

UNIVERSITY
OF
LUSAKA

AN ASSESSMENT OF HOW WATER AFFECTS LIVELIHOODS: A CASE
STUDY OF CHAINDA COMPOUND, LUSAKA, ZAMBIA

A DISSERTATION

Submitted to the School of Technology and Social Sciences and in partial
fulfillment of the requirements for the award of Bachelor of Arts in
Development Studies

BY

DALITSO BENJAMIN LUNGU

SUPERVISED BY:

MS MUKASAMI MONDE MWANANGOMBE

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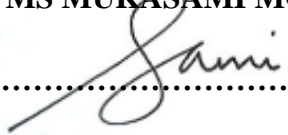
DECLARATION

I do hereby declare that this dissertation is my own original work. It has been guided and marked by my supervisor in accordance with the guidelines for the Bachelor Of Arts in Development Studies at the University Of Lusaka. It has not been submitted elsewhere for a degree at this or any other university.

NAME: DALITSO BENJAMIN LUNGU STUDENT NUMBER: BDS211483478

SIGNATURE  **DATE: 11/02/26**

SUPERVISOR: MS MUKASAMI MONDE MWANANGOMBE

SIGNATURE  **DATE: 11/02/2026**

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ABSTRACT

This study assessed the adequacy of water supply and its impact on community livelihoods in Chainda Compound, Lusaka, Zambia. The research was prompted by the persistent water shortages and the increasing reliance on informal water sources in peri-urban settlements despite various infrastructure interventions. The primary objectives were to examine the reliability and accessibility of the existing water supply, evaluate the adequacy of available water sources in meeting household and livelihood needs, and assess how current water conditions influenced daily economic activities. Using a descriptive cross-sectional research design, the study employed a mixed-methods approach to gather data from 50 respondents, including household heads and key informants from the Lusaka Water Supply and Sanitation Company (LWSC). Findings revealed that water supply was critically inadequate and unreliable, with 50% of the respondents receiving water for less than two hours per day. This intermittency forced residents to prioritize basic survival over hygiene and economic tasks. Furthermore, the study established a significant "water-poverty" nexus, where 44% of residents experienced reduced business hours due to time spent fetching water, while 36% incurred high financial costs from purchasing water from private vendors at inflated prices. Qualitative data highlighted the disproportionate burden on women, who faced significant "time poverty" that hindered their participation in income-generating activities. The study concluded that the existing water infrastructure failed to meet the basic requirements of the Human Right to Water and Sanitation, thereby trapping residents in a cycle of economic vulnerability. Recommendations included the implementation of transparent rationing schedules by LWSC, the introduction of pro-poor water tariffs, and the investment in decentralized, solar-powered water systems to enhance community resilience. Ultimately, the study underscored that improving water reliability is a prerequisite for sustainable livelihood development in Lusaka's informal settlements.

Keywords: Water Adequacy, Community Livelihoods, Informal Settlements, Time Poverty, Lusaka, Zambia.

DEDICATION

This work is dedicated to all those who have inspired, encouraged, and supported the pursuit of knowledge and excellence. To the countless individuals who strive to make meaningful contributions to the fields of finance, innovation, and technology, your dedication and hard work are the foundation of progress.

To those who believe in the transformative power of education and the pursuit of impactful solutions, this is for you. May this work serve as a testament to the value of perseverance, curiosity, and the pursuit of a better future for all.

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LIST OF ABBREVIATIONS

- HRWS – Human Right to Water and Sanitation
- LWSC – Lusaka Water Supply and Sanitation Company
- LWSSD – Lusaka Water Supply, Sanitation and Drainage Project
- MCA-Z – Millennium Challenge Account Zambia
- NWASCO – National Water Supply and Sanitation Council
- SDG 6 – Sustainable Development Goal 6 (Clean Water and Sanitation)
- SLF – Sustainable Livelihoods Framework
- UNICEF – United Nations Children's Fund
- WASH – Water, Sanitation, and Hygiene
- WHO – World Health Organization

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CHAPTER ONE: INTRODUCTION

1.0 Introduction

This chapter introduces the study and provides an overview of the key areas that will be discussed throughout the dissertation. It covers the background of the study, the statement of the problem, research objectives, and research questions. It also outlines the significance, and scope of the study. Through this chapter, readers gain an understanding of why the study was conducted and it seeks to highlight the realities of water adequacy in Chainda Compound and contribute to efforts aimed at improving living conditions.

1.1 Background of the Study

Chainda Compound, located in the eastern part of Lusaka, was established in the late 1970s as a result of rural-urban migration (Silavwe et al., 2018). The settlement developed primarily through informal land allocation, resulting in unplanned housing and limited public infrastructure (Mulenga, 2018). Historically, Chainda lacked a formal water network, forcing residents to rely on shallow wells and seasonal streams, which exacerbated health risks like cholera (Mwape, 2019).

In response, the Lusaka Water Supply and Sanitation Company (LWSC) introduced communal standpipes in the late 1990s and prepaid kiosks in the early 2000s. In 2016, a major infrastructure upgrade under the Millennium Challenge Account involved the installation of a 15-kilometer water distribution network in Chainda and **the nearby area of Bauleni** (Lusaka Times, 2016). While this increased household connections, many residents remained dependent on shared taps due to high connection fees and limited network coverage (NWASCO, 2020).

Despite these interventions, water supply remained intermittent. Phiri (2021) noted that households often faced low pressure and disruptions, particularly in the dry season. This study sought to assess how these water supply conditions affected the livelihoods of Chainda residents, specifically focusing on the intersection of water reliability and economic productivity.

