping mechanisms, (iv) economic effects of water scarcity on households, and (v) health and hygiene implications of water scarcity. A variety of closed and some open-ended questions (for elaboration) were used.

A pre-test of the questionnaire was conducted with 30 households in the neighboring Ward 3 before the main survey in order to find out if there was any ambiguity, technical difficulties or misunderstanding by the respondents. Improvements were made for comments received. To ensure accessibility and accuracy of the responses, the instrument was presented in the local language – Shona. The pre-testing instruments in the respondents' local language will increase the quality of data that will be obtained and reduce the non-response error, as stated by Saunders et al (2016).

3.6.2 Key Informant Interviews (KIIs)

Key informant (KII) interviews were used to gather information from the local government officials, NGO representatives and community leaders as semi-structured interview guides. Semi-structured interviews refer to a pre-determined list of open-ended questions, but with the option for the interviewer to follow-up or go further into the conversation depending on what leads they take (Bryman, 2016). The flexibility was especially useful in terms of identifying institutional views and understandings on the problem of water governance, policy differences, and suggested solutions on the issue of water scarcity in Chitungwiza.

All interviews were conducted with the interviewee's permission for 45 minutes to 90 minutes. All interviews were recorded with the subjects' consent, and transcribed for analysis. Detailed field notes were also recorded during and immediately after each interview to capture non-verbal cues and the observations of the context (Flick, 2018).

3.6.3 Focus Group Discussions (FGDs)

Three focus group discussions were held to gain insights into how water scarcity is perceived, experienced and coping at the community level. Group sizes were determined by the suggestions of Morgan (2019) for group dynamics that were productive and manageable, which were 6 to 9 members. Discussions were facilitated using an FGD guide with open-ended

discussion themes: frequency and predictability of water supply, changes in household practices related to water scarcity, gender of people involved in water collection, and solidarity of the community as a result of water scarcity.

FGDs are especially good at providing information that represents collective social norms, experiences, and community narratives (Kitzinger, 2017). The dynamics and cross talk between the participants can encourage dialogue and enable the researcher to see where the community agrees and disagrees. All FGDs took place in Shona and were recorded – with permission – in audio format and subsequently transposed and translated to English.

3.7 Data Collection Procedure

Before the data was collected the researcher obtained ethical clearance from the appropriate institutional review board and consent from the local community leadership in Ward 3 as well as the Chitungwiza Municipality. Data collection was carried out from August – September 2023 and lasted for six weeks. Research assistants were recruited and trained, who could speak Shona and English. Training included object of the study, administration of questionnaires, recording of data and ethics in the field.

Questionnaires were face-to-face administered in the respondents' homes. The face to face method was chosen over a self-administered questionnaire because of the low literacy levels of some of the residents as well as the requirement to explain questions as necessary, per Kothari (2017). Systematic random sampling methodology mentioned before was applied in identifying the respondents. If no select household was found or if the select household did not reply to the request to be interviewed, the next household on the street was approached.

Key informant (KIs) interviews and focus group discussions (FGDs) took place in the office or the key informants' favorite space, and in a community hall in Ward 3, to help get key informants comfortable and familiar. Data collection activities were all carried out during the day and at convenient times for the participants. Confidentiality was ensured during all procedures and data was kept securely.

3.8 Data Analysis

3.8.1 Quantitative Data Analysis

The quantitative information obtained from the structured questionnaires was coded and input into the Statistical Package for Social Sciences (SPSS) Version 26. The data were summarized and presented in descriptive statistics such as frequencies, percentages, means and standard deviations. Cross-tabulations and Chi-square tests were conducted to see if there were any

relationship among major variables (water access frequency and household income level) and among coping strategies adopted and household size. Tables, bar charts and pie charts were used to present the data for ease of interpretation.

As pointed out by Field (2018), SPSS is a popular and dependable quantitative social science research software and has various statistical procedures useful for analysis of survey data. The researcher observed the appropriate significance levels ($p \leq 0.05$) in interpreting results of the inferential statistics.

3.8.2 Qualitative Data Analysis

The qualitative results of the key informant interviews and focus group discussions were analyzed thematically, following the procedure recommended by Braun and Clarke (2019). Thematic analysis is a widely-used and flexible approach that can be used to identify, analyze and report patterns (themes) in qualitative data. The stages in the analytical process were:

The researcher first took time to become familiar with the data, reading and re-reading all transcripts and field notes to familiarize herself with them. Secondly, initial codes were developed by systematically searching the data set for meaningful units of text. Thirdly, codes were sorted and grouped into the possible themes that emerged from the frequency of the codes that were repeated in the participants' stories. 4th, themes were analyzed and developed into coherent and different themes. Fifthly, themes were found and labelled, to capture the essence of each pattern. Finally, the report was written by selecting the appropriate extracts for each of Braun and Clarke (2019) themes the report was written.

The qualitative data was organized and managed using NVivo 12 which is a software for qualitative data analysis. Bazeley and Jackson, (2017) discovered that the software assisted them to systematically code and retrieve data segments and also for the rigour and transparency of the analysis.

3.8.3 Triangulation and Integration of Mixed Methods.

The data from each data source was analyzed separately and compared and interpreted (convergent triangulation). The results for the two strands were similar and this enhanced confidence in the results. When there was a discrepancy in the results retrieved by the researcher, he/she looked for explanations in the additional analysis of the qualitative data, and/or more thorough literature search. An integration approach that is recommended by Creswell and Plano Clark (2018) for understanding complex social phenomena is a mixed methods integration approach.

3.9 Reliability and Validity

3.9.1 Reliability

Cohen et al., (2018) is reliable in terms of the consistency and stability of the research instruments and the results of the research. The pilot study was done and quantitative part of the questionnaire was tested for its reliability with Cronbach's alpha test. As for its internal consistency, the Cronbach's Alpha coefficient had a value of 0.78 which is above the acceptable ratio of Field (2018) of 0.70. The research assistants were also trained in applying the questionnaire in the same way and a standardized method was applied throughout the process of data collection.

The qualitative component included interviews and FGDs which were audio recorded and transcribed verbatim to minimize the errors of interpretation, and to allow for less errors of interpretation. In addition, member checking also was conducted to gain accuracy or improve the credibility of the qualitative data (Lincoln and Guba, 2015).

3.9.2 Validity

In order to establish the content validity of the questionnaire, five experts, including three academic supervisors and the water resources specialist, gave their opinions on the questionnaire and confirmed that the items are sufficient to cover the key dimensions of the research objectives. Pilot study was also conducted to check the face validity, which means that the question items must be clear enough and comprehensible to the target population.

To obtain credible findings for the qualitative component, the qualitative equivalent of internal validity, prolonged engagement with the study community, multiple data sources (triangulation) and thick description of findings (Denzin and Lincoln, 2017) were applied. Transferability was taken care by giving detailed description of the study context so that the readers could see the extent to which the findings in this study can be transferred to other similar contexts. An audit trail was used to ensure dependability in the documentation of methodological decisions made during the study.

3.10 Ethical Considerations

The study was based on the ethical guidelines of social science students using human subjects. Prior to the collection of any data, a suitable institutional review board granted ethical clearance for the project. During the study the following ethical principles were followed:

Informed Consent: All the participants were thoroughly informed of the purpose of the study, the method of collecting data, the voluntary participation and their rights to withdraw the study without penalty. All participants signed informed consent (IC) forms and, when literacy was

an issue, signed using their thumbprint and recorded verbally, with the presence of a witness if needed.

