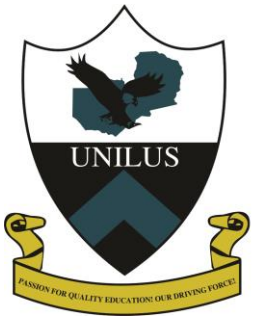

UNIVERSITY
OF
LUSAKA

ASSESSING THE EFFECTIVENESS OF WASTE MANAGEMENT UNITS GARBAGE COLLECTION SYSTEMS IN KABWATA CONSTITUENCY, LUSAKA CITY, ZAMBIA.

A DISSERTATION SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES, UNIVERSITY OF LUSAKA, IN PARTIAL FULFILMENT OF THE AWARD OF

MASTER OF SCIENCE IN ENVIRONMENTAL MANAGEMENT (MSCEM)

BY

CHISOMO CHONGO

MSCEM23119681

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SCHOOL OF POSTGRADUATE STUDIES

MASTER OF SCIENCE IN ENVIRONMENTAL MANAGEMENT (MSCEM)

I.DECLARATION

I, **Chisomo Chongo**, hereby declare that this dissertation, titled ***"Assessing the Effectiveness of Waste Management Units' Garbage Collection Systems in Kabwata Constituency, Lusaka City, Zambia,"*** is my original work and has not been submitted for a degree or any other academic qualification at any other institution of learning. I affirm that all sources consulted and cited in this dissertation are duly acknowledged All data collected and analyzed for the study were obtained ethically and in compliance with international research standards.

Name of student:: CHISOMO CHONGO

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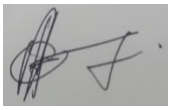
Dissertation title: ASSESSING THE EFFECTIVENESS OF WASTE MANAGEMENT UNITS GARBAGE COLLECTION SYSTEMS IN KABWATA CONSTITUENCY, LUSAKA CITY, ZAMBIA.

Signature of student: D**ate:**  Friday,17th January, 2025.

Name of Supervisor: PROFESSOR FELIX KALABA

Signature : Submitted to University Postgraduate office by Supervisor.

D**ate:** Thursday, 20th March, 2025.

II. DEDICATION

This dissertation is dedicated to my family, whose unwavering love, support, and encouragement have been a constant source of strength throughout this academic journey.

I also dedicate this work to the residents and communities of Kabwata Constituency, whose insights and experiences have been invaluable to the success of this research.

III. ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to all those who have contributed to the completion of this dissertation.

Firstly, I am grateful to my supervisor, Professor Felix Kalaba, for the invaluable topic inspiration during course work, guidance, continuous support, and constructive feedback through the research process.

I would also like to extend my heartfelt thanks to the participants in Kabwata Constituency, whose willingness to share their time, experiences, and insights made this study possible.

My sincere appreciation goes to the staff of the Lusaka City Council, the Waste Management Unit, Waste Management Unit franchisees and Architect Florence Chela, who facilitated access to data and provided logistical support during the research.

Finally, I am grateful to my friends and colleagues for their moral support, and to all those who have, in one way or another, contributed to the success of this work.

IV. TABLE OF CONTENTS

V. LIST OF TABLES

VI. LIST OF FIGURES

VII. LIST OF ACRONYMS

1. **SWM** - Solid Waste Management
2. **WMU** - Waste Management Unit
3. **WB** - World Bank
4. **UN** - United Nations
5. **EIA** - Environmental Impact Assessment
6. **EMP** - Environmental Management Plan
7. **PH** - Public Health
8. **EI** - Environmental Impact
9. **CS** - Community Satisfaction
10. **GIS** - Geographic Information System
11. **SDG** - Sustainable Development Goal
12. **ZEMA** - Zambia Environmental Management Agency
13. **LCC** - Lusaka City Council
14. **CBW** - Community-Based Waste (referring to management units or programs)
15. **NGO** - Non-Governmental Organization
16. **CBO** - Community-Based Organization
17. **PPP** - Public-Private Partnership
18. **MDG** - Millennium Development Goal
19. **WHO** - World Health Organization

VIII. SUBMISSION OF DISSERTATION FOR EXAMINATION

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SUBMISSION OF DISSERTATION FOR EXAMINATION

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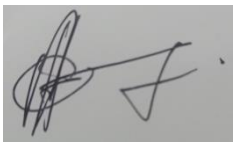
Signature of student: ……..... 

Date: Friday, 17th January, 2025.

Supervisor's Comments:

I recommend this dissertation for submission for examination.

Name of Supervisor: PROFESSOR FELIX KALABA

Signature of Supervisor: Submitted to University Postgraduate office by Supervisor.

Date: Monday, 21st January, 2025.

ABSTRACT

Globally, effective waste management is a cornerstone of sustainable urban development, mitigating public health risks and minimizing environmental degradation. However, many cities, especially in low- and middle-income countries, face persistent challenges in achieving efficient garbage collection systems .Effective waste management systems are critical for ensuring urban cleanliness, public health, and environmental sustainability. This study employs a structured qualitative case study design to assess the effectiveness of waste management units in delivering garbage collection services in Kabwata Constituency, Lusaka City, Zambia. The research focuses on evaluating operational efficiency, community satisfaction, environmental sustainability, and compliance with national waste management regulations. Data was gathered through semi-structured interviews with stakeholders, direct field observations, document reviews, and thematic analysis of responses from residents.

