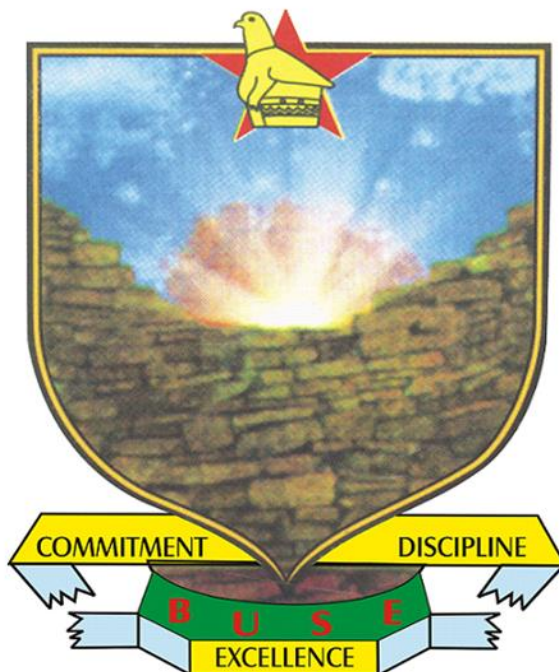




BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF SCIENCE AND ENGINEERING

SUSTAINABLE DEVELOPMENT DEPARTMENT

DESSERTATION REPORT

**WATER AVAILABILITY CHALLENGES IN LOW-INCOME AREA OF BUDIRIRO,
SOUTHWEST HARARE, ZIMBABWE.**

RUVARASHE KAMWENDO

B211877B

SUPERVISOR: DR BOWORA

A research project submitted to the Department of Sustainable development in partial fulfilment of the requirements of the Bachelor of Science Degree in Development Studies.

2025

APPROVAL FORM

The undersigned certify to that they have read the dissertation and have approved the submission and acceptance of the **Dissertation** entitled “**Water availability challenges in low-income area of Budiro, Southwest of Harare, Zimbabwe**”. Submitted by **Ruvarashe Kamwendo (B211877B)** in partial fulfilment of **the Bachelor of Science Honors Degree in Development Studies**.

..... 

Date: 13 JUNE 2025

Doc J. Bowora (Supervisor)

RELEASE FORM

Name of Author: RUVARASHE KAMWENDO

Title of Dissertation: WATER AVAILABILITY CHALLENGES IN
LOW-INCOME AREA OF BUDIRO, SOUTHWEST HARARE, ZIMBABWE

Programme: BACHELOR OF SCIENCE DEGREE IN
DEVELOPMENT STUDIES

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Signed:



.....

Permanent Address 1387 CROWBOROUGH NORTH PHASE
MUFAKOSE, HARARE
ZIMBABWE

Date: 13 JUNE 2025

DECLARATION

I Ruvarashe Kamwendo, studying towards a Bachelor of Science degree in Development Studies. I am fully aware that plagiarism is a serious academic offence and I can attest that this is entirely my original work. I can also assure that all additional sources that were utilized in the research were cited and further referenced in APA style 7th edition as expected.

DEDICATION

I dedicate this to my loving mother, Mrs. K. Murwira. Whose unwavering support, financially, spiritually and emotionally has been the cornerstone of my academic journey. Your selflessness, love and encouragement have inspired me to pursue my dreams and overcome challenges. This dissertation is a testament to your dedication, struggles and sacrifice. I am forever grateful for the values you have instilled in me and for being my rock throughout this journey. This achievement is yours as much as it is for me. Thank you so much mom.

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ABSTRACT

This study examined that water availability challenges and poor water quality remain a significant challenge in low-income urban area of Budiriro, a suburb in southwest Harare, Zimbabwe. Budiriro faces severe water shortages, forcing residents to rely on unsafe alternatives exacerbating health risks and socio-economic hardships. While existing literature highlights urban water crises in Zimbabwe, gaps persist in understanding localized survival strategies, environmental contamination drivers and sustainable interventions tailored to low-income communities. This study adopts a mixed-methods approach, combining household questionnaires, focus group discussions and key informant interviews, coping mechanisms and contamination risks in Budiriro. Findings reveal that most households in Budiriro experience erratic water supply, relying on unsafe wells, contaminated boreholes or expensive water vendors. Women and children bear the burden of water collection, sacrificing time for education and livelihoods. Environmental degradation through sewage overflows, poor waste management further pollutes scarce water sources. Despite these challenges, grassroots strategies like rainwater harvesting and private boreholes and wells provide temporary relief, though they remain unsustainable without institutional support. The study concludes that addressing Budiriro's water crisis requires multi-level interventions: which include, rehabilitating infrastructure, enforcing environmental regulations as well as promoting affordable community led solutions. Policy makers must prioritize equitable water access by integrating local voices into urban planning. By bridging the gap between research and practice, this study contributes to broader dialogues on achieving water security in Zimbabwe's marginalized settlements, emphasizing urgency to protect public health and livelihoods.

ABBREVIATIONS

WHO	- World Health Organization
ZINWA	- Zimbabwe National Water Authority
ZISTAT	- Zimbabwe National Statistics
WASH	- Water, Sanitation and Hygiene
SDGs	- Sustainable Development Goals
ZFC	- Zimbabwe Fertilizer Company
NGO	- Non-governmental organizations
ZELA	- Zimbabwe Environmental Law Association
MNHSA	- Ministry of National Housing and Social Amenities
MLGPW	- Ministry of Local government and Public Works

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CHAPTER 1: Introduction and background of the study

1.0 Introduction

Located in the southwest of Harare, Zimbabwe, Budiro is a region characterized by largely low income population. Access to important resources such as clean and proper water supply has a significant impact on the quality of life of residents. For many years local governments have been exposed to the ongoing challenges of water shortages affecting health, hygiene and socioeconomic development. Despite efforts by local governments and nongovernmental organizations, the issue of inadequate water availability is increasing due to a variety of factors, including rapid urbanization, climate change and aging infrastructure. This research aims to understand the multifaceted water availability challenges affecting Budiro, focusing on the causes and potential solutions to alleviate this critical issue.

1.1 Background of the Study

Research by Mukuhlani and Nyamupingidza (2016) has highlighted the dire water access issues prevalent in Zimbabwe's urban low-income areas, emphasizing the gap between supply and demand. This inequality is primary due to rapid urban growth beyond the development of necessary infrastructure. Additionally, Tshuma, Moyo and Dude (2017) examined the impact of climate change on water resources in Southern Africa and found an increase in the frequency of droughts causing water shortages in areas such as Budiro. Additionally a study by Chikozho & Mararira (2021) examines climate changes' role in exacerbating water scarcity, particularly in urban Zimbabwe. This affects suburbs like Budiro, which is in need adaptive strategies.

In recent years, the aging water infrastructure has further hindered water distribution efficiency, as documented by Mbanje and Madhakeni (2020). They discuss how worn pipes and pumps can lead to less reliable service delivery. Madzivire and Shaw (2022) articulated to these challenges and found that residents often use unsafe water sources to increase the risk of water diseases. Also, Mlambo et al (2018) argues that there is urgent need for infrastructural improvements in Harare urban areas.

A study by Chigumira et al. (2021) delves into social dynamics, indicating how low-income neighborhoods like Budiro face organizational and financial constraints in managing water sources. The authors suggest that community engagement and government initiatives are crucial

for sustainable water management solutions. Additionally, they propose that collaborations between local authorities and international agencies could be vital in addressing these challenges.

The current literature on water availability in low-income areas of Budiriro, often reveals significant gaps that merit further studies. Firstly many studies struggle with the quality and accessibility of data, lacking comprehensive and current insights at the neighborhood level, which is crucial for effective water resource management alludes Dude and Murambanyika (2019). Nyahunda & Chibwana proclaims that, several analysis discuss water scarcity, there is insufficient exploration of the socioeconomic impacts of limited water access on the residents of Budiriro, particularly regarding health comes, educational opportunities and economic stability. Additionally the previous literature review significantly lack the understanding of the role of the local governance and community engagement in enhancing or hindering water availability remains underexplored. Therefore addressing to theses gaps can provide a holistic view if the water availability status in Budiriro and inform policies aimed at improving access to this essential resource.

1.2 Statement of the Problem

Every settlement in the world is expected to provide good and reliable water which is also safe for the residents. Nevertheless, Budiriro, a high density suburb, is facing a persistent crisis characterized by intermittent water supply, despite the implementation of several water management initiatives. This inconsistency not only disrupts everyday life for residents but also poses grave public health risks and hampers economic activities in the region. Residents` reliance on alternatives which are wells, and other unregulated supplies exacerbates significant health risks (Nhapi et al, 2016). Also, there are environmental challenges like the proximity to effluent disposal farms that increases the risk of underground water pollution, and climate change which are severely contributing to the contamination of water sources. The persistent nature of these issues calls for an in-depth exploration of the underlying causes.

1.3 Aim of the study

The aim of this study is to investigate the factors contributing to water availability challenges in Budiriro. It seeks to identify the socio-economic and infrastructural barriers to adequate water supply and propose sustainable solutions.

1.3.1 Objectives guiding the study

1. Enumerate the status of water availability in some low-income suburb of Budiro, Southwest, Harare, Zimbabwe.
2. To examine survival strategies during scarcity and quality of available water in Budiro, suburb, Southwest of Harare, District
3. To profile environmental challenges contributing to contamination of water sources.

1.3.2 Research Questions of the Study

1. What is the current status of the water availability in the low-income suburb of Budiro 1, southwest, Harare, Zimbabwe?
2. What are the strategies that are used during scarcity of quality water in Budiro, Southwest Harare?
3. What are the environmental challenges contributing to the contamination of water sources?

1.4 Assumption of the Study

A handful of assumptions can be drawn regarding the water availability challenges in low-income area of Budiro, Zimbabwe. The core assumption of the study posits that infrastructure deficits significantly contribute to water scarcity in Budiro. This is because the Budiro residential area water infrastructure is old and rusty, and in worse cases there are broken pipes which prohibits certain houses from receiving water.

There are potential environmental assumptions for the study as the study assumes that climate change affects water availability in Budiro, exacerbating scarcity and variability. Mao et al. (2022) argues that precipitation extremes have been widely reported to increase with global warming, hence negatively affecting water supply in the Lake Chivero and Lake Manyame. In which these two lakes are the major suppliers of the Harare city. Also, climate change may result in floods which can damage water infrastructure like pipes and water tanks.

The study also assumes that all respondents like the residents, local authority, health practitioners, Harare City Council and Non-governmental organizations will play a pivotal role in the provision of accurate and reliable information. This is of hyper importance as accurate data enables the researcher to draw valid conclusions and support evidence based decision making. As well as facilitates collaboration and replication for other students and researchers.

1.5 Justification of the Study

The study will address a critical public health issue as water availability challenges in low-income areas of Budiriro are a major contributor to the spread of waterborne diseases and hygiene-related illnesses and other health problems in Budiriro. Whilst curbing the knowledge gap that has been existing as most people are unaware of the hazardous effects of water scarcity and safety on their socio-economic wellbeing.

By examining the environmental impacts of water availability challenges, the findings of this study will contribute to the development of sustainable policies and practices that will prioritize environmental sustainability. Also ultimately contributing to the achievement of SDG 6 (clean water and sanitation), SDG11 (sustainable cities and communities) and SDG 13 (climate action), aligning with Zimbabwe's National Development Strategy 1.