Confidentiality and Anonymity: The identities of all the participants in the research were kept confidential. No questionnaires were kept where personal identifying information was recorded and pseudonyms were used to report qualitative information from key informants and FGD participants. Data was kept on secure devices and only available to the researcher and principal supervisor having the password.

Voluntary Participation: Participation in the study was completely voluntary. No monetary or other incentives or inducements were provided to participants. Participants had the option to refuse to respond to specific questions as well as to stop participation at any time with no repercussions.

Do No Harm: The researcher made sure the process of data collection did not harm participants physically, psychologically, socially or economically. Interview questions were developed to be sensitive, non-threatening, and participants were allowed to stop or pause the interview if they showed signs of distress.

Permission from Authorities: Permission to start the study was sought from Chitungwiza Municipality Water Department, the Ward 3 Councilor's office and community leaders written. Such permissions allowed access to participant and institutional records.

These ethical guidelines are in line with those laid out in the British Sociological Association (BSA, 2017) and the American Psychological Association (APA, 2017) and other major social science research organizations.

3.11 Summary

This chapter has elaborately explained the methodology of this research. The design of the study was mixed methods and a case study approach using quantitative household surveys, qualitative key informant interviews, and focus group discussions. The study was carried out in Ward 3 in the Chitungwiza area where the water supply is a constant problem and population density is high. Three hundred fifty (350) households were randomly sampled using a stratified random sampling while 10 Key Informants and 3 FGD were purposively sampled.

This involved the use of structured questionnaires, semi-structured interview guides, FGD guides and document review. The qualitative data were analyzed using thematic analysis with the aid of NVivo 12 and quantitative data analyzed using SPSS version 26. Measures of

reliability and validity were embedded at various stages of the research process. Ethical rules of informed consent, voluntary participation, confidentiality and do no harm were strictly followed. The chapter also identified some important study limitations, such as the cross-sectional design, social desirability bias, and lack of generalizability. The next chapter provides and discusses the results of the study.

CHAPTER FOUR

PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS

4.1 Introduction

The findings of the study on the impacts of water scarcity on the livelihoods of the household in Ward 3 Chitungwiza is presented, discussed and examined in this chapter. Descriptive statistics, tables and percentage distributions are used to present quantitative findings and qualitative findings are integrated into the narrative to enhance the understanding of the quantitative findings and to provide triangulation. When relevant, the results are linked to the body of knowledge to place them in the current academic discourse on water scarcity and livelihoods. The names of all qualitative participants are pseudonymised.

4.2 Socio-Demographic Profile of Respondents

It is important to first understand the socio-demographic characteristics of the respondents in the study since they provide context and shape the effect of water scarcity and how it is met in the households. A summary of the main socio-demographic details of the household survey is provided in table 4. 1

Variable	**Category**	**Frequency (n=350)**	**Percentage (%)**
Sex of household head	Male	198	57
	Female	152	43
Age of household head	18–30 years	62	18

Variable	Category	Frequency (n=350)	Percentage (%)
	31–45 years	137	39
	46–60 years	98	30
	61+ years	53	13
Household size	1–3 persons	76	21
	4–6 persons	185	53
	7+ persons	89	26
Education level	No formal education	25	7
	Primary	92	25
	Secondary	176	50
	Tertiary	57	18
Primary occupation	Formal employment	98	28
	Informal/self-employed	167	48
	Unemployed	78	24
Monthly household income	Below USD 50	115	33
	USD 50–100	134	39
	USD 101–200	71	20

Variable	Category	Frequency (n=350)	Percentage (%)
	Above USD 200	30	8

Table 4.1: Socio-Demographic Profile of Respondents

Source: Field Survey, 2026

The data in Table 4.1 show that most of the household heads were male (57.7%) while the female-headed households made up a large proportion (42.3%), reflecting the changing household arrangements for Zimbabwe's cities as a result of male labour migration and marital separation, as reported by ZIMSTAT (2022). The biggest age group was 31-45 years (39.9%) suggesting a high proportion of working age adults in households. The average number of persons per household is 4-6 persons (52.8%) which is similar to the average household size for urban areas in Zimbabwe ZIMSTAT (2022) and affects the domestic water demand.

Economically, more of the respondents were involved in informal or self-employment activities (48.7%) indicating predominance of the informal economy in Chitungwiza's urban economic activities (Ncube and Tshuma, 2018). Worrying is the fact that 32.7% of the households had incomes less than USD 50, and 39.1 had between USD 50 and USD 100 monthly. This implies that many households in Ward 3 fall below the poverty datum line and hence they are very vulnerable when it comes to cost of water such as buying water from vendors or travelling to far fetching water sources, Nhapi, (2016).

4.3 Patterns and Nature of Water Scarcity in Ward 3:

4.3.1 Interruptions in water supply – frequency and duration

It is important to have a sense of the number of times and length of duration of events of water being unavailable in ward 3 to assess the severity of water shortage. Part of the question was whether the participants had trouble in getting water in a normal month – how often. The results are summarised in Table 4.2.

Frequency of Water Interruptions	Frequency (n=350)	Percentage (%)
Never (water always available)	15	4
1–2 times per month	30	8

Frequency of Water Interruptions	Frequency (n=350)	Percentage (%)
3–5 times per month	56	16
More than 5 times per month	135	39
No piped water at all (chronic shortage)	114	33

Table 4.2: Frequency of Piped Water Supply Interruptions

Source: Field Survey, 2026

The results given in Table 4.2 are very grim in regard to the availability of water in Ward 3. 71.8% of respondents suffered from a lack of piped water or water supply cuts of five or more per month. Only 3.5% of households experienced "always available" water access. These figures are similar as those derived from similar studies in urban areas in Zimbabwe. For example, Dzinamarira et al. (2020) discovered that more than 60% of the households in the high-density suburbs in Chitungwiza had access to piped water for less than 12 hours a week. In the same vein, Nhapi (2016) reported systemic water supply failures in urban municipalities in Zimbabwe, which are linked to the failure to invest in water treatment and distribution, an aging water infrastructure and population growth.

This was backed up by key informants with statistics. A municipal water officer (KI-1) said: *'The pipes in this ward were laid when they were in the 1970s. We have to cope with burst pipes every week and there aren't funds that would enable us to replace all the pipes at once.'* This observation reflects a structural crisis in the water infrastructure which has not only maintenance implications but sits in the wake of UN-Habitat's (2016) call for infrastructure investments to address the needs of ageing urban water infrastructure in Southern Africa.

Respondents also noted that, when water was available, it was only for a few hours a day and therefore not possible to collect sufficient amounts of water. A female FGD participant (FGD-1) explained: *'Sometimes the water comes at two in the morning. That's by five am and you need to get up and fill the containers all around the house*.' This night availability of water is also having significant impacts on sleep habits, domestic routines, and the overall health and physical well-being of people, especially women and girls who are predominantly responsible for gathering water (UN-Water, 2018).

The sources of water used by household groups are as follows:

Due to the volatile nature of piped water supply, households in Ward 3 must find other water sources. Figure 4.1 provides an overview of the sources that were used by the household surveyed (more than one source could be used).

Water Source	**Number of Households**	**Percentage (%)**
Municipal piped water (when available)	89	25.9
Water vendors/bowsers	85	23.9
Unprotected shallow wells	68	19.8
Neighbour's borehole	55	15.2
Rainwater harvesting	31	9
Rivers or streams	14	4.1
Communal boreholes (NGO/government)	8	2.1

Table 4.3: Alternative Water Sources Used by Households

Source: Field Survey, 2026. Multiple responses permitted.