The findings reveal systemic inefficiencies within waste management units. Operational challenges include irregular garbage collection, reported by 60% of respondents, and limited service coverage, with under 75% of households availed services. Community dissatisfaction with inconsistent collection schedules and the lack of environmentally sustainable practices were prominent concerns. Additionally, the study highlights inconsistent adherence to national waste management policies, particularly in low-income areas. The study concludes that while waste management units fulfill a vital role, their effectiveness is hindered by logistical and structural barriers. Recommendations include enhancing operational capacity through investment in equipment, expanding service coverage to underserved areas, and promoting sustainable practices in waste management operations. This research contributes to a deeper understanding of the systemic challenges faced by urban waste management units and offers actionable recommendations to policymakers and stakeholders aiming to enhance service delivery and environmental outcomes in similar urban contexts.

Key Phrases: Effective waste management, Garbage collection systems, Operational efficiency, Environmental sustainability, Community satisfaction, Policy enforcement.

1.00 INTRODUCTION

Solid waste management is a growing global concern, with cities around the world facing mounting challenges in handling the vast quantities of waste generated by expanding populations and rapid urbanization. According to the World Bank, global waste is expected to increase by 70% by 2050 if current trends continue, with developing countries bearing the brunt of this crisis (Kaza.S, 2018). Inefficient waste management systems contribute to severe environmental degradation, public health risks, and economic burdens, particularly in urban areas where the infrastructure often struggles to keep pace with the demands of growing populations.

In many developing nations, including Zambia, the situation is exacerbated by limited resources, inadequate infrastructure, and a lack of public awareness about proper waste disposal practices. These issues are particularly pronounced in rapidly urbanizing areas, where the influx of people often outpaces the capacity of existing waste management systems (Bai.X, 2017). In Lusaka City, the capital of Zambia, the challenge of managing solid waste is particularly acute. The city's rapid urbanization, coupled with a growing population, has strained the capacity of municipal waste management systems, leading to problems such as illegal dumping, inefficient garbage collection, and insufficient coverage of waste collection services. Within Lusaka, the Kabwata Constituency exemplifies these challenges. As one of the city's densely populated areas, Kabwata faces significant obstacles in maintaining an effective waste management system. The increasing population and urbanization in the area have led to a higher generation of waste, putting pressure on the existing garbage collection systems. Consequently, assessing the effectiveness of these systems is crucial to improving waste management practices in Kabwata Constituency and ensuring the well-being of its residents.

By focusing on the efficiency, accessibility, community satisfaction, and environmental impact of these systems, the research seeks to provide a comprehensive understanding of their effectiveness. The findings of this study will not only offer insights into the current state of waste management in Kabwata but may also inform future strategies for improving solid waste management in other urban areas facing similar challenges.

1.1 Statement of the problem

Effective solid waste management is a critical component of urban sustainability and public health, yet many cities, particularly in developing countries, struggle to implement efficient waste management systems (Marshall. R.E, 2013). In Lusaka City, Zambia, the challenges of managing solid waste have become increasingly pronounced due to rapid urbanization and population growth. Kabwata Constituency, a densely populated area within Lusaka, is a microcosm of these broader issues. Residents in Kabwata Constituency have reported inconsistent and unreliable garbage collection services, resulting in illegal dumping and the accumulation of waste in public spaces (Daka.M, 2019). This not only poses significant health risks due to the proliferation of disease vectors but also degrades the urban environment, contributing to pollution and the obstruction of drainage systems (McMichael. A.J, 2000). Additionally, the lack of accessibility to proper waste disposal services disproportionately affects low-income households, aggravating social inequalities within the community.

Despite these challenges, there is limited research on the effectiveness of the current waste management systems in Kabwata Constituency. Without a thorough assessment, it is difficult to identify the specific weaknesses in these systems and to develop strategies for improvement. Therefore, this study seeks to address this gap by evaluating the effectiveness of the garbage collection systems operated by waste management units in Kabwata Constituency. The research focused on key aspects such as efficiency, accessibility, community satisfaction, and environmental impact, with the aim of providing actionable insights to enhance waste management practices in the area and the country as a whole.

1.2 Research Objectives

Primary Objective:

The objective was to assess the effectiveness of the garbage collection systems employed by waste management units in Kabwata Constituency, Lusaka City.

Specific Objectives:

1. To evaluate the efficiency of the waste collection schedules and coverage.

2. To assess the accessibility and availability of garbage collection services to residents.

3. To examine the level of community satisfaction with the current waste management services.

4. To investigate the immediate environmental impact of the existing garbage collection practices.

5. To identify challenges faced by waste management units in garbage collection.

1.3 Research Questions

1. How efficient are the current waste collection schedules and coverage in Kabwata Constituency?

2. Are garbage collection services accessible and available to all residents of Kabwata Constituency?

3. What is the level of community satisfaction with the garbage collection services provided?

4. What are the immediate environmental impacts of the existing waste management practices?

5. What challenges do waste management units face in executing their duties?

1.4 Significance of the Study

The study holds significant importance for several reasons, below are the most evidently fundamental:

1. Improvement of Public Health: This study aimed to identify gaps that contribute to the improper disposal of waste, which is linked to various public health risks. Addressing these issues can lead to better waste management practices that reduce the spread of diseases and improve overall community health.

2. Environmental Protection: This study provides insights into the environmental impact of current garbage collection practices in Kabwata, offering recommendations to mitigate pollution and promote sustainable waste disposal methods.

3. Enhanced Urban Sustainability: The findings of this study inform local authorities and policymakers on how to enhance the effectiveness of waste management systems, contributing to the broader goal of urban sustainability.

4. Policy Development and Implementation: The research findings provide valuable data for local government authorities and waste management units to develop more effective policies and strategies for waste collection and disposal.

5. Community Engagement and Satisfaction: This study highlights the community's perceptions and concerns, providing a basis for waste management units to make informed decisions that align with the needs and expectations of residents of Kabwata Constituency.

6. Economic Efficiency: By identifying inefficiencies within the current garbage collection systems, the study will lead to cost-saving measures and more efficient use of resources.