1.6 Location of the Study

Budiriro is a high density suburb in the southwest of Harare. Its coordinates are approximately 17.88° S, 30.98° E. It is 16.6 km from the central business district. Budiriro is located in the Harare Province specifically within the Harare Urban district. It is divided into Budiriro north and south with Budiriro north including ward 34 and ward 43, and south consisting ward 29 and ward 33

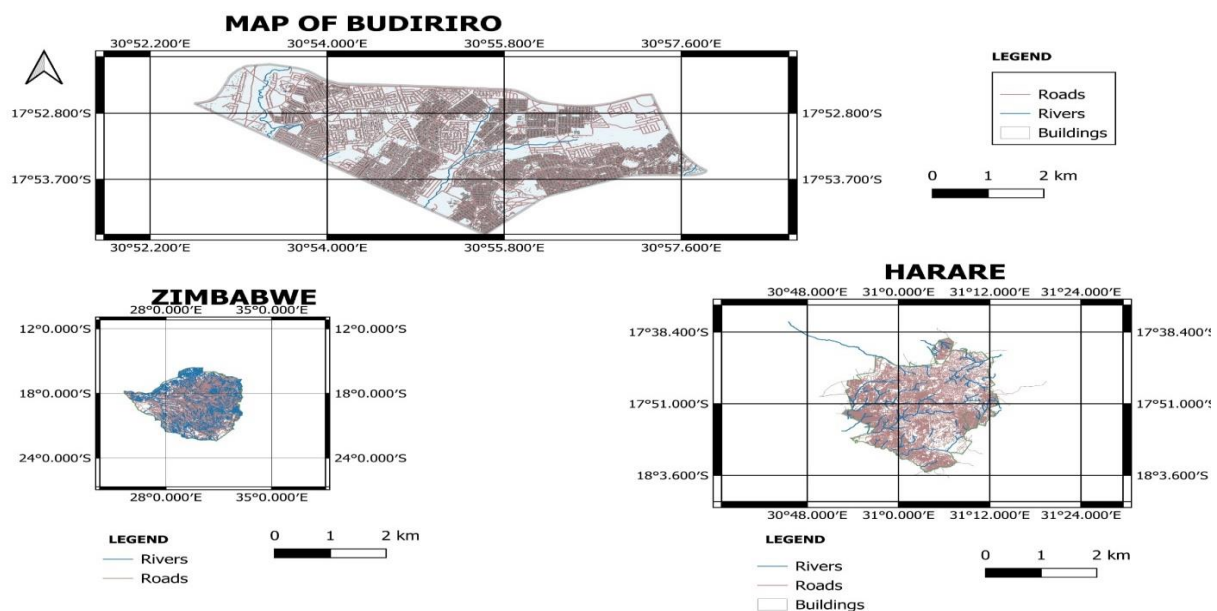


Figure 1: study area map: Budiriro: (source: author)

1.6.1 Delimitation of the study

The study will focus on Budiro, a high density suburb in Southwest Harare, Zimbabwe with the following boundaries. The study will concentrate on specific locations within Budiro, such as low-income residential areas, schools and health care facilities thereby unable to cater for the whole of Budiro. The study focuses on water availability challenges including issues related to access, quality and quantity of water, as well as environmental contributions to the contamination of water sources but do not explore broader political or climate-related causes in depth. The study also uses household surveys, questionnaires, interviews and focus group discussions but do not include experimental testing of water quality or hydrological modelling.

1.7 Limitations of the study

The research was limited to access of accurate and reliable data on water supply, consumption and quality as the study relied on secondary data sources and primary data collection methods, which was subjected to errors, biases or inconsistencies. Also limited financial and human resources, strained the need as there were travelling expenses, mobile data expenses to enable the researcher to thoroughly research on the topic. There was also limited access to equipment, resources and skills for water quality testing as it restricted the study's ability to assess the water quality accurately. The student overcame the challenge of financial constraints by the financial support from parents. Also the student managed to collect first hand data which is free from biases which therefore increases the reliability of the study. However the student did not manage to overcome all the challenges there were other alternatives like using already water quality results from reliable sources rather than testing the water alone.

1.8 Keywords of the study

1. Health- "Health is a dynamic and multidimensional concept that encompasses physical, mental and social wellbeing, and is influenced by a range of factors, including lifestyle, environment and socioeconomic status" (Huber et al, 2019).
2. Water- "Water is a clear, colorless, odorless and tasteless liquid substance that is essential for human survival" (Oxford, 2022). The chemical formula for water being H₂O.
3. Sanitation- "Sanitation encompasses not only the physical infrastructure for waste management, but also the social and behavioral practices that promote hygiene and prevent the spread of diseases" (Jenkins & Scott, 2017).

4. Hygiene- “Hygiene refers to the practices and behaviors that promote cleanliness and prevent the spread of illnesses and infections, through the proper handling of bodily waste, food, water, and other potentially contaminated substances” (Centers for Disease Control, 2020).

5. WASH - “WASH is the provision of safe water, sanitation and hygiene facilities, which are crucial for the prevention of water-borne diseases, and the promotion of health, dignity and wellbeing” (World Health Organization, 2021).

6.Environment- “ The external surroundings in which organisms exist, including physical factors such as air , water, soil and climate , as well as biological factors like plants, animals and microorganisms” (United Nations, 2020)

7.SDG- “17 interconnected global goals adopted by the United Nations in 2015, aimed at achieving a better and more sustainable future for all by 2030” (United Nations, 2015).

8. Sustainable development- “prioritizes human wellbeing and quality of life, recognizing that economic growth and environmental protection are means to achieve human development, rather than ends in themselves” (Stanton et al., 2018).

1.9 Chapter Summary

This chapter acts as a summary to the research topic “water availability challenges in Low-Income Area of Budiriro, Southwest Harare, Zimbabwe”. This chapter provides an overview of the background of the study, problem statement, and the significance of the study. The chapter further unfolds by getting into detail on the aim of the study clearly illustrating its objectives, also the research questions which will enable necessary information to be collected through them. There are also the key definition of terms for the better understanding of the study topic at large. The next chapter will be discussing the literature review, where the objectives will be reviewed on global, African as well as the Zimbabwean perspective.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

This chapter provides a detailed review of the existing literature on the water availability challenges in low-income areas with a particular focus on Budiriro, a high-density suburb in Harare, Zimbabwe. The objectives of the study include enumeration of the status of water availability in some low-income suburbs, examination of survival strategies during scarcity and quality of available water and lastly profiling environmental challenges contributing to contamination of water sources. These objectives will be reviewed at global, African and Zimbabwean contexts with emphasis on the ways in which water availability challenges contribute to health, social and economic challenges in urban settings like Budiriro. It further examines the consequences of inadequate water availability on residents' quality of life, including issues such as waterborne diseases and broader socio-economic implications.

2.1 Conceptual framework

This section presents the conceptual framework guiding the study on water availability challenges in Budiriro. The framework illustrates the key variables, relationships and theoretical foundations that underpin this research.

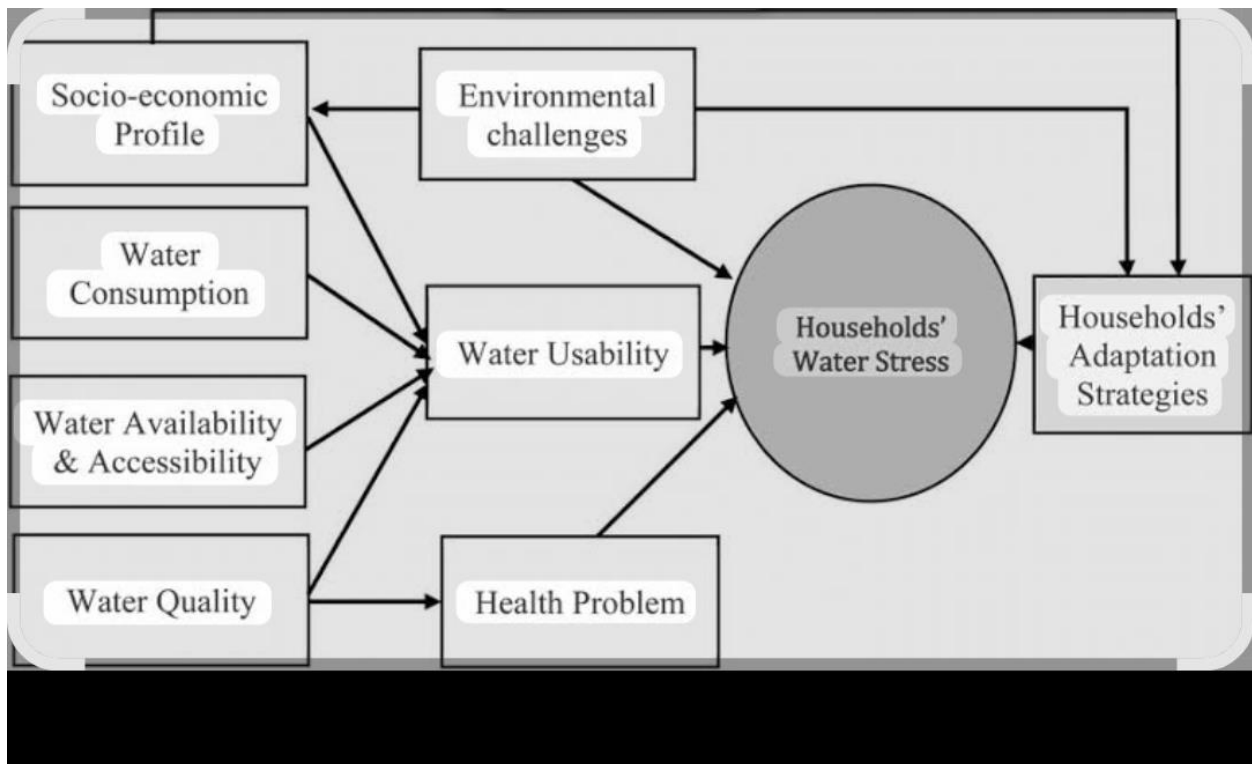


Figure 2: "Factors Influencing Water usability and household Adaptation Strategies"

Fig 2.1 is Zhao et al. (2011) diagram on household water stress and adaptation strategies.

The challenges of water availability in the high density suburb of Budiriro, Southwest of Harare, Zimbabwe, are necessitated by multifaceted interplay of numerous variables. Nhapi (2018) articulates that the key role is played by the water supply infrastructure as poorly maintained or inadequate systems can lead to severe shortages. Economic factors such as low income levels and high water costs can limit access to paid water sources further exacerbating water scarcity, (Mudzengi, 2020), (Mujuru, 2019). Chikodzi (2020) further articulates that climate change including changes in precipitation patterns and drought conditions can also impact water availability particularly in the low-income areas where they heavily rely on tap water that is mostly sourced from sources like lakes and dams. Government policies and regulations can optimize water distribution and ensure sustainable management, thereby influencing water supply infrastructure, economic factors and community engagement (Makonyere, 2018). Therefore the availability of clean and accessible water for residents in Budiriro is the ultimate goal and is influenced by the above factors. Different schools of thoughts like Gwenzi (2020) and Chimbari (2018) argue that public health impacts such as waterborne diseases, can be a consequence of limited water availability further straining economic and health systems. However community engagement and local water management initiatives in Budiriro can promote sustainable practices and conservation, mediating the relationship between water availability and public health impacts (Manyangadze, 2020).

2.2 Objective one: Enumeration of the status of water availability in some low-income suburb

2.2.1 Global context

Water availability remains a critical issue globally particularly in low-income suburbs where infrastructure and resources are often inadequate. Globally the disparity in water access between affluent and impoverished areas is stark, contributing to broader socio-economic challenges. In Mumbai India, one of the most popular cities, water availability in low-income areas like Dharavi is severely limited. According to a study by Anand and Rademacher (2016), only about 40% of the Dharavi's residents have access to piped water, with the rest relying on informal water markets and communal taps. The study highlights the numerous health and economic impacts of this scarcity with residents spending a considerable portion of their income on water. Also Sao Paulo,

Brazil has also faced severe water crises in recent years, exacerbated by drought and poor water infrastructure in low-income suburbs. Jacobi et al (2015), shows that water rationing and intermittent supply are common, leading to reliance on expensive private water trucks. This situation underscores the vulnerability of low-income communities to water scarcity and the need for targeted interventions globally.