Table 4.3 shows that when people do not have reliable municipal water they can go to a wide variety of water sources that are often unsafe. The water vendors and bowsers were a major component of the water supply system in Ward 3, with 70.3% of households utilising them. But vendors' water is costly, and its quality can vary as well. Respondents indicated that their prices for 200-litre drums of water varied from USD 2 to USD 5; well above the monthly family incomes of USD 100 or less. This is in line with the observations of the other authors in this

paper who found the poor in urban areas of Sub-Saharan Africa to be paying more for water sourced from water vendors than the middle class pay for piped water (Kariuki and Schwartz, 2016).

It is particularly concerning from a public health standpoint that 51.9% of the wells are unprotected shallow wells. Wells in areas with high population density and an absence of protection are very vulnerable to contamination caused by pit latrines, storm drains and solid waste (WHO, 2017). Evidence from Zimbabwe demonstrates a positive correlation between drinking water from unprotected wells and diarrhoeal diseases, cholera and typhoid (Mutis et al., 2021). Field observations found that some wells were very close to the pit latrines in Ward 3, exposing households to potentially high risk of water borne disease outbreak.

4.4 Economic Effects of Water scarcity in the Household Livelihoods

4.4.1 Household Expenditure on Water

A more direct economic impact of water shortage is the additional economic pressure that may be faced by households in obtaining water from alternate sources. Respondents were asked to estimate their monthly cost of water from all water sources. The results are given in the table 4.4.

Monthly Water Expenditure (USD)	**Frequency (n=343)**	**Percentage (%)**
Less than USD 5	47	13.7
USD 5–15	98	28.6
USD 16–30	123	35.9
USD 31–50	61	17.8
More than USD 50	14	4.1

Table 4.4: Monthly Household Expenditure on Water

Source: Field Survey, 2026

Table 4.4 reveals that 35.9 per cent of households paid USD 16 – USD 30 per month in water costs and 17.8 per cent paid USD 31 – USD 50 per month. This is a large proportion of total household income for households whose monthly income is less than USD 100, the majority

of sampled households. The amount of money spent on water in some cases was as high as 20-30% of the income of the household, which is much higher than the recommended international limit of not exceeding 3-5% of the household income for water cost (UNDP 2016).

A consistent theme emerged in the qualitative data with regard to the cost of water use. One male FGD participant (FGD-2) reported: '*I can spend up to USD 30 in a month on water. It's money that would otherwise have been used for school or food. Often sleep on an empty tummy due to water'* This testimony demonstrates the first order effects that water shortages have on household welfare, meaning that families must trade off other needs to obtain the water they need. This is in line with Hailu et al., (2015) who reported that low income city dwellers often forgo other essentials such as education and food intake for water.

The extent of the impact on income-generating activities will depend on the amount of land that is submerged.

A shortage means that water is not only a higher cost to households but is also having a direct effect on income generating activities that require water. Many of the households in Ward 3 (32.2 percent) are involved in informal economic activities that require water, such as home-based food vending, beer brewing, vegetable gardening, car washing, brick moulding, and hair salons. Those who did such activities (n=167) were asked to rate the Water scarcity impact on their enterprises.

Perceived Impact on Income-Generating Activity	**Frequency (n=167)**	**Percentage (%)**
Severe reduction in productivity/output	79	47.3
Moderate reduction in productivity/output	54	32.3
Minimal impact	21	12.6
No impact	13	7.8

Table 4.5: Impact of Water Scarcity on Income-Generating Activities

Source: Field Survey, 2026

Table 4.5 indicates that 79.6% of those who selected water-dependent activities said that they suffered from severe or moderate reduction in productivity and output due to water scarcity. A food vendor daughter (KI-4) said: '*I sell out of my house sadza and vegetables. When there is no water I can't cook, and I lose my whole day's income. Sometimes I can't even open for three or four days.'* This indicates a major disruption of livelihoods with repercussions on the household food security and economic resilience.

The brick moulding industry was identified by several actors to be one of the sectors that is most affected by water scarcity in the informal economy of Chitungwiza's construction sector. One brick moulder (KI-6) said: *'Bricks require water. Without the water there are no bricks. Unfortunately, I have lost a few contracts due to schedule issues*.' This is consistent with the findings of Ncube and Tshuma (2018), who highlighted the vicious cycle of poverty due to water insecurity in the city's informal sector where a lack of productivity translates people into low earnings which also yet indirectly impact their access to water storage and alternative water supplies.

4.4.3 Effect on Food Security and Nutrition

Water insecurity and food security are a complex and multi-faceted issue. Water scarcity has a multi-faceted impact on food security in Ward 3, as it means that people are less able to cook and prepare food safely and hygienically; less able to grow food in their home gardens; and less money available to buy food because they spend income on water. 78.4% (n=269) of the people questioned said that water shortages had impacted on their family's ability to feed themselves properly. Of these, 51.3% stated they missed meals on days when water was out of reach, and 34.6% stated they decreased their number of cooked meals per day.

The results align with evidence from all over the world which shows that water insecurity is associated with food insecurity in urban poor households (Vaitla et al., 2017). In addition to its role in agriculture production, water is also fundamental for food preparation and safe food storage, and access to water is a key factor in nutrition status especially for children and pregnant women as stated by the UN Food and Agriculture Organisation (FAO, 2018). Some of the women participating in the FGDs in Ward 3 said that they often had to make choices between water and food in Ward 3 which inevitably affected nutrition.

4.5 Health and hygiene impacts of water scarcity

4.5.1 Waterborne Water-Related Diseases

Households are exposed to a variety of waterborne and water related diseases by using unsafe water (either as a drinking source or for hygiene). Respondents indicated if they, or anyone in

their household, have been treated for any type of water borne illness in the past year. The result is displayed in Table 4.

Disease / Illness	**Households Affected**	**Percentage (%)**
Diarrhoea	198	57.7
Typhoid	87	25.4
Dysentery	64	18.7
Cholera	31	9.0
Skin infections	143	41.7
Eye infections	112	32.7
None of the above	58	16.9

Table 4.6: Waterborne and Water-Related Diseases Reported in Households

Source: Field Survey, 2026. Multiple responses permitted.

The data listed in table 4.6 are alarming. More than half of the sampled households (57.7%) reported at least one incidence of diarrhoea in the last year, with 25.4% having experienced typhoid, a water and sanitation-related disease (WHO, 2017). Cholera was a disease which has recurrently ravaged Zimbabwe since the 2008 outbreak and affected 9% of households, which was much higher than the national benchmarks. 41.7% and 32.7% of the households reported skin and eye infections associated with inadequate water for bathing and washing respectively.

A community health worker (KI-7) noted that the trend reflected in the survey results is evident in the ward: *'Diarrhoea is very common in this ward, particularly among children under 5 years of age. It is primarily from water. However, people are accessing unsafe wells, or even collecting water in unclean containers as it does not have enough clean water to clean the containers with'.* This observation highlights an important relationship between water supply

quality and quantity - in the absence of water quantity, households make sacrifices in practicing water quality, which increases the risk of disease, even for those who use some water (Pruss-Ustun et al., 2019).

4.5.2 Healthcare Expenditure and Productivity Losses.

Water scarcity brings disease burden with great economic consequences to households: cost of medical services and loss of productivity. Respondents that had incurred healthcare costs associated with waterborne diseases reported an average of USD 18/episode spent on consultation, medicines, and healthcare facility travel. This is a significant economic burden for the 83.1% of households who reported incurring at least one water-borne illness on top of high water acquisition costs.