7. Contribution to Academic Knowledge: There is limited research on the effectiveness of waste management systems in Zambia, particularly in the context of rapidly urbanizing areas like Kabwata Constituency. This study has contributed to the body of academic knowledge on waste management in developing countries, providing a case study that can be referenced in future or continued research.

8. Replicability in Other Urban Areas: The findings and recommendations from this study serve as a model for other urban areas in Zambia and similar contexts internationally facing challenges in waste management.

1.5 Scope of the study

The scope of this study on the effectiveness of garbage collection systems in Kabwata Constituency, Lusaka City, Zambia, is defined by several key dimensions, the said being:

1. Geographical Scope: The study was conducted within the boundaries of Kabwata Constituency, an urban area in Lusaka City, Zambia. This constituency is currently characterized by a diverse population, including residential, commercial, and informal settlements, all of which were considered in the study and provided a comprehensive assessment of waste management practices.

2. Content Scope: The research focused on assessing the effectiveness of the garbage collection systems operated by waste management units within Kabwata.

3. Temporal Scope: The study covered a specific period, typically focusing on the most recent two to three years of waste management operations within Kabwata Constituency.

4. Methodological Scope: Key stakeholders included in the study consisted of residents of Kabwata Constituency, representatives from Waste Management Units, local government officials, and environmental experts.

5. Limitations: The study was limited to the garbage collection systems within Kabwata Constituency and not extend to other aspects of waste management, such as waste reduction, recycling, or disposal methods outside of collection.

1.6 Definition of key terms and concepts

Solid Waste:

Refers to any garbage, refuse, or discarded materials, including residential, commercial, and industrial waste, that are generated by human activities and are typically non-liquid in form.

Waste Management:

The process of collecting, transporting, treating, and disposing of solid waste in a manner that minimizes its impact on the environment and public health.

Garbage Collection System:

A structured process or system for gathering and transporting solid waste from its source (e.g., households, businesses) to a designated disposal or treatment site.

Waste Management Units:

Organizations, whether governmental, private, or community-based, that are responsible for the operation and management of waste collection, transportation, and disposal services.

Urbanization:

The process by which rural areas become urban, characterized by an increase in population density and infrastructure development.

Public Health:

The science and practice of protecting and improving the health of communities through preventive measures, health education, disease control, and health policy.

Environmental Impact:

The effect that human activities, including waste generation and disposal, have on the natural environment.

Community Satisfaction:

The level of contentment or approval expressed by residents regarding the services they receive, in this context, specifically related to garbage collection.

Efficiency:

The degree to which a process or system operates with minimal waste, effort, or resources while achieving the desired outcome.

Accessibility:

The ease with which residents can access waste collection services, including the availability of service to all areas within a community, particularly marginalized or low-income areas.

1.5 Organization of the Report

Below is an outline of how the report has been structured:

1.5.1 Preliminary Sections

i. Declaration

Statement by the author confirming that the work is original, has not been submitted elsewhere for a degree, and complies with institutional research ethics.

iii. Dedication

The author dedicates the dissertation to individuals and groups that hold significance to the success of the research.

iv. Acknowledgements

Gratitude is expressed to those who contributed to the adequate completion of the dissertation.

v. Table of Contents

A comprehensive list of all chapters, sections, and subsections in the dissertation.

vi. List of Tables

A numbered list of all tables used in the thesis, with titles and page references.

vii. List of Figures

Figures (e.g., graphs, charts, maps) used in the thesis, with titles and page references are listed in this section.

viii. List of Acronyms

All abbreviations and acronyms used in the dissertation.

ix. Abstract

An abridged summary of the thesis.

1.5.2 Main Body

1. Introduction

- Background of the study
- Research problem and rationale
- Objectives and research questions/hypotheses
- Significance of the study
- Scope and limitations

2. Literature Review - Theoretical, Empirical, and Conceptual Framework

- Review of relevant theories and concepts
- Analysis of empirical studies and existing research
- Presentation of the conceptual framework guiding the study

3. Methodology

- Research design and approach
- Study area and population
- Sampling techniques and sample size
- Data collection methods (e.g., interviews, surveys)
- Data analysis techniques
- Ethical considerations

4. Data Presentation and Analysis

- Organized presentation of findings (e.g., tables, graphs)
- Analysis of data in relation to research questions or hypotheses

5. Discussion of Results and Findings/Interpretation of Results

- Critical interpretation of the findings
- Comparison with previous studies
- Insights into how the results address the research problem

6. Conclusion: Summary

- Recap of the research objectives and key findings
- Reflection on the implications of the study
- Closing remarks tying the study together

7. Recommendations

- Actionable suggestions based on the findings
- Areas for policy, practice, or further research

1.5.3 Supplementary Sections

8. References and Bibliography

- Complete and properly formatted list of all sources cited in the thesis.

9. Appendices

- Supplementary materials such as raw data, questionnaires, interview guides, or additional figures/tables

2.00 LITERATURE REVIEW

The literature review covered several key areas: global and local perspectives on waste management. The challenges, including best practices in urban waste management plus the specific context of waste management in Zambia were considered. This review provides a foundational understanding of the issues at hand and assists in framing the study's research questions and adopted research methodology.

2.1 Empirical Literature

Empirical literature provides evidence-based insights into waste management systems, drawn from real-world studies and data. Relevant empirical studies will focus on effectiveness, efficiency, accessibility, and community satisfaction in waste management systems. Below is a review of empirical studies pertinent to these aspects.

2.1.1. Global Perspectives on Waste Management:

Urban Waste Management Challenges:

Population Growth and Urbanization: Rapid urbanization and population growth in cities worldwide have significantly increased the volume of solid waste, leading to challenges in collection, disposal, and treatment of said waste (Hoornweg & Bhada-Tata, 2012). As much as increase in urban waste generation is directly proportional to urban population growth, a picture of insufficient active reduction of waste generation has been emerging.