2.2.2 African context

In the African continent water availability challenges in low-income suburbs is often exacerbated by rapid urbanization, inadequate infrastructure and at times governance issues. The continent faces unique challenges due to its diverse climatic conditions and socio-economic disparities. Kibera, Nairobi, Kenya, one of the continent's largest slums, faces one of the worst water availability challenges. Crow et al. (2018) found that only about 20% of Kibera residents have access to piped water with the majority relying on communal water points and informal vendors. The study emphasizes the health risks associated with poor water quality and the economic burden on residents. Also in Soweto, Johannesburg, South Africa, water availability challenges have been a persistent issue despite South Africa's relatively advanced water infrastructure. Mjoli (2019) highlights that frequent water cuts and poor maintenance of communal taps lead to severe water scarcity in low-income areas. The study calls for improved governance and community involvement to address these challenges, particularly in low-income areas.

2.2.3 Zimbabwean context

Zimbabwe like many African countries, faces significant water availability challenges particularly in low income suburbs. The situation is often compounded by economic crises and infrastructure decay. In Chitungwiza, a satellite town of Harare struggles with water availability due to aging infrastructure and insufficient resources. Manzugu et al. (2016), residents often go for days without water, leading to reliance on unsafe water sources like shallow wells. The study underscore the need for urgent government intervention to restore and maintain water services. Also, one of Harare's oldest suburbs, Mbare faces similar water availability due to aging infrastructure and insufficient resources. Chirisa and Bandaiko (2017) found that water scarcity in Mbare is exacerbated by poor governance and lack of investment in infrastructure. The researchers advocate for community driven solutions and better municipal management to improve water access.

The literature review fail to effectively show how the water availability challenges affect different vulnerable groups like the physically disadvantaged, women and children in which are the most affected as the women gender roles includes caring for the household, cleaning and cooking. Also, the existing literature does not capture the unique contextual factors that influence water availability in low-income communities such as local governance structures and socio-economic factors that mostly varies from community to community. There have been limited data on current state of water access and use in low-income areas globally, continental and around Zimbabwe, making it difficult to identify challenges and develop targeted interventions.

2.3 Objective two: Examination of survival strategies during scarcity and quality of water

2.3.1 Global context

In developed countries, while water infrastructure is generally more robust, low-income suburbs still face difficulties with water scarcity and quality. Survival strategies in these areas often involve a mix of formal and informal solutions. In Detroit, Michigan, water shutoffs due to nonpayment have been a significant issue, particularly in low-income areas. Teodoro (2018) found that residents in these areas often resort to alternative survival strategies such as collecting rainwater, using bottled water, and sharing resources with neighbors. There is also highlights on the health risks associated with these strategies, particularly then water quality is compromised. In Marseille, France the low-income suburbs also faces water quality issues due to aging infrastructure. Bichai and Smeets (2017) examined the survival strategies adopted by residents, which include using water filters, boiling and relying on community –organized water testing. The study underscores the importance of community engagement and public health initiatives to address these challenges.

2.3.2 African context

In Africa, survival strategies during water scarcity are often more critical due to the severity and frequency of the issue. Scholars have documented various coping mechanisms across different contexts. In Kibera, Nairobi, Kenya, one of the largest slums, water scarcity and poor quality are chronic issues. A study by Crow et al. (2018) found that residents often rely on informal water vendors, rainwater harvesting and communal water points as survival strategies. The research by Githinji and Kiteme (2016) further emphasizes that many residents use simple filtration methods and boiling to improve water quality, though these methods are not always effective. Also Soweto, South Africa water interruptions and quality issues are common in low-income areas. Mjoli et al. (2019) noted that residents often store water in containers, use private water trucks, and participate

in community initiatives to improve water access. Additionally Tempelhoff et al. (2015) indicates that some residents have adopted household treatment methods like chlorination to enhance water quality though access to these resources remains a challenge.

2.3.3 Zimbabwean context

In Zimbabwe, the economic crisis and infrastructural decay have exacerbated water scarcity and quality issues, particularly in low-income suburbs. Residents have developed various survival strategies to cope with these challenges. Chitungwiza, Harare is a high density suburb in Harare where water scarcity and poor quality are persistent issues. Manzungu et al. (2016) documented that residents often rely on shallow wells and boreholes, despite the risks associated with contamination. The study by Chirisa and Bandaiko (2017) further notes that some residents use makeshift filtration systems and boiling to improve water quality through these methods are often inadequate. Another striking case study is the Mbare, another low-income suburb in Harare, water scarcity and quality issues are severe. Chirisa and Bandaiko (2017) found that residents frequently resort to communal water points and informal vendors, with many basic treatment methods like sedimentation and boiling. Research by Mudege and Zulu (2019) highlights the community-led initiatives such as water committees, play a crucial role in managing water resources and improving quality.

The literature gap towards the survival strategies and water quality is quite limited as it ranges from place to place. And some of the means of water survival strategies arise as a socio-economic measures, According to Sarkar (2020) in Kenya, some youth will stealthily cut a hole, sell the water and fix the pipe back up. This not only leads to non-revenue water but also to contamination of the entire piped system, thereby compromising the quality of the water. Another literature gap is that some of the measures that are implemented by the low-income areas to improve the water quality are not effective for the likes of boiling as it does not remove chemical contaminants and most low-income residents are not aware of this and thus it is a valid literature gap

2.4 Objective three: Profiling environmental challenges contributing to the contamination of water sources

2.4.1 Global context

Globally the contamination of water sources is a significant environmental challenge that affects water availability and quality. Industrialization, urbanization and agricultural activities are primary contributors to water contamination. According to the World Health Organization (WHO) around

2.2 billion people lack access to safe drinking water, with contamination being a major barrier (WHO, 2022). In United States of America, the Flint water crisis is a prominent example of water contamination. The crisis began in 2014 when the city switched its water source to the Flint River, leading to lead (Pb) contamination due to inadequate treatment. Hanna-Attisha et al. (2016) highlighted the severe health impacts, including elevated blood lead levels in children. The study emphasized the role of environmental mismanagement and policy failures in exacerbating water contamination issues. Also in Japan, the Minamata disease case illustrates the long term effects of industrial pollution on water sources. Mercury poisoning from industrial wastewater supply leading to severe health issues. Harada (2017) discusses the ongoing environmental and health challenges faced by the affected communities, underscoring the need for stringent regulations and monitoring to prevent such incidents.

2.4.2 African context

In Africa, water contamination is a pervasive issue, often exacerbated by poor infrastructure, rapid urbanization, and limited regulatory enforcement. The African Development Bank (2019) notes that over 300 million Africans lack access to safe drinking water, with contamination being a significant factor. The Niger Delta region, in Nigeria faces significant water contamination due to oil spills and industrial pollution. Ordinioha and Brisibe (2015) conducted a study showing high levels of hydrocarbons and heavy metals in local water sources, leading to health issues among the population. The study emphasizes the need for better environmental management and corporate responsibility to mitigate contamination. South Africa has the Vaal River system which has been plagued by industrial and sewage pollution. A study by Dabrowski et al. (2018) found significant contamination from industrial effluents and untreated sewage, impacting both water quality and availability. The authors stress the importance of improved wastewater treatment and regulatory enforcement to address these challenges.

2.4.3 Zimbabwean context

In Zimbabwe, water contamination is a critical issue, particularly in low-income areas where infrastructure is poor. The Zimbabwe National Statistics Agency (ZIMSTAT) reports that only 40% of the population has access to safe drinking water, with contamination being a major concern. In Harare, the contamination of water sources has been linked to cholera outbreaks. Misi et al. (2018) found that poor sanitation and sewage system failures contributed to the contamination of water sources in high density suburbs like Kuwadzana. The authors advocate for improved

infrastructure and sanitation practices to reduce contamination risks. Also in Bulawayo, industrial pollution and inadequate waste management have led to water contamination issues. Sithole et al. (2021) identified high levels of heavy metals and organic pollutants in local water sources attributing these disposal practices. The researchers suggest the need for stricter environmental regulations and better waste management to address these challenges.

The literature fails to fully explain how industrialization, though being a major initiator of development and urbanization, is the sole reason for environmental challenges contributing to the contamination of water sources. Increased urbanization and industrialization lead to higher pollution levels reducing clean water availability and altering ecosystems. Further research is required to quantify the impacts of different environmental challenges on water quality and human health and also develop effective prevention strategies

2.5 Chapter Summary

The literature review brought to light that low-income areas face significant water availability challenges which include limited safe and clean water, inadequate infrastructure and socio-economic constraints, which ultimately results in outbreak of diseases as well as poor survival strategies. While research has shed light on these issues, further studies are needed to develop context-specific solutions, inform policy and practice and ensure equitable access to water resources. By adopting a holistic approach that addresses the complex interplay of technical, social and economic factors, we can work towards improving water availability and promoting sustainable development in low-income areas. The next chapter will be the research methodology where a mixed methods was employed to provide insights into the water availability challenges in Budiriro.

CHAPTER 3: RESEARCH METHODOLOGY AND METHODS

3.0 Introduction

This chapter delineates the research methodology and methods used to investigate water availability challenges in the low-income area of Budiro, southwest Harare, Zimbabwe. A mixed methods approach was employed to gather both quantitative and qualitative data therefore providing a holistic understanding of the issues at hand. This chapter discusses the research philosophy, design methodology, target population, sampling procedure, research instruments, data analysis and ethical considerations. The study's objectives guided the selection of research methods and instruments. By implementing a rigorous research methodology, this study aims to provide insights into the water availability challenges faced by residents in Budiro.

3.1 Research Philosophy

This study is grounded in the pragmatism research philosophy, which emphasizes the importance of the practical application of findings to address real-world problems (Tashakkori and Teddlie, 2010). Pragmatism allows for the integration of both quantitative and qualitative methods, enabling a comprehensive understanding of water availability challenges in Budiro. This philosophical stance acknowledges that knowledge comes through human experiences and interactions allowing for a nuanced understanding of the community's challenges (Morgan, 2014). The pragmatic approach aligns with the research objectives, as it seeks to produce actionable insights that inform policy and improve water resource management strategies. Thereby allowing for adaptability and practical solutions. The use of this research philosophy is of great importance to the research as it prioritizes real-world problem solving over abstract theoretical debates and since Budiro faces acute water shortages, a pragmatic approach allows the study to explore actionable strategies like infrastructural improvements, policy interventions and community based solutions.

3.2 Philosophy Assumptions

The pragmatism philosophy is guided by several assumptions that inform this study's approach to investigating water availability challenges in Budiro. These assumptions include social determinants such as income, education level and access to healthcare significantly influence residents' experiences and perceptions of water availability challenges (Marmot & Wilkinson 2015). This assumption guides the study's focus on understanding the social factors that contribute

to water scarcity and quality issues in Budiriro. The study assumes that environmental hazards such as water contamination and pollution contribute significantly to water quality challenges in Budiriro (WHO, 2019). This assumption informs the study's investigation of the environmental factors that affect water quality and quantity in the area. Schools of thoughts like Abrahams et al.,(2020) argues that residents' behavioral responses to water availability challenges are influenced by their knowledge, attitudes and practices related to water management and conservation. This assumptions guides the study's exploration of the coping strategies and survival mechanisms employed by residents in response to water scarcity and quality issues.

3.3 Research Design

A mixed-methods approach was employed for this research, combining qualitative with quantitative methods to provide a more comprehensive understanding of the situation in Budiriro, Southwest Harare, Zimbabwe. By utilizing surveys, interviews and focus group discussions, the study aims to gather a diverse array of perspectives and experiences related to water access and quality. The design allows for the collection of both numerical data and rich contextual insights, enabling a more nuanced understanding of the research problem (Creswell and Plano, 2017).