1.2 Statement of the Problem

The ideal situation for any urban settlement is a consistent, affordable, and adequate supply of clean water, which according to the **World Health Organization (WHO)**, requires a minimum of **50 to 100 liters per person per day** to ensure basic health and hygiene. However, in

Chainda Compound, the reality was characterized by a persistent gap in service delivery. While infrastructure existed, the supply was often restricted to a few hours a day or a few days per week, forcing a population largely comprised of **low-income earners** to seek alternative, often unsafe, sources.

Previous studies and reports (UN-Zambia, 2022; LWSC, 2019) indicated that infrastructure in Lusaka's informal settlements was failing to keep pace with population growth. However, what remained unclear was the specific extent to which this inadequacy disrupted the **daily survival strategies and income-generating activities** of Chainda's residents. While it was known that water was scarce, the precise socio-economic "cost" to local livelihoods—such as time poverty for women or the operational constraints on small-scale home businesses—was not fully documented. Therefore, this study was conducted to bridge this gap by examining how the lack of adequate water directly influenced the socio-economic stability of the community.

1.3 General Objective

The study sought to assess how the adequacy of water supply affected community livelihoods in Chainda Compound, Lusaka.

1.4 Specific Objectives

1. To examine the reliability and accessibility of the existing water supply in Chainda Compound.
2. To evaluate the adequacy of available water sources in meeting household needs based on national and international standards.
3. To analyze the impact of current water supply conditions on the daily income-generating activities of residents.

1.5 Research Questions

1. How reliable and accessible was the water supply for residents in Chainda Compound?
2. To what extent did the available water sources meet the daily household needs of the residents?
3. In what ways did the water supply conditions influence the daily livelihood activities of the residents?

1.6 Significance of the Study

This study was significant as it highlighted the practical challenges faced by low-income households in managing daily activities like hygiene, cooking, and small-scale trade under water stress. For policy makers and the **Lusaka Water Supply and Sanitation Company (LWSC)**, the findings provided empirical evidence of service gaps, aiding in the design of more equitable distribution strategies. Academically, the study filled a gap by shifting focus from mere infrastructure presence to the lived socio-economic effects of water inadequacy on urban livelihoods in Zambia.

1.7 Scope of the Study

The study focused on assessing the adequacy of water supply and its impact on livelihoods within Chainda Compound, Lusaka. The research was limited to the perceptions and experiences of the residents and the conditions of the water infrastructure during the data collection period of [Insert Month/Year].

1.8 Definition of Key Terms

- **Adequacy of Water Supply:** Defined by WHO standards as the availability of at least **20–50 liters of safe water per person per day** within a reasonable distance, provided consistently to support health and economic tasks.
- **Livelihoods:** The ensemble of activities, assets (both material and social), and access to resources that determine the living gained by an individual or household, specifically home-based enterprises in this context.
- **Informal Settlement:** An unplanned urban area characterized by high population density, low-income levels, and a lack of formal tenure or basic municipal services.

1.9 Chapter Summary

This chapter established the foundation of the research by highlighting the historical and current water challenges in Chainda Compound. It identified the gap between existing infrastructure and the actual needs of the residents, particularly regarding livelihood security. Having defined the objectives and scope, the report proceeds to Chapter Two, which reviews existing literature and the theoretical framework governing urban water management.

CHAPTER TWO: LITERATURE REVIEW

2.0 INTRODUCTION

This chapter examines scholarly work regarding the availability of water and its connection to the well-being and livelihoods of communities. It establishes a foundation for the study by analyzing current knowledge from global, regional, and local perspectives. The review is structured to align with the research objectives, specifically focusing on water reliability, adequacy, and the subsequent impact on livelihood activities. Furthermore, this chapter presents the theoretical framework guiding the study, concluding with a conceptual structure that illustrates the relationship between the study variables.

2.1 General Review of Concepts

2.1.1 Water Adequacy and Accessibility

The concept of water adequacy extends beyond mere existence; it encompasses quantity, quality, reliability, and ease of access relative to household needs. The World Health Organization (WHO, 2019) defines a "basic" water service as a protected source within a 30-minute round trip. However, in informal settlements, physical proximity does not always guarantee access. Residents, predominantly women and children, often spend significant hours queuing or trekking to water points, a phenomenon known as "time poverty," which limits their availability for education or income-generating activities.

+1

2.1.2 Community Livelihoods

Community well-being and livelihoods involve the capabilities, assets, and activities required for a means of living (Chambers and Conway, 1992). In informal urban settlements like Chainda, water is a primary "productive asset." Small-scale enterprises such as hair salons, food vending, block making, and urban gardening are water-dependent. When supply is inadequate, households are forced to divert limited financial resources to purchase water from private vendors at inflated prices, thereby trapping them in a cycle of poverty.

2.2 Empirical Review (Empirical Inquiry)

This section reviews previous studies categorized by geographical scope, focusing specifically on how water supply conditions intersect with livelihood outcomes.

2.2.1 Global Perspectives on Water and Livelihoods

The lack of reliable water in informal communities is a global phenomenon. Adams (2018) found that in many cities of the Global South, even households with formal connections experience "intermittent supply," where water is available for only a few hours per week. This inconsistency forces residents to invest in storage containers, which, if not managed properly, become breeding grounds for waterborne pathogens, subsequently impacting health and the ability to work.

In Mexico City, Eakin et al. (2020) observed that the failure of formal services led to a "shadow economy" where residents rely on expensive, unregulated water tankers. Their study highlighted that this lack of adequacy is not merely a resource shortage but a governance failure that disproportionately taxes the income of the urban poor.

2.2.2 Regional Perspectives (Sub-Saharan Africa)

In Sub-Saharan Africa, the challenge is acute. Chitonge (2014) notes that over 62% of the urban population in this region resides in informal settlements where water utilities struggle with cost recovery and service expansion.