Waste Composition and Management: The composition of urban waste has shifted towards more non-biodegradable and hazardous materials, necessitating advanced management strategies (Minghua, 2013). Consequently, Modern environmental challenges require substantially proactive and progressive solutions which are adaptive to ever increasing unequivocal climate change triggering anthropomorphic waste generating undertakings.

Technological and Policy Innovations: Various cities have adopted innovative technologies and policies to enhance waste management, including waste-to-energy technologies, recycling programs, and comprehensive waste management plans (Wilson et al., 2015).

Sustainability and Environmental Impact:

Environmental Effects of Poor Waste Management: Ineffective waste management can lead to environmental problems such as soil and water contamination, air pollution, and greenhouse gas emissions (Kaza et al., 2018).

Sustainable Waste Management Practices: Sustainable practices include reducing waste generation, increasing recycling and composting, and improving waste treatment processes (Bertolini & Gouveia, 2017).

2.1.2. Local Perspectives on Waste Management in Zambia:

Current Waste Management Practices:

Waste Collection and Disposal: In many Zambian cities, including Lusaka, waste management practices often face challenges such as inadequate infrastructure, limited resources, and informal waste collection practices (Masebo, 2015). The Lusaka City Council (LCC) indicates that the City of Lusaka generates approximately a million tons of waste annually and only about 30-40% of that is collected and taken to the dumpsite. When compared to waste management practices, successes and pitfalls in the region, the City of Lusaka has a waste management crisis. The City has one dumpsite which is basically a damaged site in need of re-engineering and redesign (Siame,2018).

Public Health and Environmental Concerns: Inefficient waste management in Zambia has been linked to public health issues and environmental degradation, with informal dumpsites and inadequate waste treatment facilities being common problems (Cheng & Lu, 2017).

Policy and Institutional Framework:

Government Policies: The Zambian government has developed policies and strategies for waste management, such as the National Environmental Policy and the Waste Management Strategy, but implementation challenges remain (Zambia Environmental Management Agency, 2019).

Role of Local Authorities and Private Sector: Local authorities and private waste management companies play crucial roles in waste collection and disposal, but coordination and resource constraints can limit effectiveness (Masebo, 2015).

2.1.3. Challenges and Best Practices in Urban Waste Management:

Efficiency and Accessibility:

Efficiency in Collection Systems: Effective garbage collection systems are characterized by regular schedules, adequate coverage, and efficient logistics (Pires et al., 2011). Challenges include overcoming logistical barriers and ensuring service in underserved areas.

Accessibility and Equity: Ensuring equitable access to waste management services is crucial, particularly in low-income and informal settlement areas. Strategies include community-based approaches and targeted interventions (Scheinberg et al., 2016).

Community Satisfaction and Engagement:

Community Involvement: Engaging communities in waste management decisions and practices can enhance satisfaction and compliance. Successful examples include participatory waste management programs and educational campaigns (Amoah et al., 2014).

Feedback Mechanisms: Implementing mechanisms for residents to provide feedback on waste management services can help address issues and improve service delivery (Rathi, 2006). Feedback mechanisms for residents receiving waste management services are essential for addressing service gaps and enhancing efficiency. These mechanisms, such as suggestion boxes, digital platforms, surveys,

and community meetings, enable residents to report issues like missed garbage collections, delayed services, or evident environmental management concerns. By gathering this input, waste management units can identify and resolve problems promptly, ensuring better service delivery.

2.1.4. Context of Kabwata Constituency:

Demographic and Socioeconomic Factors:

Population and Urbanization Trends: According to Zambia Statistics Agency, Kabwata Constituency, like many urban areas in Lusaka, is experiencing population growth and increased urbanization, impacting waste generation and management needs (Zambia Statistics Agency, 2022). Refer to Figure 2.1, 2.2 and Table 2.1 below which paint an elaborate picture of the rapid progression of recent urbanization trends

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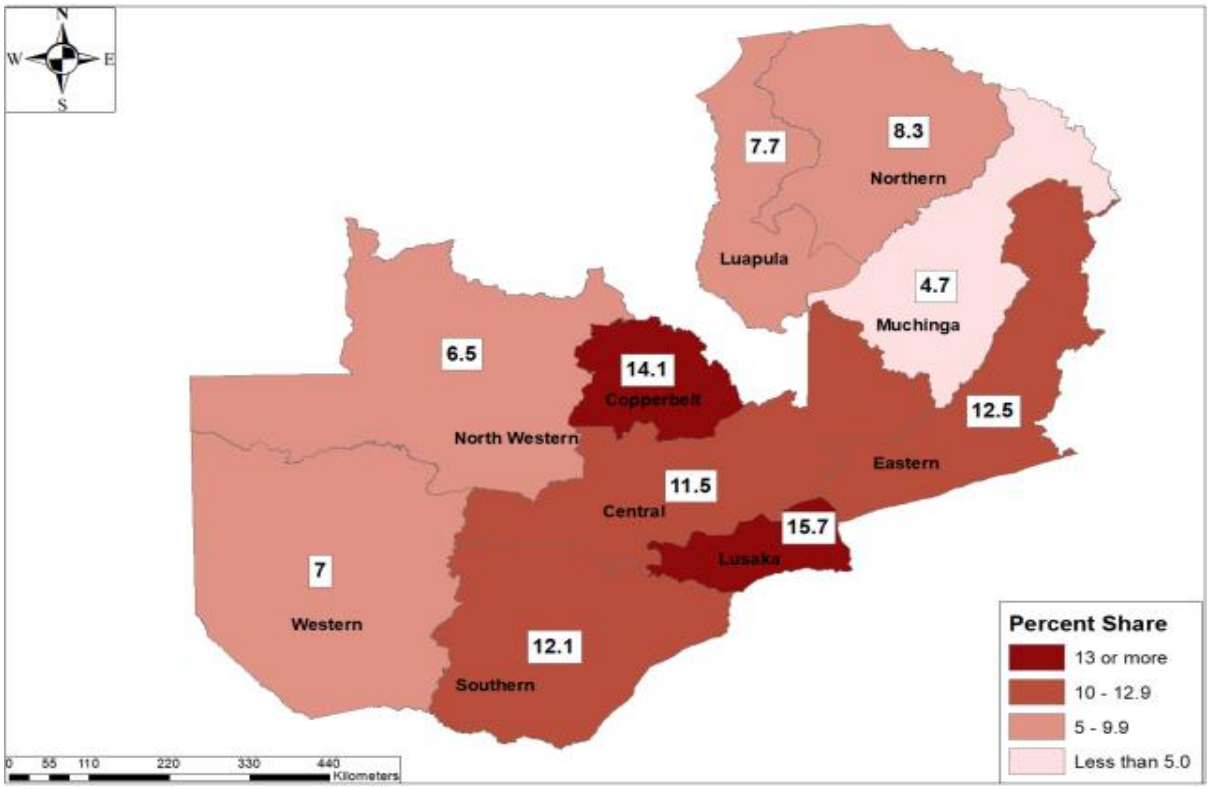