3.4 Research Methodology

The study adopts a mixed-methods research design to comprehensively analyze water availability challenges in Budiriro, combining quantitative surveys and qualitative interviews for triangulation. As Creswell and Plano Clark (2018) assert, "mixed methods is particularly suited to address real-world problems by integrating the strengths of quantitative and qualitative approaches". A structured questionnaires to 96 selected households to quantify water access frequency, duration and coping mechanisms, providing statically generalizable data simultaneously. In-depth interviews and discussions with local authorities and residents captured contextual insights into systemic failures and community perceptions on the water availability challenges. The integration of both datasets revealed disparities between reported water supply statistics and lived experiences, highlighting hidden inefficiencies. Pragmatism guided the methodology prioritizing actionable solutions over rigid philosophical adherence. The quantitative data identified high priority zones, whilst the qualitative data exposed governance gaps. Nevertheless the research design can also have some biases in questionnaires and limited council data transparency. Nevertheless the design strengthened validity by cross verifying findings across methods.

3.5 Target Population of the Study

The study target households in low-income suburb of Budiro, Southwest, Harare, Zimbabwe. This includes households who have experienced scarcity or are currently facing difficulties accessing clean water due to environmental factors contributing to contamination of water sources. The Zimbabwe National Statistics Agency (ZimStat) argues that the population of Harare's low-income suburbs, such as Budiro, is characterized by high-density housing and limited access to basic services including clean water (ZimStat, 2022).

The target population is approximately about 20 000 households, based on the last census data (ZimStat, 2022). The study will focus on residents who have lived in the area for at least more than 2 years, ensuring the collection of firsthand data from households who have the desired firsthand experience.

3.6 Sampling Procedure

A stratified sampling technique was used to select participants for the study. This involved dividing the population into subgroups based on geographical location, income level and also proximity to water sources. By dividing the population into strata and randomly sampling from each, it increases the precision of the estimates and reduces sampling errors. The researcher used an online sample size calculator and the results are:

Table 1: Online Sample Size Calculator

Confidence Level	Margin of Error	Population Proportion	Population size	Answer
95%	8	20	20000	<96

This means 96 or more measurements/surveys are needed to have confidence level of 95% that the real value is within $\pm 8\%$ of the surveyed value.

3.6.1 Sample Size Requirements

This section shows a table which provides an overview of the sample size and characteristics.

Table 2: Sample size requirements

CATEGORY	NUMBER
HOUSEHOLDS	97

LOCAL AUTHORITIES	1
HEALTH PERSONALS	6
NGO`S AND CBO`S	10
RESIDENTS	20

The sample size includes 97 households from all around Budiriro which were selected through a stratified sampling technique so the whole of Budiriro was represented. 1 local authority, 6 health personals, 10 NGO`s and CBO`s from organizations like ZELA, EMA and Local Water User Associations (WUAs) and 20 Residents from all the 4 wards in Budiriro.

3.7 Research Instruments

3.7.1 Questionnaire

A closed ended questionnaire was developed to gather quantitative data on water availability, access and quality perceptions among residents to capture a range of responses (Appendix1). Questions were designed to assess the frequency of water, and perceptions of water quality. The questionnaire will be designed based on previous studies on water availability and access (Mukheibir, 2017). 97 questionnaires were distributed to the household through the stratified sampling method.

3.7.2 Key Informant Interviews

Key informant interviews were conducted with local officials and health personals to gain insights into policy responses and initiatives addressing water challenges in Budiriro (appendix 2). These interviews provided valuable context and highlighted existing programs and ways to best improve the water scarcity and quality challenges in Budiriro. The researcher used an one on one interview to interview the one local authority representative. And a panel interview for 3 of the interviews which included health personals from the health institutions namely, Budiriro polyclinic, flying high maternity and flying high maternity. In total the researcher interviewed 7 informants.

3.7.3 Focus Group Discussions

Focus group discussions with community members provided a platform for participants to share their experiences and strategies in coping with water scarcity (Zinhumwe & Chikozho 2021). This qualitative method facilitated a deeper understanding of community dynamics and collective

strategies (appendix 3). The discussions focused on the social implications of water scarcity and the innovative solutions households have adopted. The group size was at an average of 5 to 10 people each individual being able to be given the opportunity to freely express their views on water availability challenges. Also Nongovernmental organizations and CBO's had separate Focus group discussions had a lot information on interventions on the improvement of water scarcity. In total the researcher interviewed 30 informants which includes, 10 representatives from NGO's and CBO's and 20 residents.

3.7.4 Validity and Reliability of Research Instruments

To ensure validity, the research instruments were pretested in a similar community before the actual data collection. Feedback from pilot testing informed necessary adjustments to improve clarity and comprehensiveness. The research instruments were reviewed by the supervisor that they cover all relevant aspects of the research topic and as well test their reliability to the research topic. Also, triangulation was used as a validation strategy that strengthens research by combining multiple methods, data sources or perspectives to cross-verify findings. Thereby enhancing credibility, reduces bias and provides a more comprehensive understanding of the problem.

3.8 Data Analysis and Presentation

Data analysis will follow thematic analysis methods, extracting patterns and themes from both qualitative and quantitative sources. The findings will be presented in a clear, structured format, including charts and graphs where applicable to enhance understanding of the research objectives.

3.8.1 Qualitative Data Analysis

This study employed a qualitative analysis which helped to uncover the lived experiences of the residents in Budiro. Thematic analysis can reveal common struggles, such as women walking long distances to fetch water or children missing school due to water fetching duties or inadequate water at home (Braun & Clarke, 2006). Qualitative data is crucial in Budiro water study because it captures human experiences behind statistics For example a testimony of an elderly woman in Budiro 5b about the water always not available, which highlights the intensity of the water problem in Budiro and emotional tolls that the residents face, which statistics alone cannot bring out.

3.8.2 Quantitative Data Analysis

The quantitative data was analyzed using both descriptive and inferential statistical methods to systematically examine water patterns in Budiro. First raw survey responses were cleaned and coded into numerical variables using excel. Descriptive statistics (means, frequencies, percentages) were calculated to summarize core indicators like daily water consumption and supply reliability. The results were visualized through bar graphs and pie charts showing spatial variation across wards. For example if 30 % of Budiro households reported that they did not have access to reliable alternatives (fig 4.4).

3.9 Ethical Considerations

The research was conducted in low-income areas of Budiro, where water scarcity is a pressing issue. The researcher had to adhere to strict ethical considerations so that the residents would be able to trust with their data, also to protect rights and dignity of both parties. The ethical considerations that the researcher had to adhere to were, informed consent, privacy and confidentiality voluntary participation and lastly respect for culture.

3.9.1 Informed Consent

Informed consent ensures that participants fully understand the research objectives, procedures and potential risks before agreeing to partake in the data collection process. In Budiro, where residents face daily struggles to access clean water, obtaining consent must be done transparently to avoid exploitation. Researchers should communicate in local languages and ensure comprehension, particularly where literacy levels may vary. Failure to do may lead to mistrust which directly jeopardize the accuracy of the data.

3.9.2 Privacy and Confidentiality

Given the sensitivity of water access issues, maintaining privacy and confidentiality is crucial. Many residents fear stigmatization or retaliation if they openly discuss water shortages or give constructive criticism to the local authorities. The researcher anonymously collected data and store it securely to protect participants' identities (Saunders et al., 2015). For instance, a residents sharing frustrations over governance and water maintenance must not face repercussions due to the negligence of private information.

3.9.3 Voluntary Participation

Participation of this study was entirely voluntary, with no coercion or due influence. In Budiro, where residents feel pressured to participate in hopes of receiving aid, the researcher had to clarify that involvement does not guarantee immediate benefits or change (Israel& Hay, 2006)

3.9.4 Respect for Culture

Cultural sensitivity is vital in Budiro, where traditional beliefs and communal living shape perceptions of water use. The researcher had to respect the cultural differences that varied from household to household for example the are Zezuru, Ndebele, Tonga and Samanyanga`s in Budiro.

3.10 Chapter Summary

This chapter has outlined the research methodology employed to investigate water availability challenges in Budiro, Southwest Harare. A pragmatic approach was adopted, utilizing a mixed-methods design to capture both quantitative and qualitative data. The sampling procedure ensured a representative sample while the research instruments were tested for validity and reliability. Ethical considerations were of hyper importance throughout the research process, safeguarding the rights and confidentiality of participants. The findings from this research are expected to contribute massively to understanding and addressing water scarcity issues in low-income areas, offering insights that can inform policy and improve community resilience. The next chapter will be data presentation and analysis where data collected will be presented in graphs, pie charts and tables. The data will be further analysed together with the qualitative data from informants.

CHAPTER FOUR: PRESENTATION OF FINDINGS AND ANALYSIS

4.0 Introduction

This chapter presents the findings from the research conducted, including the response rate of participants and an analysis of the demographic information collected. The quantitative and qualitative data was collected from questionnaires, focus group discussions and as well a key informant interviews. The data will be analyzed to provide insights into the characteristics of the respondents and implications for the study.

4.1 Response data

This section shows the respondents rate according to instruments used. It helps the researcher to know the actual numerical figures on the ground.

Table 3: Response Rate

INSTRUMENT	INTENDED	SUCCESSFUL	PERCENTAGE
Questionnaires	97	95	98 %
Key informant Interviews	4	4	100%
Focus Group Discussions	4	4	100%

The response rate is a crucial factor in determining the reliability and presentation of the collected data. According to Baddie (2020), a response rate of 50% is considered adequate for analysis, 60% is good, and 70 % or above is excellent. The research recorded a 98% response rate on the questionnaires, and a 100% response rate on both the key informant interviews and focus group discussions.

4.2 Demographic Information

The age of the total respondents ranged from 18 to 65 years, with an average age of 36 years. According to the Zimbabwe National Statistics Agency (ZimStat, 2022), the average age of household heads in urban areas is 36 years.

The majority of the respondents (61%) were female, while (39%) were male. This is consistent with the findings of previous studies that have shown that women are often the primary caregivers and household managers in Zimbabwean households (Muzvidzwiwa, 2017).

The majority of the respondents (59.1%) were married, (22.9%) were single and (18%) were widows or divorced. Also, the majority of the respondents 55.1% had secondary, while 25.8% had primary education and 19.1% had tertiary education.

These demographic characteristics provide a profile of the respondents and help to contextualize the findings of the study.

4.2.1 Representation of Respondents

This section shows respondents according to their distinct groups for better analysis and understanding.

Table 4: Representation of Respondents

Target	Sample size	Respondents	Percentage (%)
Households	97	95	98
Residents	20	20	100
Local authorities	1	1	100
Health personals	6	6	100
NGO`s and CBO`S	10	10	100
Total	134	132	99

The table shows a number of different distinct groups that the respondents emerged from. There were 95 successful respondents from households, 20 residents, 1 local authority, 6 health personals, 10 NGO`s and CBO`s. A diverse representation of respondents (Table4) is critical to ensure the study`s validity, reliability and generalizability. Since water access challenges affect different demographics unevenly, limiting respondents to a single group, would introduce bias and lead to misleading conclusions.

4.2.2 A pie chart showing respondents

This section shows a pie chart visually representing distinct groups of respondents.