In addition to healthcare expenses, waterborne diseases decrease the productivity of households by incapacitating people in their working age group and by discouraging caregivers, usually female, from working in the field while taking care of their sick relatives. One of the FGD participants is a female, who explained the situation: *If the children fall sick, I have to stay home with them if they have diarrhoea. I can't go to the market, to sell my vegetables. So I'm losing money on my income, and I'm spending money on drugs. 'It's a double loss*,' This testimony is a reflection of the mutually reinforcing and cyclical nexus of water insecurity, disease, and poverty, which is termed the 'water-poverty-disease trap' by Pruss-Ustun et al. (2019).

4.6 Water Scarcity in Gender Perspective

4.6.1 Women and Girls as primary Water Collectors

One of the common threads in both quantitative and qualitative data was the strong gendered approach to water collection and management in Ward 3. When asked, 76.4% of respondents reported that water collection was the main responsibility of adult women and 14.3% female children (girls). Primary water collectors of male adults (6.1%) and male children (3.2%) were identified for only a few (6.1% + 3.2%) households. The results are consistent with the worldwide picture reported by UN-Water (2018) that in Sub-Saharan Africa women and girls are responsible for 70-80% of collecting household water.

The burden of water has profound impacts on women and girls time, health, safety, education and livelihoods. During the FGDs, women indicated that when there was a lack of water they would hike to the communal taps or boreholes which were 1-3 kilometres from their homes and that they would rise early in the morning to collect water before the time of collection was called, and that they would spend 2-5 hours a day doing water related tasks. This time burden

directly restricts the capacity of women to undertake income generating activities, to be part of community decisions making and to invest time in self-development.

4.6.2 The effects on the education of girls

Water scarcity for girls was a key qualitative finding with regard to the educational implications. A number of female participants in the FGDs and key informant interviews noted that during the time of water scarcity girls were often absent from school to fetch water. A ward councillor (KI-3) commented*: 'It is girls who are hit the hardest. If there's no water, the mom is at the queue at the borehole, and she brings her daughter. The girl does not go to school; she stays behind to help with water*.' This gendered assumption is not only based on existing inequalities in access and attainment of education but has long-term consequences for the human capital development and economic empowerment of girls (UNICEF, 2016).

These findings are especially worrying because Zimbabwe is committed to the right to education and gender equality via its constitution. They focus on the systemic impact of water scarcity not only a technical infrastructure problem, but also a social justice issue, disproportionately affecting already marginalised groups (Sultana, 2018).

4.7 Household Coping Strategies

4.7.1 Coping Strategies Overview

Despite the persistent water scarcity, households in Ward 3 have come up with various coping mechanisms to cope with their water needs. A task force was set up to identify all coping strategies being used within the last year. The results are shown in Table 4.7.

Coping Strategy	**Frequency (n=350)**	**Percentage (%)**
Purchasing water from vendors	98	28
Storing large quantities when water is available	82	23.4
Using unprotected wells or streams	71	20
Reducing water usage (bathing less, etc.)	48	13.7
Sharing water with neighbours	23	6.6

Coping Strategy	Frequency (n=350)	Percentage (%)
Collecting rainwater	14	4
Relocating temporarily to relatives' homes	8	2.3
Lobbying/complaining to authorities	6	1.7

Table 4.7: Household Water Scarcity Coping Strategies

Source: Field Survey, 2026. Multiple responses permitted.

The most common coping strategies were water storage (87.8%), cutting back water usage (77.8%) and buying from vendors (70.3%). Water storage is a common adaptation that householders implement to store water when they have a surplus, in water insecure urban areas (Wutich et al., 2017). However, larger scale household water storage can also pose risks it can create breeding grounds for mosquitoes (increased risk of malaria), it can lead to contamination of water stored, and it can be a cost of getting the right water storage container.

The basic need of hygiene is frequently compromised as 77.8% of households said they had cut back on water use. As for specific kinds of water that they cut back on during water shortages, 68.4% of the respondents mentioned frequency of bathing, 59.2% mentioned cutting back on laundry and 41.3% mentioned washing utensils and food. The trade-offs that are made affect the risk of disease transmission directly and thus create a vicious cycle between water poverty and water and health outcomes (Pruss-Ustun et al., 2019).

4.7.2 Social Solidarity and Community Based Coping

An interesting discovery was the social solidarity as a coping mechanism. There were encouraging signs with community bonds and networks of mutual aid as nearly 57.7% of households reported sharing water with neighbours when there was a shortage. This fits well with the concept of social capital a community of people that trust and rely on one another which offers a strong protective buffer in water-insecure urban communities, per Wutich et al. (2017). Nevertheless, social solidarity mechanisms have their limits, and with increased water scarcity, it can result in competition and conflict over shared water sources (Nhapi, 2016).

The participants of the focus group reported a network of informal water sharing agreements between neighbours, with each neighbor paying a small amount of money and/or reciprocating

for water taken from large storage tanks or boreholes. These are short-term, non-tolerable and are testament to the failures of formal water governance institutions to meet the needs of the people.

4.8 Local Government and institutional reactions to water scarcity.

4.8.1 Community perceptions of the municipality's performance

Respondents were requested to provide feedback on the Chitungwiza Municipality's performance with respect to responding to water scarcity in the Ward. The majority 89.2% (n=306) gave a rating of very poor or poor as the performance of municipal services. Just 4.4% described it as satisfactory and only 1.5% found it to be good. The ratings reflect the high level of dissatisfaction in the community with the inconsistent water services that are being provided and unsafe.

The key informant interviews with municipal officials revealed a precariously failed institution both financially and operationally. One of the officers of the water department said: 'We are working on a very restricted budget. We can't get the dollars from those who have hardship paying bills and without the dollars there's an issue with the infrastructure. This is a vicious circle,' Zimbabwe's urban municipalities are stuck with a fiscal trap, as poverty makes it hard to collect revenue, which results in low levels of service provision, which worsens poverty (Muller, 2017).

4.8.2 The role of the NGOs and civil society organizations

The poor performance of the municipality has been partially compensated for by non-governmental organizations (NGOs) and civil society organizations. In Ward 3, a number of NGOs were found to be involved in delivering some water related interventions, such as rehabilitation of boreholes, giving out water purification tablets, hygiene promotion campaigns and advocating for better water governance at the municipal level. NGO representatives (KI-9, KI-10) commented on the importance of community participation in water management and the need for demand-based water management mechanisms based on communities with a focus on the needs of women and vulnerable households.

But, NGO interventions, as described by the respondents, were fragmentary, short-term and donor dependent. There is a community leader (KI-5) who said: 'NGOs come and go. They dig a well, train some and proceed further. In case the borehole goes out, no one will repair it. This critique is shared with the overall discussion of dependency and sustainability of NGO water provisioning in the context of poor water governance by the state (Harvey and Reed, 2016).