Figure 2.1.0 shows the percent share of the population by province from 2010 to 2022. Central, Luapula, Muchinga , North Western and Western provinces recorded an increase in the percent share of the population between 2010 and 2022.

(Source: Zambia Statistics Agency, 2022)

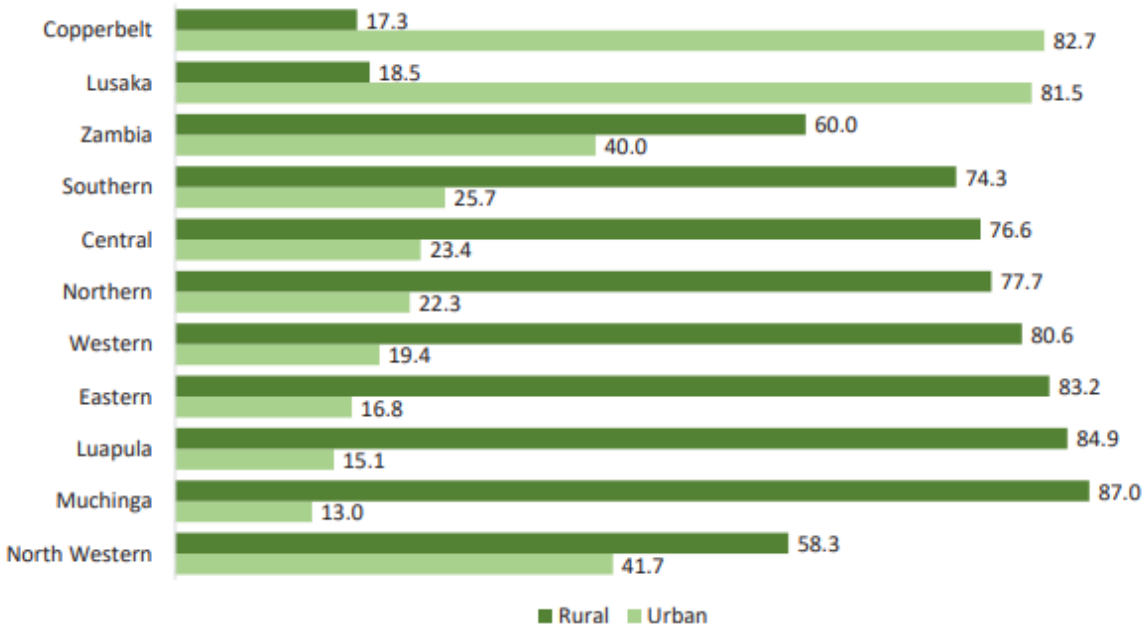

Figure 2.2.0 Shows more than 80 percent of the population in Copperbelt Province (82.7 percent) and Lusaka Province (81.5 percent) resided in urban areas while more that 80 percent in Western (80.6 percent), Eastern (83.2 percent), Luapula (84.9 percent), Muchinga (87.0 percent) provinces resided in rural areas. Source: Zambia Statistics Agency, 2022)

Table 2.1.0: Population Size by Constituency and Sex, Lusaka Province 2010-2022

Constituency	2010 Population			2022 Population		
	Male	Female	Total	Male	Female	Total
Lusaka Povince						
Chilanga	53,863	53,188	107,051	111,095	114,181	225,276
Chongwe	70,900	70,401	141,301	152,923	160,466	313,389
Kafue	60,047	60,368	120,415	106,552	113,022	219,574
Feira	11,979	12,325	24,304	17,514	18,419	35,933
Chawama	93,490	94,075	187,565	101,568	106,851	208,419
Kabwata	83,109	91,229	174,338	105,372	122,650	228,022
Kanyama	181,742	182,913	364,655	256,862	269,040	525,902
Lusaka Central	56,016	61,081	117,097	64,844	73,259	138,103
Mandevu	178,602	180,186	358,788	226,624	241,120	467,744
Matero	140,242	142,492	282,734	154,626	165,954	320,580
Munali	127,223	134,752	261,975	149,584	165,705	315,289
Rufunsa	25,785	25,217	51,002	41,478	40,255	81,733
Total	**1,082,998**	**1,108,227**	**2,191,225**	**1,489,042**	**1,590,922**	**3,079,964**

Source: Zambia Statistics Agency, 2022)

Economic and Social Factors: Socioeconomic conditions, including income levels and housing types, influence waste generation patterns and access to waste management services (Masebo, 2015).