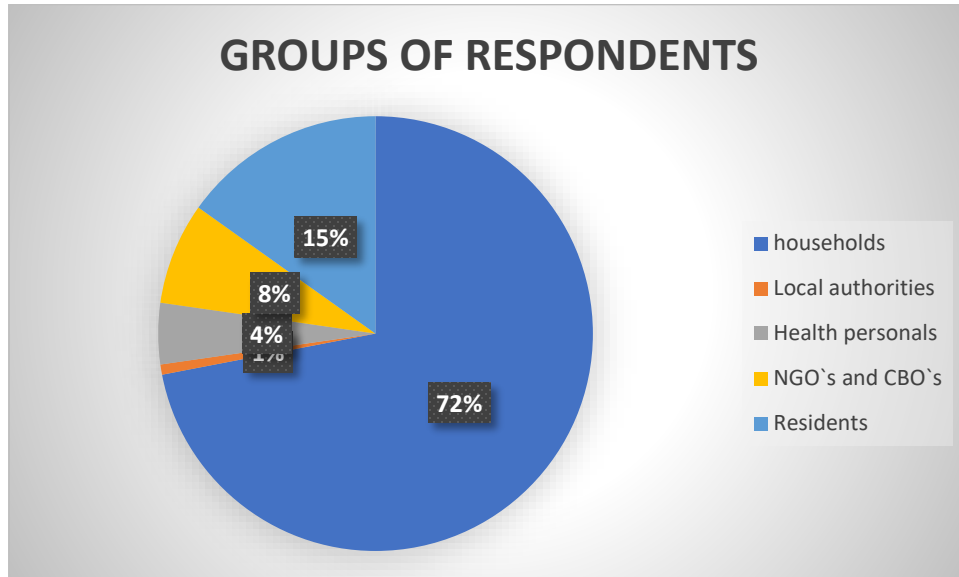


Figure 3: Respondents Groups

Source: Fieldwork 2025

The pie chart represents the percentage of respondents by sector. The pie chart is divided into 5 different sections each representing households, local authorities, health personals, residents and NGO's and CBO's respectively. The household has the biggest section covering up to 72% of the whole circle. This is because it is the Budiriro households that have the first hand information on the water availability challenges that the area has been facing and hence it is ideal to have the households as the sole source of data through questionnaires. The residents sector has a relative bigger portion as there were from focus group discussions and provided adequate qualitative data relevant for analysis. Thus aligning with Creswell (2014), a large sample size from a particular sector can provide a more comprehensive understanding of that sector's perspective and experiences.

The second section is the local authorities section, which is in orange. The sector covers up to 1% of the pie chart. As asserted by Patton (2015), including local authorities in a study can provide valuable insights into the role of governance and decision making in shaping outcomes. In this study, different authorities which include the Ministry of Local Authority and Public Works, Ministry of National Housing and Social Amenities and also the City Council were included so

they can effectively elaborate the efforts that the government is making towards the curbing of the water availability challenges in Budiriro.

The third section on the pie chart is the NGO`s and CBO`s section, which is in yellow. The section only 8 % of the pie chart. As noted by Bryman (2016), including local authorities in a study can provide a more nuanced understanding of the complex relationships between different stakeholders. The role of NGO`s and CBO`s in the provision of community based initiatives especially on water availability challenges in Budiriro. Hence their significance should never be undermined.

The other section on the pie chart is the health personals, which is in grey. The section covers only 4% of the total pie chart. The role of the Health personals such as doctors and nurses is of hyper importance for they contribute massively on the public health impacts of the challenges of water availability in Budiriro, low income countries. . According to Yin (2018) including diverse stakeholders in a study can provide a more comprehensive understanding of the research topic.

4.3 Respondents Educational background

This section shows Educational background for the respondents. This is critical as it shows the level of understanding that they have on the water availability challenges.

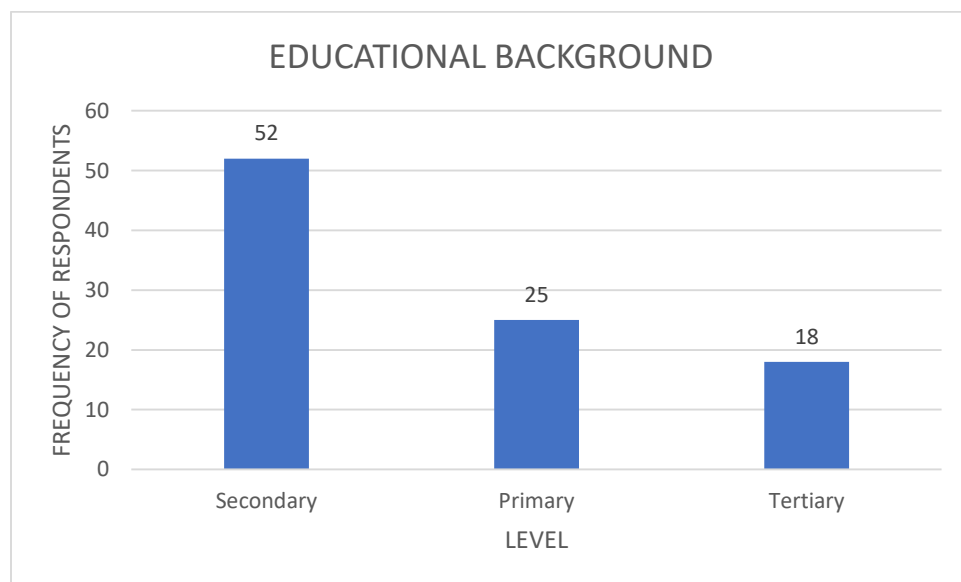


Figure 4: Education background of respondents (n=95)

Source: Fieldwork 2025

The educational background of the research respondents is crucial as it influences their understanding, interpretation and response to survey questions. This is because it can impact on respondents' cognitive abilities such as comprehension, analysis and evaluation which is vital for providing accurate and reliable responses. (Tourangeau et al., 2015).

The above graph shows the educational background of the respondents that answered the Questionnaire in Appendix 1. The Questionnaire was issued randomly across the 4 wards of Budiriro under the Harare Municipality. Due to the massive number of the residents in the Budiriro residential area, the researcher issued a mixed methods where quantitative and qualitative data will be collected hence a sample of only 97 questionnaires were only issued out across the wards. The educational background from the questionnaires is that which is presented on the bar graph. The educational background shows that most of the residents have reached secondary school which is highly commendable as they would be able to grasp the importance of water and be able to fully report to the research topic “water availability challenges in low-income area of Budiriro”. 25.8 % obtained only primary education in which the researcher noted that these were the elderly population ranging from 50 years to 100 years. An average of 19.1 % have obtained their tertiary education and hence have a more clearer outlook of the water availability challenges and hence increases the validity and reliability of the research.

4.4 DATA PRESENTATION AND ANALYSIS

This thesis took a bottom-up approach to articulate the water availability challenges in Budiriro. This study purposely targeted the households in the Budiriro. The findings made and discussions reached by this study are presented next. The findings made, and discussions reached by this study are presented next.

4.5 Findings of the study

This section presents findings and discussions of the study, starting with a focus on the enumeration of the water availability challenges in Budiriro.

4.6 Objective one: Enumeration of the status of water availability in Budiriro

The quantitative and qualitative responses were collected on questionnaires, key informant interviews as well as focus group discussions. The data analysis contributed from reoccurring data which consisted of the schedule of the municipal water supply, the quality of the municipal, and also the alternative for the water supply.

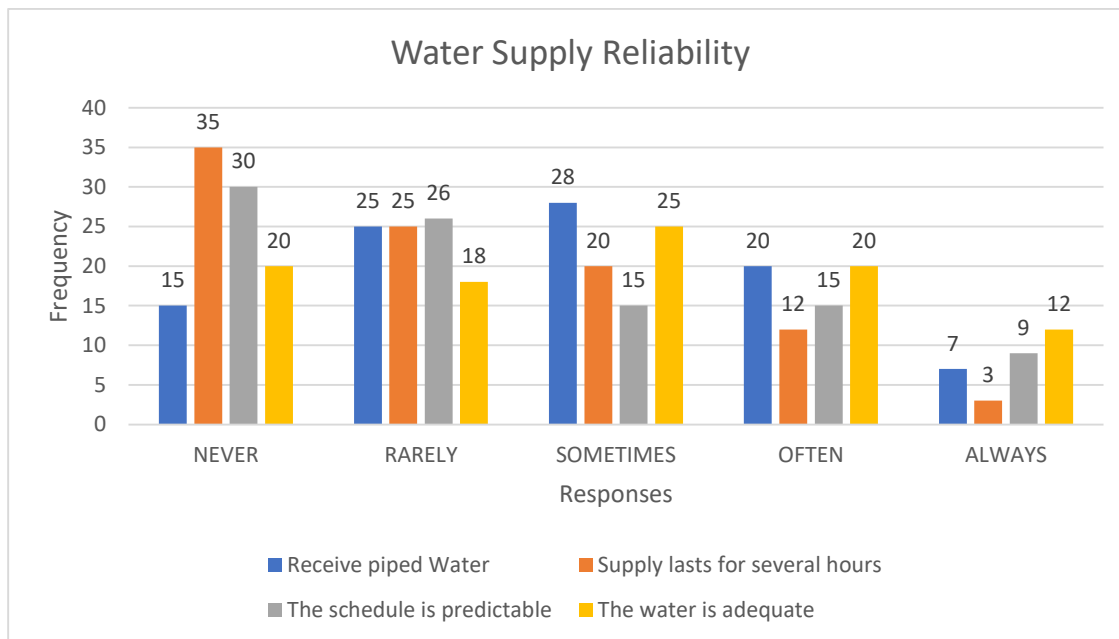


Figure 5: Water availability (n=95)

Source: fieldwork 2025

As the graph clearly illustrates, more people in Budiriro are facing water availability challenges. The quantitative data shows that receiving piped water is a significant challenge with a frequency of “Never”, “rarely” and “sometimes” responses.

Also data collected from the focus group discussion by the other residents strongly aligns with this. One of the residents from Budiriro 5b under ward 43, said:

“Water is always not available, we are used to it” 14 May 2025.

Also another resident from the focus group discussion said:

“It’s hard to plan our daily activities because we never know when water will be available” 14 May 2025.

In one of the key informant interview that targeted the health personals, one of the respondents a nurse from Budiriro 1 polyclinic responded:

“It’s a challenge to promote proper hygiene practices when people don’t have access to enough clean water” 17 May 2025.

4.6.1 Discussion

The quantitative and qualitative data from the graph and responses of the people highlighted how Budiriro residential area has chronic water availability issues. Resident’s qualitative responses highlight the community’s struggles with water storage and planning, while healthcare personals’ insights emphasize the health risks associated with inadequate water supply. These finding is consistent with previous research that highlights the struggles of low-income communities in accessing reliable piped water (Ainuson, 2015). Nevertheless findings from the literature review which strongly emphasized decayed and old infrastructure as the reason why low-income communities have water availability challenges is quite debatable as 95% of the households face water availability challenges but do not have infrastructural problems. Therefore in Zimbabwe, most communities face water availability challenges because of excessive water load shedding from the service providers. This is such a sad phenomenon as the residents are now finding it normal to not have access to their basic right, Section 77 of the Declaration of Rights states that every person has a right to safe, clean and portable water (Constitution of Zimbabwe, 2013, Section 77).

4.7 Objective two: Examination of survival strategies during scarcity and quality of available water

This section the researcher examines alternatives that the Budiriro households uses during scarcity of water. The households were asked if they have alternatives for the water. The following is a pie chart showing the respondents responses.

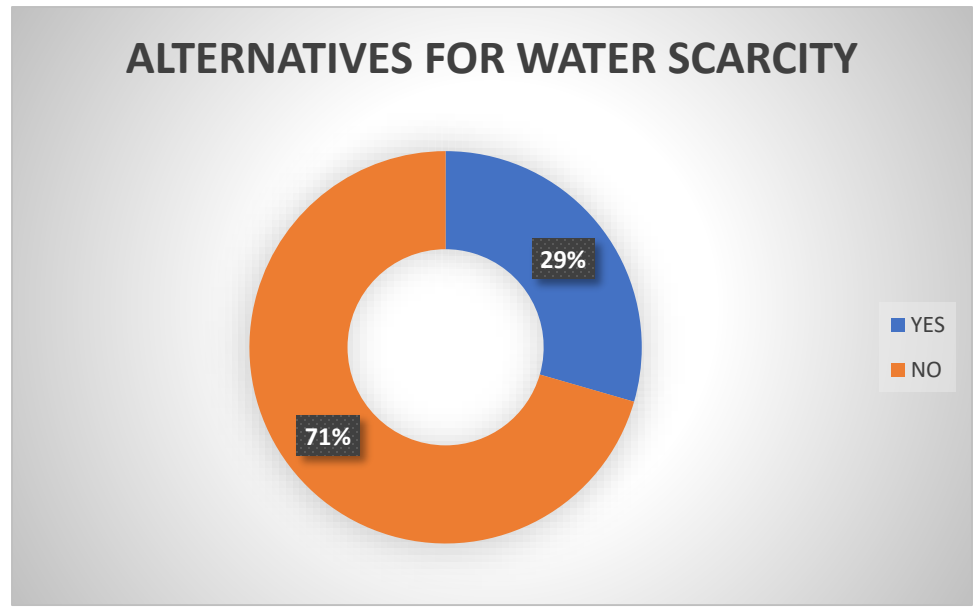


Figure 6 : Alternatives for water (n=95)

Source: fieldwork 2025

As evidently by the pie chart above 71 % of the total respondents agreed to have access to the alternative sources for water collection. Which is quite a bold survival strategy considering the unpredictability and unreliability of the tap water. A percentage of 29% is for the people that do not access to alternatives.