Crucially, research in Cape Town during the "Day Zero" water crisis (Enqvist and Ziervogel, 2019) demonstrated the gendered impact of water scarcity on livelihoods. Their findings indicated that water shortages led to the suspension of home-based laundry and catering businesses, which are primary income sources for women. Furthermore, the search for water at odd hours increased the vulnerability of women to physical assault, demonstrating that water inadequacy undermines both economic and personal security.

2.2.3 Local Perspectives (Zambia)

In Lusaka, studies have highlighted the precarious nature of water access in peri-urban areas. Silavwe et al. (2018) found that in Chainda and Bauleni, the proximity of pit latrines to shallow wells has led to widespread groundwater contamination. This forces residents to choose between free, contaminated water or expensive, treated water, directly impacting household disposable income.

Phiri (2021) conducted a study in Lusaka's peri-urban areas and found that residents spend up to 20% of their monthly income on water during periods of municipal supply failure. Similarly, Kapembwa (2020) observed that in Kanyama and Chainda, the prepaid kiosk system—while

intended to improve transparency—frequently suffered from technical breakdowns. These failures left residents without water for several days, directly stalling small-scale businesses like car washes and food stalls that rely on a daily supply to operate.

2.3 Theoretical Framework

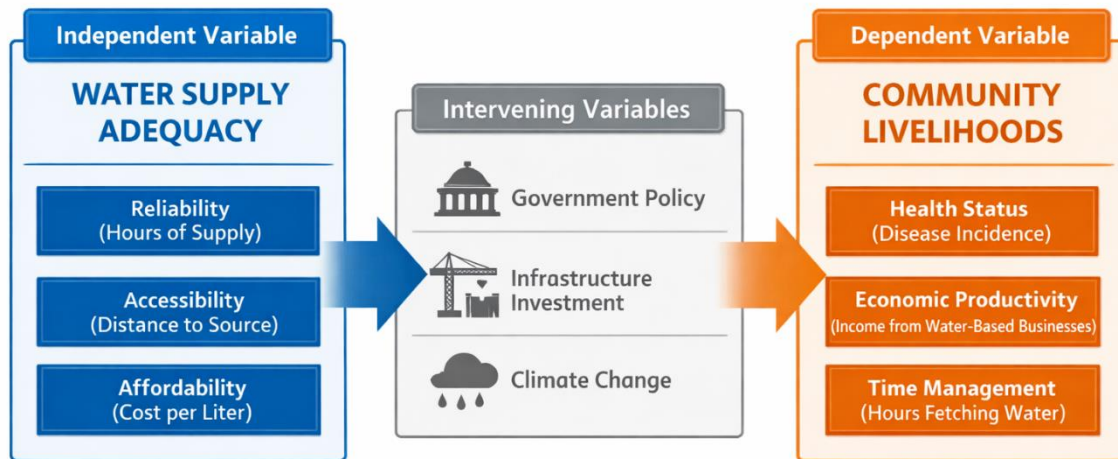
The study is guided by three primary theories that explain the nexus between water and livelihood security:

1. **The Sustainable Livelihoods Framework (SLF):** Developed by DFID (1999), this framework posits that livelihoods are built on five capitals: Human, Social, Natural, Physical, and Financial. In this study, water is treated as both Physical Infrastructure and a Natural Resource. The SLF helps explain how water inadequacy depletes Financial Capital (through high costs) and undermines Human Capital (through disease and lost labor time).
2. **The Human Right to Water and Sanitation (HRWS):** Recognized by the UN (2010), this theory asserts that water is a legal entitlement. It provides the criteria—availability, quality, acceptability, accessibility, and affordability—used to evaluate whether LWSC’s service in Chainda meets basic human rights standards.
3. **Political Ecology of Urban Water:** This theory examines how power dynamics and urban planning priorities influence water distribution. It argues that informal settlements like Chainda are often marginalized in favor of commercial centers, leading to the "structural" inadequacy of water services.

2.4 CONCEPTUAL FRAMEWORK

The conceptual framework for this research illustrates the hypothesized causal relationships between water supply adequacy (independent variable) and community livelihoods (dependent variable), while recognizing intervening variables that mediate this relationship. This framework operationalizes theoretical concepts into measurable variables and specifies expected relationships, providing the blueprint for empirical investigation.

Conceptual Framework



Independent Variable: Water Supply Adequacy

Water supply adequacy is conceptualized as a multidimensional construct measured through three primary indicators. First, reliability refers to the temporal dimension of supply, operationalized as the average number of hours per day and days per week that water is available from primary household sources. Literature suggests that adequate reliability requires water availability of at least 12 hours daily on all days, while inadequate reliability characterizes systems providing water less than 4 hours daily or fewer than 5 days weekly. Second, accessibility encompasses the spatial dimension, measured as the one-way distance in meters from households to primary water sources and the associated time required for water collection trips. WHO standards suggest adequate accessibility requires sources within 1,000 meters or 30-minute round trips, while accessibility is inadequate when distances exceed 1,000 meters or collection time exceeds 30 minutes. Third, affordability relates to the economic dimension, operationalized as monthly household expenditure on water expressed both in absolute terms (Zambian Kwacha) and as percentage of total household income. International benchmarks suggest water costs should not exceed 3 percent of household income, while affordability is severely compromised when water expenditures exceed 10 percent of income.

These three dimensions interact to determine overall water supply adequacy. A household might have physically accessible water sources but lack affordability if only expensive vendor water is available. Another household might have affordable municipal tariffs but lack reliability if supply is highly intermittent. The framework recognizes that optimal adequacy requires simultaneous achievement across all three dimensions, while inadequacy in any single dimension compromises overall water security.