2.1.5 Existing Waste Management Systems:

Current Practices in Kabwata Constituency: Understanding the specific waste management practices in Kabwata, including collection frequency, service coverage, and community perceptions were crucial for assessing system effectiveness. According to the Lusaka City Council, the Waste Management Unit (WMU) is the regulatory Unit of Waste Management in Lusaka City. It is mandated to plan, organize, execute (directly or indirectly) and supervise waste management services in other selected areas in the City and the management of disposal site.

Table 2.2: Main functions of the Waste Management Unit as listed on the Lusaka City Council's official website:

#	Function
1	**Chunga Landfill Management**: Oversee disposal site (est. 2007).
2	**Waste Registration & Fees**: Register waste and charge fees.
3	**CBD Waste Collection**: Collect waste from Central Business District (CBD).
4	**CBD Fee Collection**: Collect fees in CBD (Waste Management District "D").
5	**Secondary Collection in Unplanned Areas**: Manage peri-urban waste collection and fees.
6	**Private Contractors**: Contract private companies for waste collection in WMDs.
7	**Contract Supervision**: Manage and oversee private waste contractors.
8	**Inspection & Enforcement**: Inspect and enforce waste management regulations.
9	**Long-term Plans**: Develop and implement waste management strategies and mobilize resources.
10	**Environmental Audits**: Conduct audits and provide implementation recommendations.
11	**Policy Advice**: Advise management on waste management policies.
12	**Stakeholder Engagement**: Engage with waste generators, especially those with contracts.

Noteworthy empirical studies emphasize the evaluation of effectiveness, efficiency, accessibility, and community satisfaction within waste management systems. The subsequent section provides a critical review of pertinent empirical studies related to these key aspects.

1. Effectiveness of Waste Management Systems:

Study on Urban Waste Collection Efficiency in Sub-Saharan Africa:

Author(s): Masebo, E. , **Year:** 2015

Findings: This study analyzed waste management practices in Lusaka, including collection frequency, coverage, and operational challenges. It found that inefficiencies in collection schedules and limited coverage were common; leading to increased littering and environmental issues (Masebo, 2015).

Research on Solid Waste Management in Developing Countries:

Author(s): Kaza, S., Yao, L., Bhada-Tata, P., **Year:** 2018

Findings: The study provided a global overview of waste management practices, highlighting that many developing cities struggle with inefficient waste collection systems. Key factors influencing effectiveness include infrastructure, management practices, and financial constraints (Kaza et al., 2018).

2. Efficiency in Garbage Collection Systems:

Efficiency of Municipal Waste Collection Services:

Author(s): Rathi, S., **Year:** 2006

Findings: Rathi's study focused on optimizing municipal waste collection services, emphasizing the need for efficient logistics, regular collection schedules, and proper waste segregation to improve overall efficiency (Rathi, 2006).

Case Study of Waste Management in Addis Ababa:

Author(s): Belayneh, S., & Eshetu, S., **Year:** 2021

Findings: This study assessed the efficiency of waste collection services in Addis Ababa, revealing that while collection services had improved, challenges remained in service delivery due to inadequate infrastructure and resource constraints (Belayneh & Eshetu, 2021).

3. Accessibility and Equity of Waste Management Services:

Study on Accessibility to Waste Management Services in Low-Income Areas:

Author(s): Scheinberg, A., & Coad, A., **Year:** 2016

Findings: The research highlighted disparities in access to waste management services in low-income and informal settlements. It stressed the importance of targeted interventions and community-based approaches to enhance service accessibility and equity (Scheinberg & Coad, 2016).

Waste Management in Informal Settlements in Nairobi:

Author(s): Kabiru, J., & Ngugi, G., **Year:** 2020

Findings: This study examined waste management practices in informal settlements in Nairobi, finding that residents often relied on informal waste collectors due to gaps in formal service coverage, impacting overall accessibility and service quality (Kabiru & Ngugi, 2020).

4. Community Satisfaction and Engagement:

Impact of Community Participation on Waste Management Outcomes:

Author(s): Amoah, P., & Kuitunen, M., **Year:** 2014

Findings: The study explored the role of community participation in waste management, demonstrating that involving residents in decision-making and implementation processes significantly improved satisfaction and compliance with waste management services (Amoah & Kuitunen, 2014).

Community Perceptions of Waste Collection Services in Lagos:

Author(s): Onuoha, G., & Ekpe, N., **Year:** 2022

Findings: This research assessed community perceptions of waste collection services in Lagos, Nigeria. It found that residents' satisfaction was influenced by factors such as service reliability, cleanliness, and responsiveness to complaints (Onuoha & Ekpe, 2022).

5. Environmental Impact of Waste Management Practices:

Environmental Impacts of Solid Waste Management in Developing Countries:

Author(s): Wilson, D. C., Velis, C., & Cheeseman, C., **Year:** 2015

Findings: The study reviewed the environmental impacts of waste management practices, highlighting issues such as landfills, pollution, and greenhouse gas emissions. It emphasized the need for more sustainable waste management practices to mitigate these impacts (Wilson et al., 2015).

Health and Environmental Impacts of Improper Waste Management:

Author(s): Cheng, W., & Lu, B., **Year:** 2017

Findings: This research investigated the health and environmental impacts of improper waste management in Sub-Saharan Africa. It identified significant health risks and environmental degradation resulting from inadequate waste disposal practices (Cheng & Lu, 2017).