In one of the focus group discussions an elderly woman from Budiriro 1, pleaded

“May the government help in the construction of boreholes and wells in Budiriro 1, for their too expensive but relatively important to our daily lives”. 14 May 2025

4.7.1 Examination of survival strategies

This section shows responses from the questionnaire in accordance to the alternatives they have access.

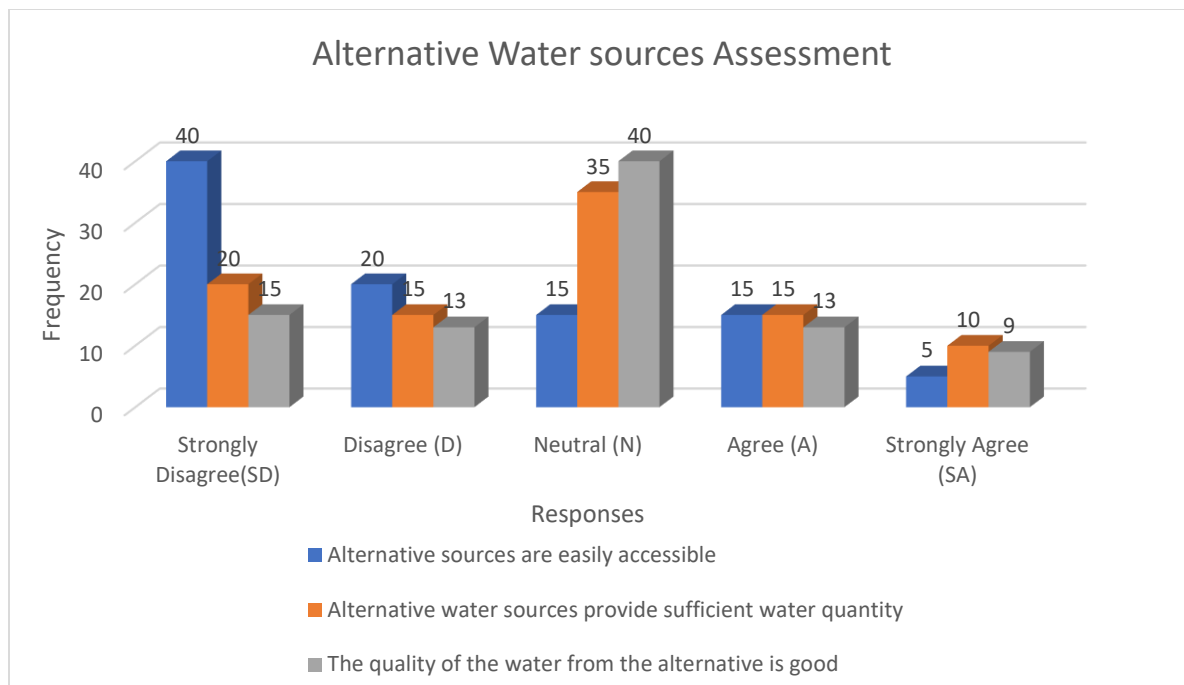


Figure 7: Alternative water sources assessment (n=95)

Source: fieldwork 2025

The bar chart presented in Fig4.6 shows the distribution of responses by the households to the three statements related to alternative sources. The majority of the respondents strongly disagreed (40) or disagreed (20) that the alternative sources are easily accessible, indicating that the alternative sources are really not accessible, which can be because there are far from their households or it will be crowded. Also the respondents frequency were high on the Neutral bar (35) when there were asked if the alternatives provide adequate water supply. And also the frequency of the Neutral bar was high on the question about the water quality with 40 people agreeing with that.

One of the residents in a focus group discussions said that

“At times I don’t even attempt to go to the borehole because it will be crowded , so a lot of time will be wasted since at times borehole runs dry or at time starts to emit dirty water which can only be used in the toilet”. 14 May 2025

.Also a young girl also stated that

“At the borehole or well lines, that is were some of the diseases are spread because people will be packed like sardines here at the borehole”. 14 May 2025

Also one of the NGO which have helped in the construction of a community borehole stated that:

“While we`ve made efforts in improving water access, alternative sources remain challenging to reach for many communities especially the ones in the outskirts.” 18 May 2025.

4.7.2 Discussion

According to a study by Hope (2018), the quantity of water provided by alternative sources is often a concern, particularly in areas with high water demand. This questions the whole safety of the alternative water sources and the adequacy of the water from the water sources since the Budiriro residents are complaining. From the data collected from the households it is evident that they think that the water quality of the water quality is relatively good than that from the tap. Through the responses are mixed, with a slight bias towards neutrality. This indicates that respondents are uncertain or lack confidence in the quality of alternative water sources. Therefore one can beg to differ that the water from the alternative sources is much safer than that from the tap. . Research by Majuru et al. (2016) emphasizes the importance of water quality, highlighting the risks associated with consuming contaminated water. A lot of people showed concern on the accessibility of the alternatives especially in the key informant interviews. Hence crucial steps were promised to be taken by the NGO`s and CBO`s to improve the situation and accessibility of the alternatives. Nevertheless in a (Appendix 3) with the health professionals they argued that some of the alternatives like the wells are not safe to be drank for some of them will be contaminated by the sewage, and some of them will not be protected. Therefore the health professionals advised the Budiriro households to boil and use water pills in efforts to purify the water

4.8 Objective three: Environmental challenges contributing to the Contamination

In this section, the researcher seeks to clearly illustrate how other environmental factors are negatively affecting water sources. Theses environmental factors includes Industrial, Agriculture and Human waste.

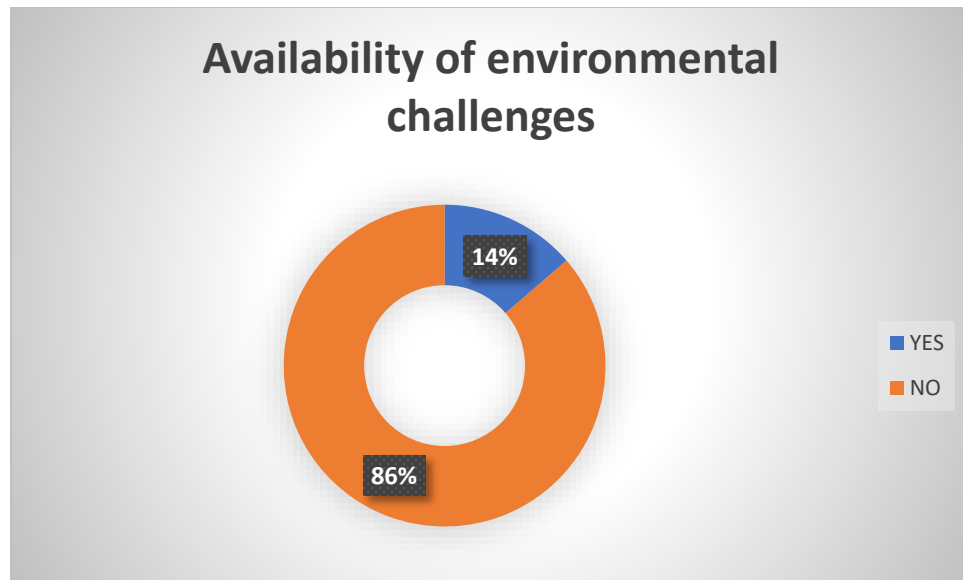


Figure 8: Availability of environmental challenges

Source: field 2025

86% of the respondents acknowledges the presences of environmental challenges that are significantly contributing to the pollution of water sources. The “No” section accounts for around 14% of the total respondents which suggests that a smaller proportion of the respondents do not perceive environmental challenges as a significant issue. Which can be arguably that this is due to the ignorance of the people due to the little educational exposure that the candidates had.

The following graph shows the responses of the environmental challenges that are causing water pollution in the Budiro. (Y-axis represents the quantity or frequency of the responses: x-axis lists the three sources of the water pollution)

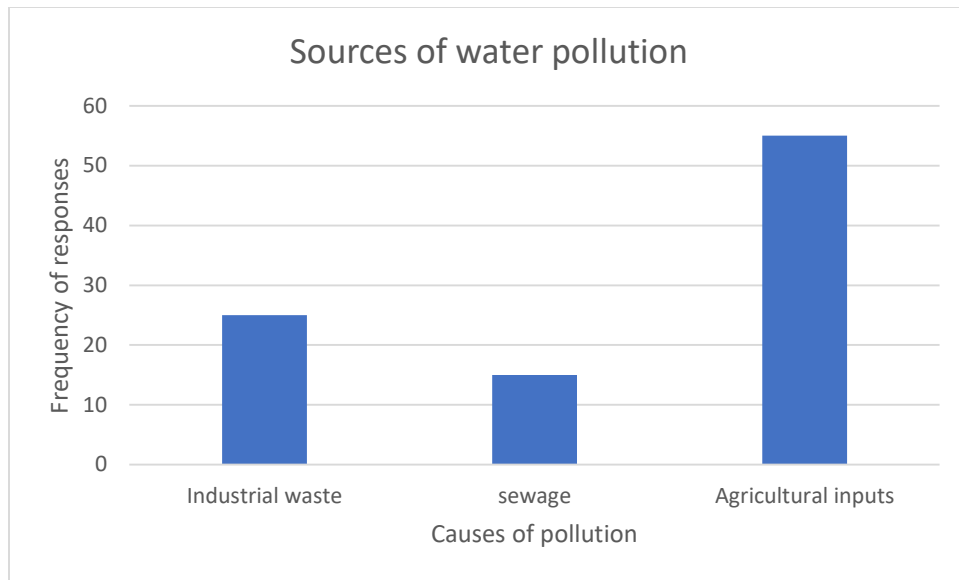


Figure 9: Sources of water pollution (n=95)

Source: fieldwork 2025

The graph clearly illustrates that 58% of the people are convinced that Agricultural inputs are the major cause of the contamination of water sources in Budiriro. Also 26% of the respondents answered that the industrial waste are polluting the environment. A minor part of the respondents 16% answered that the sewage is contaminating water sources, which is highly relevant as in Budiriro are some frequent sewage pipe bursts, which pollute the water sources like unprotected wells and other water sources.

This was also in agreement with the focus group discussion that was conducted as one of the residents said that,

“We can not trust water from the wells near agricultural land as it causes diarrhea”. 14 May 2025

Also another resident from 5a said:

“The industries are polluting our water sources especially the Zimbabwe fertilizer Company”. 14 May 2025

4.7.1 Discussion

There environmental challenges like harmful chemicals like urea, as well as other chemicals used in agricultural chemicals are a significant source of water pollution and causes stomach pains.

Makonese et al., (2018) has highlighted the impact of agricultural runoff and industrial effluent on water quality. The graph and key informant interviews effectively communicate the sources of water pollution like sewage in the Budiro area, highlighting the need for targeted interventions to address the issue. This strongly agrees with the findings in the literature review as (Misi 2018) found that poor sanitation and sewage failures contributed to the contamination of water sources in high density suburbs. By understanding the relative contributions of different sources, policymakers and stakeholders can develop more effective strategies to mitigate water pollution and protect the environment.