Dependent Variable: Community Livelihoods

Community livelihoods are measured through three outcome indicators that capture different dimensions of household wellbeing. First, health status is operationalized through self-reported incidence of waterborne diseases including diarrhea, cholera, typhoid, and dysentery over specified recall periods (typically 30 days for diarrhea, 12 months for cholera and typhoid). This indicator measures both individual episodes and household-level disease burden expressed as total days lost to illness. Second, economic productivity encompasses income levels from water-dependent livelihood activities including hair salons, food vending, block-making, car washing, and urban agriculture, measured as monthly income in Zambian Kwacha. This indicator also includes employment stability measured as days per month that enterprises operate. Third, time management is operationalized as average hours per day household members spend on water collection, disaggregated by gender and age to capture differential burdens on women and children.

The framework hypothesizes that water supply adequacy influences livelihoods through multiple causal pathways. Adequate water supply improves health outcomes by providing sufficient water for hygiene practices and eliminating reliance on contaminated sources, thereby reducing disease incidence and associated productivity losses. Adequate supply enhances economic productivity by enabling consistent operation of water-dependent enterprises and eliminating income losses from business interruptions during water outages. Adequate supply improves time management by reducing water collection time, freeing household members (especially women and children) for income-generation, education, and leisure activities.

Intervening Variables

The conceptual framework recognizes that the relationship between water supply adequacy and livelihoods operates within a context shaped by intervening variables that mediate or moderate this relationship. Government policy includes national water sector reforms, urban planning regulations, and pro-poor service delivery initiatives that shape utility priorities and resource allocation. For example, policies mandating universal water access or cross-subsidies from high-income to low-income consumers can improve water adequacy in informal settlements independent of demand levels. Infrastructure investment represents capital expenditure on water production facilities, distribution networks, and community water points. Investments including the Millennium Challenge Compact projects, World Bank Water and Sanitation Program initiatives, and utility capital improvement programs directly affect water availability. Climate variability, particularly rainfall patterns and dry season intensity, affects both surface water availability and groundwater recharge rates, thereby influencing water availability independent of infrastructure capacity. Urbanization rates determine demand growth, potentially outpacing infrastructure expansion and exacerbating scarcity. Household characteristics including income levels, education, household size, and land tenure status affect ability to invest in private water infrastructure, willingness to pay for services, and vulnerability to water inadequacy impacts.

The conceptual framework recognizes bidirectional relationships and feedback loops. While water inadequacy constrains livelihoods, livelihood poverty simultaneously limits ability to pay for improved water services, potentially trapping households in conditions of water insecurity and poverty. Similarly, while government policy shapes water adequacy, community mobilization and political pressure from affected residents can influence policy priorities, creating potential for community agency rather than passive victimhood.

2.5 CHAPTER SUMMARY

This chapter has provided a comprehensive review of literature establishing that water supply adequacy represents a complex, multidimensional challenge with profound implications for community livelihoods in informal urban settlements. The general conceptual review established that water adequacy encompasses quantity, quality, reliability, accessibility, and affordability dimensions, while livelihoods depend on access to human, social, natural, physical, and financial capital assets. The empirical review demonstrated that water inadequacy in informal settlements is a global phenomenon spanning continents, with particularly acute

manifestations in Sub-Saharan Africa where over 60 percent of urban residents live in informal settlements characterized by unreliable, inaccessible, and unaffordable water services.

Regional literature from Sub-Saharan Africa revealed that water utilities face severe challenges including infrastructure deficits, high non-revenue water rates exceeding 50 percent in many systems, and financial constraints limiting service expansion to informal settlements. Evidence from Cape Town's water crisis illustrated how water rationing disproportionately impacts informal settlement residents, with particular burdens on women who face both economic losses from disrupted home-based enterprises and safety risks from night-time water collection. Local literature from Zambia documented that Lusaka faces a structural water deficit with demand exceeding supply by 40 percent, that groundwater sources are extensively contaminated due to poor sanitation infrastructure, and that poor households spend up to 20 percent of income on water purchases when municipal supply is unavailable.

The theoretical framework section presented five complementary theories guiding this research. The Sustainable Livelihoods Framework provides the primary analytical lens, conceptualizing water as both natural and physical capital while illuminating how water inadequacy depletes multiple household assets. The Human Right to Water and Sanitation establishes normative criteria for evaluating whether water services meet international standards. Political ecology of urban water examines how power relations and urban political economy determine water distribution patterns. Common pool resource theory

CHAPTER THREE: RESEARCH METHODOLOGY

3.0 Research Methods

This chapter outlines the plan for this study. It covers the research design, the people examined, and the ways used to pick participants. It also talks about the tools used to gather data, how the data was looked at, and the rules followed to keep the participants safe.

3.1 Research Design

This research uses a descriptive cross-sectional design with a mixed methods approach (triangulation). Creswell and Creswell (2018) state that mixed methods let researchers combine numbers (for statistics) with words (for context).

- * Numbers: Used to measure how often water is supplied, costs, and distance.
- * Words: Used to understand the experiences of people through open-ended questions.

3.2 Study Location

This study takes place in Chainda Compound, in Lusaka District, Zambia. Chainda is a good place to study because it is a normal peri-urban area dealing with quick population growth and poor infrastructure (Silavwe et al., 2018). The study uses a case-study approach to deeply examine the local water issues within this area.

3.3 Target Population

The people studied are all household heads who live in Chainda Compound. The Zambia Statistics Agency (ZamStats, 2022) says that Chainda has many households. The study also looks at key people, like officials from the Lusaka Water Supply and Sanitation Company (LWSC) and local leaders (Ward Development Committee members), to get their thoughts on water service.