2.2 Theoretical Framework

The theoretical framework was based on established theories and models relevant to waste management, urban sustainability, and public administration. This framework guided the analysis of how garbage collection systems function and impact the community. Below are key theories and models that were utilized:

- **Systems Theory:** Provided a holistic view of the garbage collection system as an interconnected network, emphasizing the importance of feedback loops and interactions among components (Gutberlet. J, et al, 2017). This theory was instrumental in understanding the garbage collection system as a complex network of interrelated components, including waste generation, collection, transportation, and disposal. Systems Theory also helped assess the influence of external factors such as population growth and urbanization on waste management.
- **Contingency Theory:** This theory Highlights the impact of contextual factors on the effectiveness and adaptability of waste management practices (Woods. M, 2009). The theory guided the analysis by considering how local conditions (e.g., geographic location, socioeconomic factors, governance structures) influence the design and effectiveness of waste management systems. The said theory accommodated the examination of why some strategies or systems may be more successful in certain contexts than in others, and how waste management practices can be adapted based on local challenges and resources.
- **Public Administration Theory:** Focuses on the management, accountability, and service delivery aspects of waste management by public and private entities (Rosenbloom D.H, Et al, 2022). This theory assisted in the evaluation of the roles and responsibilities of public and private entities in waste management. It provided a foundation for assessing how policies, regulations, and public administration structures impact service delivery..
- **Sustainability Theory:** Guides the assessment of environmental and social impacts, emphasizing the importance of balancing various sustainability goals (Gibson R.B, 2006). Using this theory, one can explore how waste management

practices impact the environment and the local community, focusing on ecological, economic, and social sustainability. The theory guided the evaluation of how well the garbage collection system balances the need for operational efficiency with the goals of minimizing environmental harm and promoting long-term community well-being.

- **Service Quality Model:** Evaluates the quality of garbage collection services based on dimensions such as reliability and responsiveness, from the perspective of community satisfaction (Kelly, J.M. and Swindell, D., 2002). This model was essential for assessing community satisfaction with garbage collection services. The model enabled the analysis of how key dimensions of service quality (e.g. reliability, responsiveness, assurance and empathy) contribute to residents' perceptions of the system. Community feedback was critical in understanding service effectiveness and areas for improvement.

The theoretical framework establishes a robust and multidimensional foundation for a thorough examination of garbage collection systems in Kabwata Constituency (Das.S, Et al, 2019). By integrating key theories from systems theory, contingency theory, public administration, sustainability, and service quality models, the framework ensured a comprehensive analysis of the various factors influencing waste management practices. The aforementioned framework allowed for an in-depth exploration of how the garbage collection system operates as an interconnected network, where feedback loops and system interactions are essential for maintaining efficiency and responsiveness.

2.3 Conceptual Framework

The conceptual framework serves as a guiding structure for understanding the key concepts and variables that shape the effectiveness and impact of garbage collection systems in Kabwata Constituency (Esmaeilian.B Et al, 2018). By integrating critical elements from the theoretical framework, this framework established a clear path for exploring the interactions among different aspects of waste management. The following key concepts were fundamental to the research:

1. **Garbage Collection Systems**:
    - **Definition**: Garbage collection systems encompass the processes, infrastructure, and logistics involved in the collection, transportation, and disposal of solid waste. These systems are designed to ensure that waste is efficiently removed from urban areas and disposed of in a manner that minimizes harm to public health and the environment.
    - **Components**: The system's primary components include collection schedules, the methods used for waste transportation (e.g., trucks, bins, manual collection), waste sorting procedures, and the facilities available for waste disposal or recycling (e.g., landfills, transfer stations, recycling centers). These components interact to form a functional and sustainable system of waste management.
2. **Effectiveness**:
    - **Definition**: The effectiveness of a garbage collection system refers to how well it meets its intended objectives, such as timely waste collection, adequate coverage across the constituency, and proper disposal practices.
    - **Indicators**: The effectiveness will be measured by service reliability (e.g., regularity of pickups), collection frequency (e.g., how often waste is collected), the coverage area (e.g., whether all areas, including underserved neighborhoods, are covered), and adherence to collection schedules (e.g., timely service delivery). These indicators will provide a quantitative and qualitative understanding of the system's ability to fulfill its objectives.

3. **Efficiency**:
    - **Definition**: Efficiency in waste management refers to the ability of the system to achieve waste management goals using minimal resources such as labor, equipment, and finances. A highly efficient system minimizes waste, reduces costs, and optimizes the use of available resources.
    - **Indicators**: Key indicators of efficiency include cost-effectiveness (e.g., cost per unit of waste collected), resource utilization (e.g., optimal use of vehicles, labor, and equipment), operational performance (e.g., the time taken for waste collection and transportation), and logistical management (e.g., the effectiveness of routes and scheduling in reducing delays and operational costs).
4. **Accessibility**:
    - **Definition**: Accessibility measures the extent to which residents can easily access and utilize garbage collection services. A system that is easily accessible ensures that all households, regardless of their location or socioeconomic status, have reliable waste management services.
    - **Indicators**: The indicators of accessibility include the geographic coverage of waste collection services (e.g., whether all areas, including remote or underserved communities, are included), the availability of collection points (e.g., convenience of drop-off locations or curbside pickup), and responsiveness to service requests (e.g., how quickly the system addresses missed pickups or requests for additional services).
5. **Community Satisfaction**:
    - **Definition**: Community satisfaction reflects the level of contentment among residents regarding the quality, efficiency, and effectiveness of garbage collection services. High satisfaction is an indicator of a well-functioning system that meets public expectations.
    - **Indicators**: This will be measured through resident feedback (e.g., complaints, suggestions), perceptions of service quality (e.g., how residents view the reliability and cleanliness of the service), and satisfaction surveys (e.g., structured surveys or interviews to gauge

resident opinions). High levels of satisfaction typically correlate with improved public health and quality of life in urban areas.