4.9 Summary

The results of the study on the impact of water scarcity on household livelihoods in Ward 3, Chitungwiza have been presented and discussed in this chapter. The results illustrate a community with a lack of water security, high difficulty levels, and influences on the economic wellbeing, health, gender and community cohesion. Water is interrupted for most of the households >5 times in a month or they have no piped water source. Those who are the poorest households are most susceptible to the economic effects of water scarcity as they spend a large share of their scarce income on water, but also suffer losses due to reduced productivity in their water-intensive livelihoods. More than half of households reported recent (last year) diarrhea, the cost of use of unsafe water sources and hygiene compromises. Women and girls are disproportionately responsible for gathering water and it has a disproportionate impact on their education, time use and economic inclusion. The hybrid coping mechanisms of the households are innovative and adaptive, but not adequate, sustainable or permanent. The institutional reaction to this crisis is inadequate, and the municipality can't solve the structural water shortages because of budget limitations. The conclusions and recommendations for policy and practice of this research is in the following chapter.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The final chapter presents findings of the study conducted and recommendations to remedy the water scarcity effects on the household livelihoods of Ward 3, Chitungwiza. The chapter begins by reminding the reader of the goals of the research, followed by a summary of the key findings with regard to the goals. It then provides actionable evidence-based recommendations with a number of stakeholders, such as the Chitungwiza Municipality, the national government, NGOs and the communities themselves. The chapter ends with a discussion of the implications of the study for the current literature and a list of future research directions.

The study's goals were conceptualized in five general areas: (i) to understand the extent of water scarcity experienced by households in Ward 3; (ii) to understand the economic effects of water scarcity on households' livelihoods; (iii) to understand the health and hygiene effects of water scarcity; (iv) to analyse the gender aspects of water scarcity; and (v) to observe the coping strategies adopted by the households and the institutional response to water scarcity. The conclusions that are put forward for each of these objectives are summarized in this chapter.

5.2 Summary of key findings

It is helpful to briefly reiterate the key empirical results of the study before making conclusions and recommendations. The following conclusions/ recommendations are based on the evidential foundations in this study, and can be summarised by the following key empirical results.

The study has revealed that water scarcity in Ward 3, Chitungwiza is a severe, widespread and persistent problem. The majority of the households surveyed (more than 70%) reported piped water supply with more than 5 interruptions a month, and approximately 1/3 of all households experienced no functional piped water supply. The major structural issues were identified as being linked to an old infrastructure, financial restrictions, population growth and lack of maintenance by the municipality which led to water insecurity in the ward.

It was found that water shortages have a compounding and marked economic impact on household livelihoods. Households with monthly income of more than their water expenditure from the vendors was high (up to 30% of monthly income). Those livelihoods that depend on water, particularly for their informal sector economic activities like food vending, beer brewing, brick molding and market gardening, experienced significant losses in production and

this further increased household poverty. Over three-quarters of all respondents indicated that water scarcity had had a negative impact on their household's food security, in a number of ways.

The effect of water shortage on sanitation and health was very distressing. More than half of all households reported having had at least one case of diarrhoea in the year prior to the survey; and almost a quarter of households reported having experienced typhoid. The main transmission pathways were attributed to lack of sanitary facilities, and reduction in hygiene practices due to inadequate water access; many families had unprotected wells near pit latrines which were their water sources. So financial burden from the cost of health care and lost productivity caused by water borne diseases further strained already straining households.

The study confirmed the big gender gaps in access to water in Ward 3. Women and girls were mainly involved in collecting water and in situations of extreme water scarcity two to five hours of their day was spent on water chores in more than 90 per cent of the households. This time burden hindered women's economic participation and for girls, in many instances, this translated to absence from school, leading to lasting effects on gender equality and access to education.

A variety of coping mechanisms were used by the households such as storing water, buying water from vendors, decreasing water usage and sharing water with neighbours. While these strategies demonstrate the impressive adaptability of communities to disasters, most are reactive, are themselves unsustainable and have risks. The institutional measures taken by the municipality to tackle water scarcity were rated very low by the majority of the respondents and the interventions of NGOs were reported as being donor-driven and fragmented.

5.3 Conclusions

5.3.1 Conclusions about water scarcity and its characteristics

The study concludes that the water scarcity in Ward 3 Chitungwiza is a structural problem and not a problem of water delivery, having been prevailing for a long time. The lack of consistent, safe and affordable water for most of the water supply in the ward is a basic violation of the human right to water set out in General Comment 15 of the United Nations Committee on Economic, Social and Cultural Rights (UN OHCHR, 2015). This is because structurally caused crisis ageing infrastructure, lack of investment, fiscal unsustainability and lack of good governance can only be redressed at a higher level, by individuals acting at the household level. They require immediate, systemic and multi-stakeholder action.

The results of this study are consistent with the general trend of water insecurity in the cities of Sub-Saharan Africa (Bain et al., 2018; Vorosmarty et al., 2015). The situation in Chitungwiza is not unique but is characteristic of city water systems that are unable to manage population growth and lack of investments combined with low institutional capacity in the region. The study thus makes a contribution to the growing evidence base for the transformation of urban water governance, now being demanded (UN-Habitat, 2016) of the Global South.

5.3.2 Summary of Economic impacts

Finally, it is concluded that water scarcity is one of the factors that facilitate high poverty rate and livelihood insecurity of the households of Ward 3. The economic costs of water scarcity can manifest themselves in a number of ways: higher water spending, lost productivity in time-poor water reliant livelihoods, lower food security, and higher healthcare costs, all of which individually put strain on household budgets and together constitute a poverty trap from which structural reform of water provision is hard to claw out of in the absence of such reforms. In Zimbabwe, these inequities in water use mirror and perpetuate urban inequality as those with low household incomes are burdened by high share of their income on water, while at the same time earning less (Ncube and Tshuma, 2018; Nhapi, 2016).

This study therefore concludes that water scarcity is not just an environmental or technical concern but an economic and social justice concern and has huge implications for attaining the Sustainable Development Goals (SDGs), specifically SDG 1 (No Poverty), SDG 2 (Zero Hunger), SDG 6 (Clean Water and Sanitation) and SDG 10 (Reduced Inequalities). The initiatives to respond to water scarcity in Ward 3 need to be viewed as an issue of poverty reduction and equity, rather than only a water sector matter.

5.3.3 Health and Hygiene - Conclusion

The study concludes that the health impacts of water shortage in Ward 3 are high, preventable, and closely connected with the structural breakdown of the municipal water system. The high prevalence of diarrhoeal diseases, typhoid and other water related diseases demonstrates that the combination of the unsafe alternative water sources and the decreased hygiene practices caused by lack of water, are creating compounding risks. These health outcomes may in turn also carry economic costs which further consolidate poverty.

Overall, the study findings indicate that enhanced water supply reliability and safety would have major public health benefits in Ward 3 and other urban areas. Since similar interventions in Sub-Saharan Africa have demonstrated that long-term improvements in water access can

lead to a 25 to 40 percent decrease in the burden of diarrhoeal disease, especially among children under the age of 5 and people with weakened immune systems (Pruss-Ustun et al., 2019), these potential improvements could be significant. Water infrastructure investment is a public health investment with multiplier impacts on education, productivity and quality of life.

5.3.4 Concluding remarks about Gender Dimensions

Overall, the study highlights that water scarcity is a gendered issue in Ward 3; women and girls face the greatest and most pressing threats to water security. Women and girls bear the burden of water collection in terms of time, labour and health risks, restricting their education and economic potential and reinforcing gender disparities. These results confirm the global evidence of the gendered effects of water insecurity given by UN-Water (2018) and Sultana (2018) and supports the need for gender-responsive approaches to water policy and programming.

Gender dimensions need to be incorporated in the way that any steps to mitigate water scarcity in Ward 3 affect women and girls' ability to collect water, particularly by easing this burden, but also by ensuring women and girls are meaningfully engaged in water governance and decision-making. Otherwise, it is possible to reinforce existing inequalities despite the improvement of infrastructures.