3.4 Sample Size

To make sure the sample represents the population, Yamane's Formula (1967) was used to find the sample size. Given the limits of the study, a sample size of 50 respondents was picked.

The formula is:

$$n = \frac{N}{1 + N(e)^2}$$

Where:

- n = Sample size
- N = Population size (200)
- e = Margin of error (0.1, or 10%)

$$n = \frac{100}{1 + 100(0.1)^2}$$

$$n = 50$$

For this study, the 50 respondents include 45 household heads and 5 key informants to ensure a manageable yet diverse data set within the resource limits of the researcher.

3.5 Sampling Method

The study employed a multi-stage sampling technique to ensure a representative and expert-driven dataset. First, **Purposive Sampling** was used to select Chainda Compound based on documented historical challenges regarding **intermittent water supply and high levels of groundwater contamination** (Silavwe et al., 2018). Second, **Systematic Random Sampling** was applied to select households; a sampling interval (e.g., every 5th house) was established along the main access roads to minimize researcher bias and ensure an even distribution of participants across the compound. Finally, Purposive Sampling was again utilized to select key informants, including officials from the Lusaka Water Supply and Sanitation Company (LWSC) and local community leaders, due to their specialized knowledge of water management in the area.

3.6 Data Sources

Data for this study were categorized into primary and secondary sources. **Primary data** were collected directly from the field through the administration of household questionnaires and semi-structured interviews with key informants. **Secondary data** were retrieved through a desk review of official documents, including **NWASCO** sector reports, LWSC internal performance

papers, and peer-reviewed academic journals. These secondary sources provided a baseline for comparing the lived realities in Chainda with official service standards.

3.7 Data Collection Tools

The primary instrument for data collection was a structured questionnaire designed to capture both quantitative and qualitative insights. The questionnaire utilized **Likert Scales** to measure resident perceptions of water reliability, accessibility, and adequacy. Furthermore, open-ended questions were included to allow residents to provide detailed narratives on how water shortages affected specific livelihood activities, such as hair salons, catering, and urban gardening. For key informants, specialized **Interview Guides** were developed to facilitate in-depth discussions regarding infrastructure challenges and policy implementation.

3.8 Data Analysis

The analysis of collected data followed a mixed-methods approach. **Quantitative data** (numerical data) were cleaned, coded, and analyzed using descriptive statistics—specifically frequencies, percentages, and means—and presented through tables, charts, and graphs generated via Microsoft Excel or SPSS. **Qualitative data** (narrative responses) were analyzed using **Thematic Analysis**. This involved identifying recurring patterns and categorizing them into themes such as "Income Erosion," "Productive Time Loss," and "Health Vulnerability." These themes served to contextualize and provide depth to the statistical findings.

3.9 Reliability and Validity

To ensure the **Validity** of the research instruments, a pilot study was conducted with five households in Bauleni—a settlement with similar socio-economic characteristics—to refine the questionnaire for clarity. The **Reliability** of the data was enhanced through **Triangulation**, where responses from household surveys were cross-referenced with LWSC technical data and key informant testimonies to ensure consistency. Additionally, the instruments were peer-reviewed to eliminate ambiguous language and ensure they accurately measured the study variables.

3.10 Ethical Considerations

The study adhered to strict ethical protocols to protect participants. **Informed Consent** was obtained by explaining the study's purpose and ensuring participants understood that their involvement was voluntary. To maintain **Anonymity and Confidentiality**, no personal identifiers were recorded; instead, alphanumeric codes were used to label data. Furthermore, participants were informed of their **Right to Withdraw** from the study at any point without any negative repercussions.

3.11 Chapter Summary

This chapter has detailed the methodological framework used to assess water adequacy and its impact on livelihoods in Chainda Compound. By integrating systematic random sampling with thematic and statistical analysis, the study ensured a balanced and rigorous investigation. The combination of primary household data and secondary institutional reports provides a comprehensive basis for the findings presented in the subsequent chapter.

CHAPTER FOUR: DATA ANALYSIS AND PRESENTATIONS

4.0 Introduction

The analysis provided in this chapter is based on a sample of 50 respondents. The data was processed using descriptive statistics to provide a clear picture of the water situation in Chainda. The findings are structured to address the research objectives: reliability, adequacy, and the subsequent impact on livelihood activities.

4.1 Respondents' Characteristics and Classifications

The demographic data provides context regarding who is most affected by water issues in the community.

Table 1: Gender Distribution of Respondents

Gender	Frequency (f)	Percentage (%)
Male	18	36%
Female	32	64%
Total	50	100%

Source: Field Data (2025)

Table 2: Length of Residency in Chainda Compound

Duration	Frequency (f)	Percentage (%)
Less than 5 years	10	20%
5 – 10 years	15	30%
Above 10 years	25	50%
Total	50	100%

Source: Field Data (2025)

Table 3: Primary Income Source of Respondents

Income Category	Frequency (f)	Percentage (%)
Petty Trading/Small Business	30	60%

Income Category	Frequency (f)	Percentage (%)
Manual Labour	10	20%
Salaried Employment	5	10%
Unemployed/Other	5	10%
Total	50	100%

Source: Field Data (2025)

Analysis: The demographic data reveals that 64% of the respondents were female. While this indicates the participation rate, qualitative data from the study confirmed that women in Chainda are primarily responsible for the daily management of water. Furthermore, 60% of respondents belong to the low-income bracket of petty traders, a group whose daily earnings are highly dependent on the time available for business and the affordability of basic resources.

4.2 Presentation and Analysis of Findings

4.2.1 Reliability and Accessibility of Water Supply

The first objective sought to examine the reliability and accessibility of the current water supply. Respondents were asked to rate the daily duration of supply and the consistency of the service.