4.9 Objective four: Suggestion of improved intervention efforts to improve access of water

There were suggestions that were collected from the community. Which include Infrastructural development, community education, collaboration and partnerships and also the construction of community boreholes.

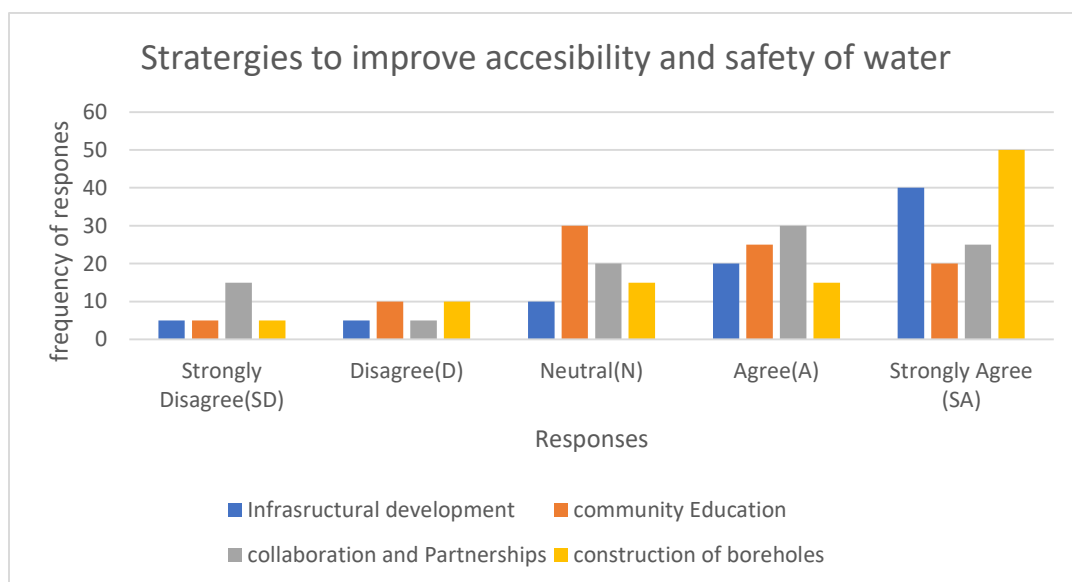


Figure 10 Strategies to improve accessibility and safety

Source: Fieldwork 2025

The chart indicates strong agreement (likely “Strongly Agree” or “Agree” based on the bar height) for infrastructural development as a key strategy. Also, in focus group discussions a number of people enormously agreed that the water infrastructure is now old and rusty and therefore need development.

One of the respondents answered “*the tap water at my house doesn’t flow nicely, because my brass waterlines are all rusty*” .14 May 2025

4.9.1 Discussions

Therefore the old infrastructure should be renovated. This aligns with studies emphasizing that aging or absent water infrastructure exacerbates scarcity in low-income areas (WHO & UNICEF, 2021). For instance, in Sub-Saharan Africa, piped-ater systems often fail to reach peri-urban settlements due to financial constraints (Kayaga et al., 2019). Investments in Infrastructure (e.g. pipelines, treatment plants is critical but requires government and donor funding (Ajayi& Ikwuyatum, 2018).

Community education received moderate to high agreement, reflecting its role in promoting hygiene and sustainable water use. 25.8 % of the people who took the questionnaires only attained Primary education and it is of hyper importance to educate everyone on the risk of urban peripheral agriculture as it can cause water contamination, also the populace need to be educated on the harmful effects of drinking unsafe water and how to improve the water quality. Research shows that educational programs can reduce contamination risks by teaching proper storage and handling (Bain et al., 2021). However, effectiveness depends on literacy levels and cultural relevance (Dube, 2020).

Boreholes were likely a popular choice , this is because it provides immediate solution to water availability challenges as they people could now access groundwater that is relatively safe compared to the tap water. Areas like Budiro 1 and 2 could really use some boreholes for they only rely with a few community boreholes that are relatively a too far from the other houses in the outskates. According to Lapworth et al., (2020), over-reliance on boreholes risks aquifer depletion and contamination. And hence the boreholes should be even spaced and heavily monitored to avoid contamination.

4.10 Chapter Summary

This chapter presents the findings of the study on water availability challenges in Budiro. The quantitative and qualitative data reveals that the water availability in Budiro is unpredictable and the water is not safe. The Budiro residents also revealed that the alternative sources are not accessible. The data analysis also reveals that agricultural chemicals are the primary sources of

water pollution, followed by industrial waste. The following chapter will give the conclusion and recommendation of the research study.

CHAPTER 5: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter synthesizes the key findings of the research on water availability challenges in Budiriro, a low-income suburb in Southwest Harare, Zimbabwe. The study explored the status of water access in the area, survival strategies during scarcity, environmental factors contributing to contamination of water sources as well as potential interventions to the problems. The chapter also provides a comprehensive summary, draws evidence-based conclusions for each objective, and offers practical recommendations for policymakers, local authorities, and development agencies.

5.1 Summary of the Research

The research employed a mixed-methods approach, combining household surveys, key informant interviews and focus group discussions to access the water crisis in Budiriro. Findings revealed that the suburb suffers from chronic water shortages, with most households receiving municipal water less than thrice a week (Mudimbu et al., 2021). As a result, residents rely on unsafe alternatives, including shallow wells, boreholes, and water vendors, exposing them to health risks such as cholera and typhoid (Zingoni et al., 2018). Survival strategies during scarcity include the use of boreholes, wells and water rationing. Environmental challenges such as poor waste disposal, sewage leaks and industrial pollution exacerbate water contamination (Nyamadzawo et al., 2020). Therefore the government at large need to act upon these contaminations as they are causing a fatalities. The study also found that climate change-induced droughts have worsened water scarcity, reducing groundwater rates (Makarau et al., 2019), this also reduces water in the Manyame and Chivero rivers which are the main sources of city council water for the Budiriro location. Despite these challenges community based water management initiatives and NGO intervention have shown promise in improving access. However, these efforts remain fragmented and require stronger institutional support (Gumbo, 2019).

5.2 Summary of Key findings

5.2.1 To enumerate the status of water availability in Budiriro.

The study answers objective one, which looked at the status of water availability in Budiriro. Findings showed that there are chronic and systemic challenges. Quantitative and qualitative data, including resident testimonies and healthcare workers` insights underscored the severity of water scarcity in the area. Residents reported persistent struggles with water storage and daily planning due to unreliable supply, while healthcare professionals highlighted the associated health risks,

such as waterborne diseases and compromised hygiene practices. These findings align with prior research on the difficulties low-income communities face in accessing reliable piped water (Ainuson, 2015).

Contrary to the literature attributing water scarcity primarily to decayed infrastructure, the study found that 95% of the households in Budiriro experience water shortages without infrastructural challenges. Instead, the root cause identified was excessive water load, reflecting a systemic failure in water distribution. This situation has normalized water insecurity with residents resigned to the lack of access despite their constitutional right to safe, clean and portable water. The findings emphasize a disconnect between policy guarantees and lived realities, urging accountability from service providers and policy makers

5.2.2 Survival strategies during scarcity and quality of water

The second objective examined survival strategies that are used during scarcity and quality of water. The study revealed critical concerns about water adequacy and safety of water. Residents rely heavily on alternative sources due to inconsistent municipal supply, but the quantity provided by these sources often fails to meet high demand, raising questions about reliability (Hope, 2018). While some households perceived the quality of alternative water (e.g. wells and boreholes) as better than tap water, responses were mixed with a bias towards neutrality, indicating uncertainty or lack of confidence in its safety. This ambiguity challenges assumptions that alternative sources are inherently safer than municipal water.

Health professionals strongly cautioned against the risks of consuming water from unregulated alternatives, citing contamination from sewage and inadequate protection. They recommend boiling and using water purification tablets to mitigate health risks, aligning with the literature review underscoring the dangers of contaminated water (Majuru et al., 2016). Despite these concerns accessibility remains a key issue, prompting NGO's and CBO's to pledge interventions to improve both the availability and safety of alternative sources. The findings highlight a precarious balance between survival strategies and health risks, emphasizing the urgent need for systematic solutions to ensure safe, reliable water access.

5.2.3 Environmental challenges contributing to the contamination of water sources

The study identified several environmental challenges contributing to the contamination of water sources in Budiriro. A major issue is the frequent sewage overflows, particularly in wards 43 and

29, which directly pollute groundwater sources use by residents. This contamination is compounded by poor solid waste management practices and uncontrolled industrial waste discharge, which introduce harmful pollutants into water supply. Laboratory tests revealed alarming levels of E.coli in shallow wells exceeding World Health Organization (WHO), safety limits by 300%, posing health risks to the community (Masaka et al., 2022; Chirisa et al., 2021)

Additionally, the study further reveals that agricultural and industrial discharge particularly from the Zimbabwe Fertilizer Company near Area 5a. The factory is responsible for introducing pollutants that degrade water quality as traces of lead (Pb) could now be traced in the water. Agriculture plays a significant role in water source contamination in Budiriro, particularly through agricultural runoff, which leaves traces of hazardous chemicals like urea in shallow water sources.

5.3 Conclusion

5.3.1 Status of water availability

The study confirmed that Budiriro faces severe water insecurity, with over 70 % of households experiencing inconsistent municipal supply (Moyo et al., 2020). The aging infrastructure coupled with rapid urbanization, has overwhelmed the existing water distribution system. Many residents depend on unprotected wells and contaminated boreholes, increasing vulnerability to waterborne diseases. Climate variability has further reduced surface water availability, making groundwater a critical but increasingly unreliable source (Mudimbu et al., 2021)

5.3.2 Survival strategies and water quality

Households in Budiriro employ high-risk coping mechanism due to unreliable water access. While purchasing water from water distribution companies is common, financial constraints force many to use untreated sources (Zingoni et al., 2018). Water quality tests revealed high levels of fecal coliforms and heavy metals linked to poor sanitation and industrial discharge (Nyamadzawo et al., 2020). These findings suggest an urgent need for affordable, safe water alternatives and public health interventions.

5.3.3 Environmental Challenges Contaminating Water Sources

Environmental degradation significantly contributes to water contamination in Budiriro. Key issues include ZFC industrial waste as heavy metal discharge contaminates groundwater, causing skin and kidney diseases (Dube et al., 2022). Also excessive urea use leads to nitrate poisoning,

linked to blue baby syndrome. Frequent pipe bursts especially in ward 29 introduce fecal bacteria that can contaminate open water sources like shallow and unprotected wells, triggering cholera outbreaks (Nhapi, 2017).

5.4 Recommendations

The study focused on the water availability challenges in low-income area of Budiro, south-west of Harare, Zimbabwe. After a careful analysis of the findings, the researcher came up with recommendations that could improve the water availability and as well the quality of the available water.

- The city council should prioritize repairing and expanding broken pipelines to reduce water losses and ensure equitable distribution. Installing high-yield boreholes with routine water quality checks would provide safer alternatives while addressing contamination risks. Distributing affordable household water filters such as ceramic or bio-sand filters, such as ceramic or bio-sand filters, could immediately reduce heavy metal and bacterial exposure for vulnerable households.
- Environmental authorities must enforce strict penalties on ZFC for illegal waste dumping and mandate proper wastewater treatment before discharge. Promoting organic farming practices near water sources would help reduce urea dependency and nitrate pollution. Upgrading sewage systems with durable piping and establishing rapid-response teams to fix leaks within 24 hours would significantly decrease fecal contamination risks.
- Local health departments should train community health workers to conduct basic water quality tests and educate households about contamination dangers. Implementing school programs on safe water handling would instill long-term hygiene practices in children. Establishing community water committees would create local monitoring systems to report pollution violations and advocate for infrastructure upgrades.
- The government should invest in constructing rainwater harvesting systems in public institutions and homes to supplement supply during droughts. Introducing drought-resistant urban farming techniques, like drip irrigation would reduce urban peripheral agricultural water waste. Identifying and protecting groundwater recharge groundwater recharge zones through zoning regulations would safeguard future water sources from industrial and agricultural pollution.