5.3.5 Summary of Coping Strategies and institutional responses

The study reveals that households in Ward 3 are remarkably resilient and resourceful in coping with scarcity of water; however, many of these coping mechanisms are inadequate, risky and unsustainable. They are coping behaviours to the structural failures instead of solving the problem. While financial limitations have contributed to the municipality's failure to meet its water service mandate, these failures are also a result of poor collection of revenues, planning of water maintenance, and lack of engagement with the community. NGO interventions can help to complement and fill gaps but cannot replace effective municipal governance.

Therefore, the study recommends a fundamental re-structuring of water governance in Chitungwiza, which incorporates infrastructure rehabilitation, better finances, real engagement of the community and accountability to the community. The results indicated that there was considerable interest in the community to participate in and to help develop the better water management if institutional trust could be re-built and improvements could be seen.

5.4 Recommendations

5.4.1 Chitungwiza Municipality recommendations

From the results and conclusions of this study, the following recommendations are aimed for the Chitungwiza Municipality:

Firstly, the municipality should take urgent measures to rehabilitate and replace the ageing water distribution infrastructure in Ward 3 and even throughout Chitungwiza. A phased infrastructure renewal plan that is developed with residents' input should be created and made public to show the commitment and to establish trust by the residents. The municipality should consider funding options such as municipal securities, public-private partnerships and loans from development finance institutions to finance infrastructure rehabilitation, as national government grants fall short (UN-Habitat, 2016).

Second, the municipality should improve its revenue collection systems to enhance the financial sustainability. This may be provided by community-based payment mechanisms, graduated tariff options which allow for safeguarding the poorest domestic systems and removal of illegal connections that deplete revenues and put pressure on systems. Improved billing accuracy and transparency is a key element in helping to restore community willingness to pay for water services.

Third, the municipality should create a community water committee for Ward 3 to monitor the water service, resolve complaints and interface with the municipal water management based on the elected representatives of the community (50 per cent of them women). Using water governance frameworks that involve communities has been demonstrated to enhance water services accountability and sustainability (Manzungu and Chioreso, 2016).

Fourth, the municipality should establish an emergency water supply protocol, which ensures WASH plus minimum standard, 20 litres per person per day (WHO, 2017), in times of acute water scarcity by introducing water tankers in the most affected communities such as Ward 3.

5.4.2 Recommendations for National Government

National Government of Zimbabwe should substantially boost funding to urban water and sanitation infrastructure as a constitutional obligation as stated in Section 77 of the Constitution of Zimbabwe (2013) that guarantees every citizen access to safe, clean and potable water. The Ministry of Local Government and Public Works should provide a national urban water infrastructure fund to aid municipalities in rehabilitation and expansion of urban water infrastructures.

The government should improve and consolidate the regulatory structure of urban water services to provide greater clarity around accountability for poor service delivery, to enforce water quality standards and to provide greater protection for consumers' rights. The Zimbabwe National Water Authority (ZINWA) and local authorities should be obliged to issue annual performance reports of their water services to serve as a way of promoting transparency and accountability.

Water security should be included in the national urban planning policy, so that new residential developments are not approved if it is not possible to demonstrate the capacity and sustainability of the water supply. The growth rate of Chitungwiza has been a major contributor to the current crisis situation (ZIMSTAT, 2022) and if not abated in the future, it will also accelerate the crisis.

5.4.3 Recommendations for NGOs and Development Partners

A shift is needed in paradigm from project/grant-funded water interventions to more long-term and more community embedded approaches that encourages local partnerships and institutional capacity both within the specific context of Ward 3 and Chitungwiza more broadly, with the involvement of NGOs and development partners across the wards. More specifically, NGOs should emphasize the establishment of community managed WUAs, WUA members training in borehole and pump maintenance, and strengthen WUA committees and relations with municipalities.

Research on suitable and economical water treatment technologies at household level for communities in Ward 3 and other similar areas should be encouraged and supported by development partners, such as solar disinfection (SODIS), ceramic filters, and chlorination kits. Sustainable hygiene promotion education should be part of the distribution of such technologies, so as to ensure that they have the greatest possible public health impact WHO, (2017).

NGO programming should explicitly be gender transformative - not just about alleviating women's water collection burden (by improving water access) but also about questioning the gender norms that put the burden on women in the first place. This includes men and boys participation in the house hold water management and advocacy process.

5.4.4 Recommendations for the community

There is a need to encourage and support households in Ward 3 to invest in the improved water storage facility like covered plastic tank with sealable lid so as to reduce the risk of

contamination in water storage and minimise mosquito breeding. Community savings groups could be a mechanism for enabling communities to purchase storage units.

They should be supported to mobilise and collectively lobby the municipality and/or national level policy makers on the need for improved water service. In practice, collective advocacy achieved through the creation of ward development committees, civic organisations and through media is found to be more effective than complaints to get the municipality to hold them accountable, Muller, (2017). Women, who have unique knowledge and interest on water issues, should be supported to take an active role in and lead water governance advocacy efforts in particular.

To minimize wastage, when there is water available, the community should have a say in water conservation practices. Educational campaigns with the community on efficient water use and reporting of water leakages, and preventing vandals from attacking communal water points and pollution of water points can help to maximise water availability and quality in the ward.

5.5 Contribution to Knowledge

The current study has a number of contributions, which contribute to the existing knowledge on water scarcity and urban livelihoods in Zimbabwe and in the Sub Saharan Africa generally. First, it provides empirical evidence at the ward-level level, showing the complex consequences of water scarcity on household livelihoods in an urban setting in Zimbabwe, which has been missing from literature that has tended to focus on rural context or at city-wide level without disaggregation at ward-level (Nhapi, 2016; Dzinamarira et al., 2020).Secondly, the study contributes to the growing literature on gender issues and dimensions of water insecurity in Southern Africa, drawing on quantitative data and qualitative analysis of the impact of the water insecurity burden on women and girls and how water insecurity is likely to worsen gender inequalities (Sultana 2018; UN-Water 2018).

Third, the study is methodologically significant in that it is a case study that demonstrates a combination of methods which provide a rich and contextually relevant source of evidence for the lived experience of water scarcity at the community level. Data collected through a household survey and qualitative data collected through key informant/expert and focus group interviews were merged together to provide a broad and detailed understanding of the issue than either of the data collection techniques alone (Creswell and Plano Clark, 2018).

Last but not least, the study has a practical contribution as it provides recommendations that are actionable and relevant to the various stakeholders and are based on community evidence

and can help inform water governance policies and programmes that are more effective and equitable in urban areas such as Chitungwiza in Zimbabwe.

5.6 Recommendations for future research

This research has led to insights but there are still a number of questions that need to be addressed. Firstly, a cross-sectional study would not pick up time-lagged effects of water access or allow for studying the evolution of the water access over time as a longitudinal study would do on the same households over a period of 3-5 years. Secondly, the results obtained from this study can be replicated using comparative study of other wards of Chitungwiza or other urban municipalities in Zimbabwe to study the specificity of the findings to the Chitungwiza ward or the overall governance of urban water supply in Zimbabwe. Comparative evidence would help lay the groundwork for national recommendations for policy. Third, an economic cost analysis of water scarcity at the municipal and national level should be undertaken that would include the loss of productivity in industrial and commercial activities, the cost of the healthcare system and the loss of human capital accumulation. A full economic justification of water insecurity in cities would have strong arguments for public investment in water infrastructure for policy makers and development finance institutions. Fourth, having participatory action research methods that involve the people of Ward 3 in designing and assessing water governance solutions would be very valuable and evidence would be owned by them, and would build local capacity in water advocacy and local water management.