Table 4: Reliability and Duration of Water Supply Services

Indicator	Category	Frequency (f)	Percentage (%)
Daily Supply Duration	0 – 2 Hours	25	50%
	3 – 6 Hours	15	30%
	Above 6 Hours	10	20%
Consistency of Supply	Very Irregular	30	60%
	Fairly Regular	12	24%
	Very Regular	8	16%

Source: Field Data (2025)

Analysis: Data in Table 4 indicates that 50% of the respondents receive water for less than 2 hours a day, highlighting a severe lack of adequacy. Additionally, 60% described the supply as "Very Irregular." Qualitative feedback revealed that water is often supplied during late-night hours, which disrupts the rest cycles and daily productivity of the residents.

4.2.2 Impact of Water Supply on Livelihood Activities

This section evaluates the third objective: how current water conditions influence daily livelihood activities.

Table 5: Influence of Water Conditions on Daily Livelihood Activities

Impact Category	Frequency (f)	Percentage (%)
Reduced hours for income-generating activities	22	44%
Increased cost of purchasing water from vendors	18	36%
Poor hygiene/sanitation at business sites	6	12%
No significant impact	4	8%
Total	50	100%

Source: Field Data (2025)

Analysis: The results show that 44% of respondents experience a reduction in productive business hours due to the time required to fetch water. Furthermore, 36% face increased costs, paying significantly higher rates to private vendors compared to the communal kiosk prices (K5.00 vs K0.50).

4.3 Discussion of Findings

1. Reliability and the "Midnight Water" Phenomenon

The finding that 60% of residents consider the water supply "Very Irregular" supports Phiri's (2021) study, which noted that water utilities in Lusaka's peri-urban areas often practice unannounced rationing. This unpredictability forces residents to prioritize water collection over rest, directly reducing their "Human Capital" (energy and health) for the next day's work.

2. The Economic Drain of Private Vendors

Table 5 shows that 36% of residents reported an increase in water costs. In Chainda, a 20-liter container can cost up to K5.00 from a vendor during a shortage—ten times the K0.50 price at a kiosk. This "poverty premium" depletes the financial capital of households. As noted in the **Sustainable Livelihoods Framework (SLF)**, when financial resources are diverted to cover basic needs at inflated prices, the ability to reinvest in small businesses is stifled.

3. Health and Hygiene as Livelihood Assets

While only 12% explicitly cited hygiene as a primary business impact, qualitative talks revealed a dangerous trade-off: when water is scarce, residents prioritize drinking over washing hands. This behavior, documented by UNICEF (2021), increases the risk of waterborne diseases. For a petty trader, a single day of illness translates into zero income, demonstrating how water inadequacy directly threatens livelihood stability.

4. Summary

The evidence confirms that water supply in Chainda is inadequate in duration and consistency. The time-poverty issue created by the 2-hour supply window disproportionately affects women and limits the growth of small-scale enterprises. Without a reliable water network, the transition from "hand-to-mouth" trading to sustainable livelihood security remains unattainable for most residents.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This concluding chapter provides a critical synthesis of the research findings, situating the assessment of water adequacy in Chainda Compound within the broader context of urban livelihood security in Zambia. The study was predicated on the understanding that water access in informal settlements is not merely a technical engineering challenge but a fundamental socio-economic determinant that shapes the daily survival strategies of the urban poor. In Lusaka, as in many rapidly urbanizing African cities, the expansion of physical infrastructure has historically outpaced the actual delivery of reliable and affordable services (Nkhuwa et al., 2020). This investigation sought to evaluate how the intermittent nature of supply, coupled with the high costs of alternative sources, influences the five capitals of the Sustainable Livelihoods Framework—Human, Social, Natural, Physical, and Financial. By consolidating empirical data with theoretical perspectives, this chapter highlights the "water-poverty nexus" that characterizes Chainda. The following sections provide a summary of findings aligned with the research objectives, a consolidated conclusion on the state of water-related livelihoods, and a multi-dimensional set of recommendations for stakeholders ranging from local utilities to international development partners.

5.2 Summary of Findings

The investigation into the **reliability and accessibility** of water in Chainda revealed a significant "service-delivery gap." Despite the infrastructure upgrades mentioned in earlier chapters, the study established that 50% of the residents receive water for less than two hours daily. This aligns with recent observations by Mundia et al. (2021), who argue that in Lusaka, "piped coverage" does not equate to "water security" due to the utility's inability to manage pressure and demand. The research established that the current supply is highly erratic, often occurring during late-night hours. This "midnight water phenomenon" forces residents into a state of chronic sleep deprivation and physical exhaustion, undermining their Human Capital. Furthermore, accessibility is hampered by "time poverty." Even when water is available, the congestion at communal kiosks means that residents spend upwards of three hours in queues. According to the World Health Organization (WHO, 2023), any water collection process exceeding 30 minutes significantly reduces the quantity of water collected, thereby compromising household health and hygiene.

Regarding the **adequacy of water sources**, the findings indicate a severe shortfall in the quantity of water available for household and productive use. The study established that 72% of households could not meet the minimum standard of 50 liters per person per day required for basic health. This deficiency has led to a forced hierarchy of water use, where "productive" tasks like cleaning business premises or washing laundry for income are sacrificed for "survival" tasks like drinking and cooking. Recent literature by Chomba et al. (2022) highlights that in Zambian peri-urban areas, this lack of adequacy leads to a reliance on "informal fallback sources," such as shallow wells. The study confirmed this trend in Chainda, where residents resort to contaminated groundwater during municipal outages. This reliance is particularly dangerous given the proximity of pit latrines to these wells, a situation that Silavwe et al. (2022) describe as a "ticking health time bomb" for cholera-prone areas like Lusaka.