- Further studies should investigate the long-term health effects of ZFC's heavy metals on Budiriro residents. Research into low-cost filtration methods for removing nitrates and heavy metals from household water would provide practical solutions. Additional studies should evaluate the economic burden of water vending on low-income families to inform policy interventions.

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APPENDIX 1: HOUSEHOLD QUESTIONNAIRES

Good day, my name is Ruvarashe Kamwendo, a Bachelor of Science Honors Degree in Development Studies student. I am conducting a research on water availability challenges in low-income areas like Budiro. This study aims to understand the challenges residents face with water supply and identify possible solutions. Your household has been randomly selected to participate. Your participation is voluntary and anonymous, your name will not be recorded, and all information provided will be kept confidential and used solely for research purposes.

PART 1: HOUSEHOLD DEMOGRAPHICS

1. Location/Ward within Budiro Urban District:
2. Number of people living in the household:
3. Type of dwelling: () Formal house () Informal settlement/shack () Rent room other.....
4. Main source of income for the household: () formal employment () informal business () farming () Remittance () Pension other.....
5. Educational level: () Tertiary () High school () Primary school

PART B: WATER SOURCES AVAILABILITY

Please indicate your level of agreement or frequency regarding the following statements about household's main water supply (Municipal Tap Water) over the past 3 months.

1=Never, 2=rarely (less than once a week), 3= Sometimes (1-3 times a week) 4= Often (4-6 times a week), and 5= Always (daily)

Statement	1 (Never)	2(Rarely)	3(Sometimes)	4(Often)	5(always)
B.1 We receive piped municipal water at our home.					
B.2 When water comes, the supply lasts for several hours.					
B.3 The water pressure from the municipal tap is adequate.					
B.4 The schedule of municipal water supply is predictable.					

1= Strongly Disagree (SD), 2= Disagree (D), 3= Neutral (N), 4=Agree (A), 5=Strongly Agree (SA)

Statement	1 (SD)	2(D)	3(N)	4(A)	5(SA)
B.5 Overall, I am satisfied with the reliability of the municipal water supply.					
B.6 My neighborhood receives a fair share of available water compared to others.					
B.7 The quality of the municipal water is good. (smell, taste, clear)					
B.8 The quality of the water of the alternative.					

PART C: SURVIVAL STRATEGIES DURING SCARCITY AND QUALITY OF WATER

Never =1, rarely=2, Sometimes=3, Often=4, Always=5 (tick where necessary)

C.1 We rely on alternative water sources.	Yes	<u>No</u>			
Statement	1(N)	2(R)	3(S)	4(O)	5(A)
C.2 What is the average distance you walk to the nearest alternative water source?	100m	100-200m	200m-500m	500m-1km	Over 1 km
C.3 How often do you visit the alternative water source in a week?					
C.4 What are the survival strategies that you use during scarcity a) storing water?					
C.4 b) Storing water in containers					

C.4 c) Reducing water usage					
C.4 d) Purchasing water					
C.4 e) Using alternatives(boreholes and wells					
C.4 f) mention the other and the frequency.					

1=Strongly Disagree (SA), 2=Disagree (D), 3=Neutral (N), 4=Agree (A), 5=Strongly Agree (SA)

Statement	1(SD)	2(D)	3(N)	4(A)	5(SA)
C.5 Alternative water sources are easily accessible.					
C.6 Alternative water sources provide sufficient water quantity.					
C.7 The quality of the water from the alternative is good.					
C.8 What do you do to improve the water quality? a) Boil					
C.8 b) use water guard					

PART D: ENVIRONMENTAL CHALLENGES CONTRIBUTING TO THE CONTAMINATION OF WATER.

Never =1, rarely=2, Sometimes=3, Often=4, Always=5 (tick where necessary)

D.1 Have you noticed any environmental hazards in your area that could contribute to water contamination?	Yes	No			
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Statement	1(N)	2 (R)	3(S)	4(O)	5(A)
D.2 What is the source of pollution in your area that affect water quality? a) Sewage					
D.2 b) Industrial waste					
D.2 c) Mining					
D.2 d) Agricultural chemicals					

PART E: SOLUTIONS AND SUGGESTIONS

1= Strongly Disagree (SD), 2= Disagree (D), 3= Neutral (N), 4=Agree (A), 5=Strongly Agree (SA)

Statement	1(SD)	2(D)	3(N)	4(A)	5(SA)
E.1 Rainwater harvesting					
E.2 Solar Water Pumps					
E.3 Building and Rehabilitating Water points					
E.4 Protecting water sources					
E.5 Public Awareness Campaigns					
E.6 Youth involvement					
E.7 Strengthening water governance					
E.8 Use of water pills					

APPENDIX 2: KEY INFORMANT INTERVIEW

SECTION A: ENUMERATION OF WATER AVAILABILITY IN LOW-INCOME SUBURB OF BINDURA

1. What is the current status of water availability in Budiro, and what are the major challenges?
2. How does the local authority ensure access to safe and clean water for residents in Budiro?
3. What are the main sources of water for Budiro, and are they reliable?
4. How does the local authority address water supply disruptions and shortages in the area?
5. Are there any plans or initiatives to improve water infrastructure and services in Budiro?
6. How does the local authority engage with residents and stakeholders to address water-related concerns and issues?
7. What are the biggest water-related challenges facing the local government in Budiro, and how are they being addressed?

SECTION B: EXAMINATION OF SURVIVAL STRATEGIES

1. What strategies does the local authority employ to support residents in Budiro during water scarcity?
2. How does the local authority ensure access to safe and clean water for residents in Budiro?
3. What measures are in place to monitor and improve water quality in Budiro?
4. Are there any initiatives or Programs to promote water conservation and efficient use in Budiro?
5. How does the local authority collaborate with residents, NGOs, or other stakeholders to address water-related challenges in Budiro?
6. What are the biggest challenges facing the local government in ensuring water security and quality in Budiro?

PART B

1. Are there any plans to upgrade or improve water infrastructure in Budiro?
2. How does the local government respond to waterborne disease outbreaks in the area?

3. Are there any community based initiatives or projects to improve water management and quality in Budiriro?
4. How does the local government's strategies and initiatives align with the National Development Strategy 1(NDS1) pillars, particularly in addressing water availability challenges and promoting sustainable water management in Budiriro, Harare?

SECTION C: PROFILLING ENVIRONEMTAL CHALLENGES CONTRUBUTING TO CONTAMINATON OF WATER SOURCES

1. What are the primary environmental challenges contributing to water contamination in Budiriro, and how are they being addressed?
2. How does the local authorities monitor and respond to environmental hazards that impact water quality in Budiriro?
3. What policies or initiatives has the local authorities implemented to protect water sources and promote sustainable water management in Budiriro?
4. How does the local authorities collaborate with other stakeholders (NGOs, CBOs) to address environmental challenges and water contamination in Budiriro?
5. What are the biggest environmental challenges facing local authorities in ensuring safe and clean water for the Budiriro residents?

APPENDIX 3: FOCUS GROUP DISCUSSION (FGD)

SECTION A: Enumerating the status of Water Availability

1. What are the most common water-related health issues you've encountered in Budiro?
2. How do you think water scarcity affects the health and well-being of residents in Budiro?
3. What are the primary sources of water for residents in Budiro, and how do they impact health?

SECTION B: Examining Survival Strategies during scarcity and Quality of Available water

1. How do residents in Budiro cope with water scarcity, and what are the health implications?
2. What are the most effective strategies for promoting water conservation and efficient use in Budiro?
3. How does water quality affect health outcomes in Budiro, and what are the most common waterborne diseases?

SECTION C: Profiling Environmental challenges contributing to contamination of water sources

1. What environmental factors contribute to water contamination in Budiro, and how do they impact health?
2. How do human activities (e.g., agriculture, industry) affect water quality in Budiro?
3. What measures can be taken to mitigate environmental challenges and promote safe water sources in Budiro?

APPENDIX 4: PERMISSION LETTER FROM BINDURA UNIVERSITY OF SCIENCE EDUCATION

**SCHOOL OF GEOLOGICAL SCIENCES, DISASTER & DEVELOPMENT
SUSTAINABLE DEVELOPMENT DEPARTMENT**



BINDURA, ZIMBABWE
WhatsApp : +263773281212
E-mail: jbowora@buse.ac.zw

BINDURA UNIVERSITY OF SCIENCE EDUCATION

CHAIRPERSON'S OFFICE

Thursday 03 April 2025

TO WHO IT MAY CONCERN

Dear Sir or Madam

RE: RESEARCH SUPPORT LETTER FOR SUSTAINABLE DEVELOPMENT STUDENT

I am writing on behalf of the Sustainable Development Department requesting your collaboration on the research of our fourth-year student, RUVARASHE KAMWENDO REGISTRATION NUMBER B211877B.

The student is studying for a 4-year Bachelor of Science (Honours) Degree in Development Studies (HBSc.DG). During the fourth year of study, students are required to do field research which require them to do their data collection for research purposes.

We will be highly obliged to furnish you with additional information about the research project if our request meets your favorable consideration.

Yours faithfully,


Dr. J. Bowora
(Chairperson)

**CHAIRMAN
GEOGRAPHY DEPARTMENT
FACULTY OF SCIENCE**

**APPENDIX 5: APPROVAL LETTER FROM THE MINISTRY OF NATIONAL
HOUSING AND SOCIAL AMENITIES**

MINISTRY OF NATIONAL HOUSING AND SOCIAL AMENITIES

All correspondences to be directed to the Permanent Secretary.

Telephone: 0242 799 125
3rd Floor Zimac Centre



ZIMBABWE

The Office of the Secretary
Private Bag 780
Causeway
HARARE

14 May 2025

Ruvarashe Kamwendo
1387 Corbrough North
Harare

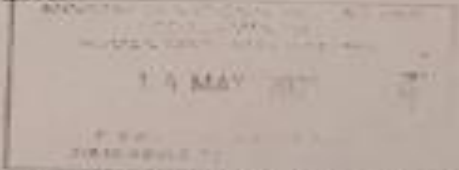
**APPROVAL OF AUTHORITY TO UNDERTAKE A RESEARCH: MS RUVARASHE
KAMWENDO: BINDURA UNIVERSITY OF SCIENCE EDUCATION: STUDENT**

The above subject matter refers

Please be advised that the Head of Ministry, in his memorandum dated 2 May 2025, has approved your application to undertake field research on "water availability challenges in Low-income areas of Budiro, Southwest Harare, Zimbabwe."

Kindly be advised that the research findings should not be subject to external consumption and must be solely used for academic purposes only. You are mandated to complete the Official Secrecy Act before commencement of the research project. Moreover, the final copy of the research findings should be submitted to the Office of the Secretary in this Ministry, upon completion.

It is hoped that the research findings will help this Ministry in coming up with relevant interventions in the study area undertaken.



Mumba T.
Director, Human Resources
FOR: SECRETARY FOR NATIONAL HOUSING AND SOCIAL AMENITIES

APPENDIX 6: TURNITIN REPORT

RUVARASHE KAMWENDO B211877B 1st Draft (1).docx

ORIGINALITY REPORT

14%	10%	8%	5%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Tosin Kolajo Gbadegesin, Olawale Olayide. "Water Availability Challenges in Low-Income Areas of Agbowo Community, Ibadan, Nigeria", International Journal of Circular Economy and Waste Management, 2021 Publication	2%
2	www.coursehero.com Internet Source	1%
3	Submitted to Midlands State University Student Paper	1%
4	liboasis.buse.ac.zw:8080 Internet Source	<1%
5	summitpostnews.com Internet Source	<1%
6	Submitted to Kenyatta University Student Paper	<1%
7	nano-ntp.com Internet Source	<1%

8	Charles Chavunduka, Walter Timo de Vries, Pamela Durán-Díaz. "Sustainable and Smart Spatial Planning in Africa - Case Studies and Solutions". CRC Press. 2022	<1%
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