5.7 Concluding Remarks

This research has shown that water scarcity is one of the greatest and multi-dimensional problems that households in Ward 3, Chitungwiza are facing. That is not just on the day to day burden of standing in line for water, but on the economic, social, health and education facets of community life, that all have an effect on livelihoods, increase the poverty rate, affect health, and continue to perpetuate gender inequalities. The findings of this study strongly support the thesis that access to safe, reliable and affordable water is a basic necessity of life and not a luxury for human dignity and sustainable development.

Finding the answers to the problems of water scarcity in Ward 3 is more difficult and costly, but not impossible, and requires strong political will, institutional growth and community involvement. If coordinated and sustained, the recommendations outlined in this chapter can greatly affect the water security situation in Ward 3 and can be replicated in other urban areas of Zimbabwe. Experiences of communities like Ward 3 must be shared and responded to with

urgency and decisiveness, as the world strives towards reaching Sustainable Development Goal 6: availability and sustainable management of water and sanitation for all.

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APPENDIX A

Structured Household Questionnaire

Household Survey Ward 3, Chitungwiza

PURPOSE: To collect quantitative and structured qualitative data on household water access, the effects of water scarcity on health, economic livelihoods and food security, and household coping strategies.

Introduction to Participant

Dear Respondent, my name is Esther M Manditsera, a student at Bindura University pursuing a research degree in Development Studies. I am conducting a study on the effects of water scarcity on household livelihoods in Ward 3, Chitungwiza. Your household has been selected to participate. Participation is entirely voluntary and anonymous; your responses will be used for academic purposes only and kept strictly confidential. Please answer all questions honestly based on your own experience. There are no right or wrong answers.

No.

Question / Statement

Response Options

SECTION A: DEMOGRAPHIC AND SOCIO-ECONOMIC PROFILE

A1 What is the gender of the head of household?

☐ Male ☐ Female

A2 Age of head of household:

☐ 18–25 ☐ 26–35 ☐ 36–45 ☐ 46–55 ☐ 56+

A3 Highest level of education attained by head of household:

☐ None ☐ Primary ☐ Secondary ☐ Tertiary ☐ Postgraduate

A4 Primary occupation of head of household:

☐ Formal employment ☐ Informal trade ☐ Farming ☐ Unemployed ☐ Other

A5 Estimated total monthly household income (USD):

☐ <$100 ☐ $100–$299 ☐ $300–$499 ☐ $500–$699 ☐ $700+

A6 Number of people permanently residing in your household:

☐ 1–2 ☐ 3–4 ☐ 5–6 ☐ 7–8 ☐ 9+

A7 How long have you lived in Ward 3, Chitungwiza?

☐ <1 year ☐ 1–5 years ☐ 6–10 years ☐ 11–20 years ☐ 20+ years

A8 Type of household dwelling:

☐ Owner-occupied ☐ Rented ☐ Lodger/shared ☐ Other

SECTION B: WATER ACCESS AND NATURE OF WATER SCARCITY

B1 What is your primary source of water for household use?

☐ Municipal tap ☐ Borehole ☐ Communal standpipe ☐ Water vendor ☐ River/dam ☐ Other

B2 On average, how many days per week do you receive piped municipal water?

☐ 0 days ☐ 1–2 days ☐ 3–4 days ☐ 5–6 days ☐ Every day

B3 When water is available, for how many hours per day?

☐ <2 hours ☐ 2–4 hours ☐ 5–8 hours ☐ 9–12 hours ☐ >12 hours

B4How long has your household experienced water scarcity?

☐ <1 year ☐ 1–3 years ☐ 4–6 years ☐ 7–10 years ☐ >10 years

B5 Distance from your home to the nearest reliable water source:

☐ <100 m ☐ 100–500 m ☐ 501 m–1 km ☐ >1 km

B6 How much time does your household spend per day collecting water?

☐ <30 min ☐ 30–60 min ☐ 1–2 hrs ☐ 2–4 hrs ☐ >4 hrs

B7 Who primarily collects water in your household?

☐ Adult male ☐ Adult female ☐ Male child ☐ Female child ☐ All members

B8 Do you store water at home?

☐ Yes ☐ No

B9 If YES to B8, what containers do you use? (Tick all that apply)

☐ Plastic tanks ☐ Drums ☐ Buckets ☐ Clay pots ☐ Multiple types

B10 How adequate is your household water storage for daily needs?

☐ Very inadequate ☐ Inadequate ☐ Moderate ☐ Adequate ☐ Very adequate

SECTION C: EFFECTS ON HEALTH AND SANITATION

C1 How often has your household experienced waterborne diseases (diarrhoea, cholera, typhoid) in the past 12 months?

☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Very often

C2 Water scarcity has negatively affected hygiene practices (bathing, handwashing, toilet use) in my household.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

C3 Has your household experienced inadequate sanitation (e.g. open defecation) due to water shortages?

☐ Yes, frequently ☐ Yes, occasionally ☐ Rarely ☐ Never

C4 Estimated monthly household expenditure on health costs linked to waterborne illness (USD):

☐ $0 ☐ $1–$10 ☐ $11–$25 ☐ $26–$50 ☐ >$50

C5 Have children in your household missed school due to water-related illness in the past 12 months?

☐ Yes ☐ No ☐ No school-age children

C6 How significantly has water scarcity affected the mental/emotional wellbeing of household members?

☐ Severely ☐ Moderately ☐ Slightly ☐ Not at all

SECTION D: EFFECTS ON ECONOMIC LIVELIHOODS

D1 Does your household engage in any water-dependent income-generating activity (e.g. gardening, brick-making, food vending, brewing)?

☐ Yes ☐ No

D2 If YES to D1, has water scarcity reduced income from this activity?

☐ Greatly reduced ☐ Reduced ☐ Slightly reduced ☐ Not affected ☐ N/A

D3 Monthly household expenditure on purchasing water from vendors (USD):

☐ $0 ☐ $1–$10 ☐ $11–$25 ☐ $26–$50 ☐ >$50

D4 Has water scarcity caused your household to reduce food expenditure in order to afford water?

☐ Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never

D5 Has water scarcity caused any adult household member to miss work or lose income opportunities?

☐ Yes, frequently ☐ Yes, occasionally ☐ No

D6 Has your household taken on debt to meet water-related expenses?

☐ Yes ☐ No

D7 Overall, how significantly has water scarcity reduced your household's economic productivity?

☐ Greatly ☐ Significantly ☐ Moderately ☐ Slightly ☐ Not at all

SECTION E: EFFECTS ON FOOD SECURITY

E1 Does your household engage in urban agriculture or home gardening?

☐ Yes ☐ No

E2 If YES to E1, has water scarcity reduced productivity of your garden?

☐ Greatly ☐ Moderately ☐ Slightly ☐ Not at all ☐ N/A

E3 How many meals does your household typically eat per day?

☐ 1 meal ☐ 2 meals ☐ 3 meals ☐ More than 3

E4 Has the number of daily meals decreased due to water scarcity?

☐ Yes ☐ No ☐ Sometimes

E5 Water scarcity has negatively affected the diversity of my household's diet.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

E6 How do you assess the overall food security status of your household?

☐ Food secure ☐ Mildly insecure ☐ Moderately insecure ☐ Severely insecure

SECTION F: COPING STRATEGIES AND RECOMMENDATIONS

F1 What strategies does your household mainly use to cope with water scarcity?