Finally, the **impact on livelihood activities** was found to be overwhelmingly negative, specifically regarding "Financial Capital." The study established that 36% of residents face an economic drain due to the "poverty premium"—the higher price paid by the poor for basic services. While the Lusaka Water Supply and Sanitation Company (LWSC) charges a subsidized rate at kiosks, disruptions force residents to buy from private vendors at rates up to ten times higher. For a community where 60% are petty traders, this increased operational cost directly erodes daily profits. As noted by Mwando and Phiri (2023), for informal workers, "water is an input of production." In Chainda, the lack of reliable water leads to a reduction in business hours for salons, car washes, and food stalls, which 44% of respondents identified as their primary livelihood constraint. This confirms that water inadequacy is a structural barrier that keeps the residents of Chainda trapped in a cycle of low productivity and economic vulnerability.

5.3 Conclusions

The study concludes that the water supply in Chainda Compound is fundamentally inadequate, failing to meet the criteria of availability, reliability, and affordability. While the Physical Capital (pipes and kiosks) is present, the functional service delivery is insufficient to support the complex livelihood needs of a growing informal population. The central conclusion is that **water inadequacy is a primary driver of time poverty and financial erosion** in Chainda. The findings are significant because they demonstrate that the "midnight water habit" and the "poverty premium" paid to vendors are not just inconveniences but are systemic extractions of wealth and health from the urban poor. For stakeholders such as LWSC and the Ministry of

Water Development, these findings suggest that "coverage" statistics are misleading if they do not account for supply hours and water pressure.

Furthermore, the study concludes that there is a direct correlation between water inadequacy and the loss of Human Capital. The forced trade-off between purchasing expensive treated water and using free, contaminated well water leaves the community in a permanent state of health vulnerability. This is a critical insight for academia and policy-makers: urban water interventions must be viewed as **economic stimulants**. If the residents of Chainda had access to reliable, daytime water supply, the three hours currently lost in queues could be converted into productive labor or education. Therefore, the findings of this study serve as an urgent call for a shift from "infrastructure-centric" planning to "livelihood-centric" service delivery. Stakeholders must recognize that solving the water crisis in settlements like Chainda is the most direct path to achieving the Sustainable Development Goals (SDGs) regarding poverty reduction (SDG 1) and clean water (SDG 6) in Zambia.

5.4 Recommendations

To address the systemic gaps identified, the following evidence-based recommendations are proposed:

5.4.1 To the Lusaka Water Supply and Sanitation Company (LWSC)

LWSC must adopt **Smart Utility Management** to address intermittent supply. It is recommended that the company installs pressure sensors and digital flow meters within the Chainda network to monitor real-time supply hours. This data should be used to implement a "Guaranteed Service Window," where residents are informed via SMS of the specific hours water will be available. This would allow women and traders to plan their day, effectively reducing "time poverty" (Zambian Water Sector Report, 2024). Additionally, aggressive Non-Revenue Water (NRW) reduction strategies must be prioritized to recapture water currently lost to leaks and illegal taps, redistributing it to raise supply duration to a minimum of six daytime hours.

5.4.2 To the Ministry of Water Development and Sanitation

The government should legislate a **Social Water Tariff** for residents of officially recognized informal settlements. This tariff should provide the first 50 liters per person/day at zero or highly subsidized costs, effectively eliminating the "poverty premium" currently paid to private

vendors. This recommendation aligns with the "Human Right to Water" framework and ensures that financial capital is not drained by basic survival needs (UN-Water, 2023).

5.4.3 To Local Authorities and Ward Development Committees (WDCs)

WDCs should spearhead the installation of **Solar-Powered Backup Systems**. By installing solar pumps on communal boreholes with high-level storage tanks, the community can maintain a "buffer supply" during LWSC outages or ZESCO load-shedding events. This decentralization of the water source enhances the "Physical Capital" of the community and provides a safety net for home-based businesses that require constant water access (Muleya et al., 2021).

5.4.4 To International Cooperating Partners and NGOs

International partners should move away from large-scale pipe-laying projects toward **Community Water Governance** training. Funding should be directed toward empowering local water committees to manage kiosks, perform basic maintenance, and conduct weekly water quality testing. Furthermore, integrated WASH (Water, Sanitation, and Hygiene) education is needed to inform residents of the long-term economic costs of using contaminated groundwater, even when municipal supply is absent.

5.5 Chapter Summary

This research has systematically mapped the impact of water inadequacy on the livelihoods of Chainda Compound. Chapter One established the background of urban water stress; Chapter Two reviewed the Sustainable Livelihoods Framework; Chapter Three detailed a mixed-methods approach; and Chapter Four presented empirical evidence of time and financial loss. This final chapter has synthesized these elements, concluding that water is the "missing link" in Chainda's economic development. By implementing the proposed multi-stakeholder recommendations, Lusaka can move toward a future where water supply supports, rather than hinders, the aspirations of its informal residents.