☐ Buy from vendors ☐ Use borehole ☐ Reduce usage ☐ Store water ☐ Harvest rainwater ☐ Other

F2 How effective are your current coping strategies in meeting household water needs?

☐ Very effective ☐ Effective ☐ Moderately effective ☐ Ineffective ☐ Very ineffective

F3 Who do you consider primarily responsible for resolving water scarcity in Ward 3?

☐ National government ☐ Chitungwiza Municipality ☐ ZINWA ☐ Community itself ☐ All stakeholders equally

F4 What is the most urgent intervention needed to address water scarcity in Ward 3?

☐ Repair infrastructure ☐ Drill boreholes ☐ Promote rainwater harvesting ☐ Policy reform ☐ Community education

F5 How satisfied are you with the local government's response to the water crisis?

☐ Very satisfied ☐ Satisfied ☐ Neutral ☐ Dissatisfied ☐ Very dissatisfied

Thank you very much for your time and participation. Your responses are greatly valued.

APPENDIX B

Key Informant Interview Guide

Semi-Structured Interview Guide: Officials and Community Leaders

PURPOSE

To gather in-depth qualitative insights from key stakeholders including local government officials, water authority representatives, ward councillors, and community leaders on the causes, extent, governance, and effects of water scarcity on household livelihoods in Ward 3.

Introduction to Participant

Dear Key Informant, thank you for agreeing to participate in this interview. The information you provide will contribute to an academic research study on the effects of water scarcity on household livelihoods in Ward 3, Chitungwiza. The interview will take approximately 45–60 minutes. With your permission, the interview will be audio-recorded to assist with accurate transcription. All information shared will be treated with strict confidentiality and will not be attributed to you personally in any publication.

No.

Key Question

Probes / Follow-ups

THEME 1: NATURE AND EXTENT OF WATER SCARCITY IN WARD 3

1.1 How would you describe the water supply situation in Ward 3 from your experience/position?

Duration of problem? Severity compared to other wards? Getting better or worse over time?

1.2 What do you consider the primary causes of water scarcity in Ward 3?

Infrastructure? Governance failures? Budget constraints? Population pressure? Illegal connections?

1.3 Are there particular times of the year when water scarcity is most acute?

Seasonal patterns? Dry season? Any cyclical trends observed?

1.4 Which categories of households are most severely affected and why?

Female-headed? Elderly? Low-income? Those far from infrastructure?

THEME 2: EFFECTS ON HOUSEHOLD HEALTH AND SANITATION

2.1 What health outcomes have you observed or documented as a result of water scarcity in Ward 3?

Disease outbreaks? Child malnutrition? Hygiene-related illness?

2.2 How has water scarcity affected sanitation conditions in the ward?

Open defecation? Overflowing sewers? Hygiene behaviours?

2.3 What burden do water-related diseases place on the local health system?

Frequency of cholera/diarrhoea cases? Cost to health facilities?

THEME 3: EFFECTS ON HOUSEHOLD ECONOMIC LIVELIHOODS

3.1 How has water scarcity affected the economic activities and income sources of households in Ward 3?

Informal businesses? Formal employment? Water-dependent activities?

3.2 What is the economic cost of water scarcity on households?

Vendor expenditure? Lost productivity? Debt? Time costs?

3.3 In what ways has water scarcity contributed to poverty among households in this area?

Poverty traps? Gendered impacts? Intergenerational effects?

THEME 4: INSTITUTIONAL RESPONSES AND GOVERNANCE

4.1 What measures have been taken by the Municipality or relevant authorities to address water scarcity in Ward 3?

Infrastructure projects? Rationing policies? Emergency interventions?

4.2 What challenges does your institution face in addressing water scarcity?

Funding gaps? Capacity? Political will? Institutional fragmentation?

4.3 How effective has inter-institutional collaboration (Municipality, ZINWA, government ministries) been?

Mandate overlaps? Coordination mechanisms? Accountability?

THEME 5: COPING STRATEGIES AND RECOMMENDATIONS

5.1 What coping strategies have households adopted and how sustainable are they?

Vendors? Boreholes? Rainwater harvesting? Migration?

5.2 What policy interventions do you recommend to address water scarcity and its livelihood effects?

Short-term? Medium-term? Long-term? Community vs institutional level?

5.3 Is there anything else you would like to add about water scarcity and household livelihoods in Ward 3?

Any perspectives or experiences not yet covered?

Thank you for sharing your expert insights. Your contributions will remain confidential and will only be used for academic research.

APPENDIX C

Focus Group Discussion (FGD) Guide

FGD Facilitation Guide Community Members, Ward 3

PURPOSE

To generate collective qualitative data on community experiences, perceptions, coping strategies, and livelihood impacts related to water scarcity in Ward 3, Chitungwiza, through group discussion.

Introduction to Participant

Good morning / afternoon. Thank you all for joining us today. We are here to have a discussion about water access in Ward 3 and how water shortages affect your families and livelihoods. All views are equally important, there are no right or wrong answers. This session will take approximately 60–90 minutes. With your consent, the discussion will be audio-recorded to help with accurate note-taking. Everything shared here is confidential and will not be attributed to any individual by name.

Discussion Question

Purpose / Objective

OPENING / WARM-UP QUESTIONS (5–10 minutes)

O1 Can everyone briefly introduce themselves — your name and how long you have lived in Ward 3?

O2 When you think about water in your home, what is the very first thing that comes to mind?

THEME 1: WATER ACCESS AND LIVED EXPERIENCE OF SCARCITY

T1 Describe a typical day in your household when there is no water supply. What happens step by step?

T2 How has the water situation in Ward 3 changed over the years? Has it become better, worse, or stayed the same?

T3 Who within the family is most affected by water shortages, and why do you think that is?

THEME 2: EFFECTS ON HEALTH AND WELLBEING

T4 Have water shortages led to illness in your household or in the wider community? Can you share specific examples?

T5 How has the lack of water affected your ability to maintain cleanliness and hygiene in your home?

T6 In what ways has the water situation affected the emotional wellbeing or mental health of your family?

THEME 3: EFFECTS ON ECONOMIC LIVELIHOODS AND FOOD SECURITY

T7 How has the water situation affected your ability to earn an income or run a business from home?

T8 How much does your household typically spend on buying water when there is no municipal supply? Is that manageable for your family?

T9 Has your family ever had to choose between buying water and buying food? Tell us about that experience.

THEME 4: COPING STRATEGIES AND COMMUNITY RESPONSES

T10

What strategies do you use as a family to manage when water is scarce? Which ones work best, and which create other problems?

T11 Have you as a community ever collectively done something to address the water problem? What happened?

T12 What do you believe needs to be done by government, the municipality, or the community to solve the water problem in Ward 3?

CLOSING QUESTION

Is there anything important about how water scarcity affects your household or community that we have not discussed today and that you feel we should know?

Thank you very much for your participation and for openly sharing your experiences. Your contributions are greatly appreciated.

CHITUNGWIZA MUNICIPALITY

RE: APPROVAL TO CONDUCT RESEARCH

This letter serves to grant permission to Esther M Manditsera, a student at Bindura University of Science Education, to conduct a research project entitled: "An Investigation into the Effects of Water Scarcity on Livelihoods: A Case Study of Chitungwiza Municipality." The researcher is authorized to collect data within Chitungwiza Municipality for academic purposes. All research activities should be conducted ethically and with respect for participants' rights and confidentiality.

Approved by: T. N. Mashatise

Town Clerk/Authorized Officer

Chitungwiza Municipality

Date: 26 May 2026