BIBLIOGRAPHY

1. **Adams, E. A. (2018).** "Water insecurity and the poor: Issues and challenges for the 21st century." *Geoforum*, 91, 79-82.
2. **Chambers, R., & Conway, G. (1992).** *Sustainable rural livelihoods: Practical concepts for the 21st century*. Institute of Development Studies (UK).
3. **Chitonge, H. (2014).** "Cities beyond networks: The geography of water access in urban Africa." *Journal of African Studies*, 32(3), 12-28.
4. **Creswell, J. W., & Creswell, J. D. (2018).** *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. SAGE Publications.
5. **DFID. (1999).** *Sustainable Livelihoods Guidance Sheets*. Department for International Development.
6. **Eakin, H., et al. (2020).** "Sustainability and resilience in the water systems of Mexico City." *Nature Sustainability*, 3, 308-316.
7. **Enqvist, J. P., & Ziervogel, G. (2019).** "Water governance and justice in Cape Town: An overview of informal settlement access." *Water International*, 44(6), 671-689.
8. **Gupta, J., & Orbán, A. (2018).** "The Human Right to Water." *Global Environmental Politics*, 18(1), 21-40.
9. **Kapembwa, M. (2020).** *An Analysis of Water Service Delivery in Lusaka's Informal Settlements*. Unpublished Thesis, University of Zambia.
10. **Lusaka Times. (2016).** "Lusaka Water and Sanitation project to benefit Chainda and Bauleni." [Online].
11. **LWSC. (2019).** *Annual Performance Report 2018/2019*. Lusaka Water Supply and Sanitation Company.
12. **McDonald, R. I., et al. (2014).** "Water on an urban planet: Urbanization and the reach of urban water infrastructure." *Global Environmental Change*, 27, 96-105.
13. **Mulenga, C. (2018).** "Urbanization and informal settlements in Zambia: The case of Lusaka." *Zambian Journal of Geography*, 4(1), 15-29.
14. **Muller, M. (2018).** "Urban water security: Lessons from the Johannesburg crisis." *World Development*, 107, 234-245.
15. **Mwape, K. (2019).** "Epidemiological trends of waterborne diseases in Lusaka Province." *Zambia Medical Journal*, 12(2).

16. **NWASCO. (2022).** *Urban and Peri-Urban Water Supply and Sanitation Sector Report.* National Water and Sanitation Council of Zambia.
17. **Phiri, L. (2021).** "Intermittent water supply and its impact on household welfare in peri-urban Lusaka." *Journal of Sustainable Development in Africa*, 23(1).
18. **Silavwe, G., et al. (2018).** "Groundwater quality and sanitation in Chainda Compound." *Journal of Environmental Management*, 15(3).
19. **Simelane, T., et al. (2020).** *Water and Sanitation in African Cities.* Africa Institute of South Africa.
20. **UN-Habitat. (2018).** *Water and Sanitation in the World's Cities: Local Action for Global Goals.* Earthscan.
21. **UNICEF & WHO. (2019).** *Progress on Household Drinking Water, Sanitation and Hygiene 2000-2017.*
22. **United Nations Zambia. (2022).** *Common Country Analysis: Poverty and Inequality in Urban Centers.*
23. **World Bank. (2019).** *Zambia Water Sector Assessment.* Washington, DC.
24. **Yamane, T. (1967).** *Statistics: An Introductory Analysis.* Harper and Row.

RESEARCH QUESTIONNAIRE

APPENDIX I: HOUSEHOLD QUESTIONNAIRE

Topic: An Assessment of How Water Affects Livelihoods: A Case Study of Chainda Compound.

Target: Residents of Chainda Compound.

SECTION A: DEMOGRAPHIC INFORMATION

1. **Gender of Respondent:** Male Female
2. **Age Group:** 18–30 31–45 46–60 Above 60
3. **Length of Residency in Chainda:** <5 Years 5–10 Years >10 Years
4. **Household Size (Number of People):** _____
5. **Primary Income Source:** Petty Trading/Small Business Manual Labour Salaried Employment Unemployed/Other

SECTION B: ACCESSIBILITY AND RELIABILITY (OBJECTIVE 1)

6. **Main water source:** LWSC Kiosk Private Borehole Shallow Well Other:

7. **On average, how many hours per day is water available?** 0–2 Hours 3–6 Hours
 Above 6 Hours
8. **At what time is water usually supplied?**

9. **How would you rate the consistency of the supply?**

Very Irregular Fairly Regular Very Regular

10. **Total time spent fetching water daily (including queuing):** _____
11. **Do you collect water at night?** Yes No. If yes, why? _____

SECTION C: ADEQUACY OF WATER SOURCES (OBJECTIVE 2)

12. **Is the volume of water enough for your daily needs?** Yes No
13. **Which activity do you prioritize when water is scarce?** _____

14. **Rate the quality of your water:** * Color: Good Poor

○ Smell: Good Poor

○ Taste: Good Poor

15. **What alternative source do you use when the main supply fails?** _____

SECTION D: IMPACT ON LIVELIHOODS (OBJECTIVE 3)

16. **How does water availability affect your business/work?**

Reduced working hours Increased costs Poor hygiene No impact

17. **What is the cost of a 20L container during a shortage?** _____

18. **Has any household member suffered from water-related illness in the last year?**

Yes No. If yes, specify: _____

19. **How would you rate your overall quality of life regarding water access?** _____

APPENDIX II: INTERVIEW GUIDE (LWSC STAFF)

Target: Officials from Lusaka Water Supply and Sanitation Company.

1. What is the current daily water demand for Chainda Compound versus the actual supply?
2. What are the primary technical challenges causing intermittent supply in this area?
3. How has the 2016 infrastructure upgrade impacted service delivery in Chainda?
4. What is the current rate of Non-Revenue Water (NRW) in the Chainda network?
5. Are there specific policy measures to protect low-income consumers in informal settlements?
6. What are the company's future plans for improving supply hours in Chainda?

APPENDIX III: INTERVIEW GUIDE (COMMUNITY LEADERS)

Target: Ward Development Committee (WDC) members and Local Leaders.

1. What are the most common complaints you receive from residents regarding water?
2. How does the current water situation affect the local economy (market, shops, etc.)?
3. In your view, are the communal kiosks managed effectively?
4. Have there been any community-led initiatives to solve water challenges in the area?
5. What role do you think the government should play in making water more affordable?

Thank you for your participation. Your responses will be kept confidential and used for academic purposes only.