6. **Environmental Impact**:
    - **Definition**: The environmental impact of waste management practices pertains to how waste collection, transportation, and disposal affect the environment, including issues like pollution, resource conservation, and ecosystem degradation.
    - **Indicators**: The indicators for environmental impact include emissions from waste disposal (e.g., greenhouse gas emissions from landfills or incinerators), landfill usage (e.g., the extent to which waste is diverted from landfills through recycling or composting), recycling rates (e.g., the percentage of waste diverted for reuse or recycling), and overall environmental degradation (e.g., air and water pollution caused by improper waste disposal practices).

The relationships between these key concepts are interdependent and guided the analysis. For instance, the effectiveness of the garbage collection system directly influences community satisfaction and environmental impact. Efficient use of resources enhances both effectiveness and accessibility. Similarly, improved accessibility and service reliability contribute to higher levels of community satisfaction. Find below and adapted Conceptual Framework summary in Figure 2.3.

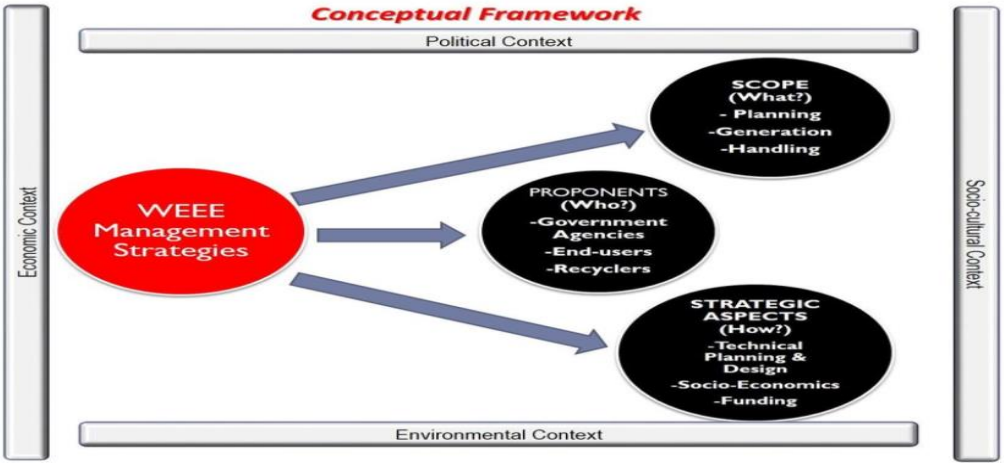

Figure 2.3: Conceptual Framework for WEEE Management Strategies (adapted from "Conceptual Framework for Municipal Solid Waste Management in Low-Income Countries" by Schübeler et. al., 1996)

2.4 Identified Themes

The reviewed literature underscores the multilayered nature of waste management, encompassing global, local, and community-specific dimensions. Globally, challenges such as rapid urbanization, population growth, and shifts in waste composition necessitate innovative technological and policy approaches. Sustainability emerged as a cornerstone, emphasizing waste reduction, recycling, and environmentally conscious disposal to mitigate adverse ecological impacts. In Zambia, and specifically in the Kabwata Constituency, waste management faces significant challenges due to inadequate infrastructure, resource constraints, and inefficient practices.

Empirical studies highlight the critical aspects of efficiency, accessibility, community satisfaction, and environmental impact. Effective systems prioritize equitable service delivery, logistical optimization, and community engagement to enhance compliance and satisfaction. Moreover, sustainable practices are essential to reduce environmental degradation and ensure the long-term viability of waste management systems. The theoretical and conceptual frameworks provide a structured approach for understanding and analyzing garbage collection systems. By integrating systems theory, contingency theory, public administration principles, sustainability, and service quality models, a holistic understanding of waste management challenges and opportunities emerges.

Addressing waste management challenges in Kabwata Constituency requires a multidimensional approach informed by both global best practices and localized strategies. By leveraging empirical insights and theoretical underpinnings, waste management systems can be enhanced to ensure operational efficiency, equitable service delivery, and minimal environmental impact. Such improvements will not only address immediate urban sanitation needs but also contribute to broader goals of sustainability and community well-being.

2.5 Gaps in the Reviewed Literature

The reviewed literature provided a comprehensive understanding of waste management systems, exploring global trends, local contexts, and specific challenges faced in urban settings like Kabwata Constituency. Empirical studies also underscored key aspects of efficiency, accessibility, community satisfaction, and environmental impact, offering insights into best practices and areas for improvement. Consequently, the following deficiencies were observed:

1. **Insufficient Focus on Community Engagement**

While the importance of community participation is recognized, there is limited research on effective strategies for sustaining community involvement and integrating local knowledge into waste management practices.

2. **Lack of Context-Specific Studies**

Few studies address waste management challenges specific to Zambia or Kabwata Constituency, particularly regarding the interaction of socioeconomic factors, informal settlements, and demographic trends.

3. **Limited Analysis of Policy Implementation**

Although national policies and strategies exist, the literature provides little insight into the barriers to their implementation, including resource constraints, institutional coordination, and enforcement mechanisms.

4. **Underrepresentation of Technological Innovations in Low-Income Settings**

Most studies on technological advancements in waste management focus on high-income or middle-income countries, leaving a gap in understanding how these innovations can be adapted to low-income contexts like Zambia.

5. **Inadequate Exploration of Environmental Impacts**

Research on the environmental consequences of current waste management practices, particularly on water, soil, and air quality in Kabwata Constituency, remains sparse. During interviews with several residents of Kabwata Constituency, it was observed that there is an increase in the supply of contaminated water in Kabwata Constituency that requires investigation.

6. **Neglect of Informal Sector Contributions**

The role of informal waste collectors and recyclers is often overlooked, despite their significant contribution to waste management in many developing countries, including Zambia. A notable number of Kabwata Constituency residents exhibited preference for informal waste collectors, with affordability and consistency being repeated themes in rationalizing the said preference.

7. **Limited Use of Quantitative Data**

Many studies rely on qualitative assessments, with insufficient quantitative data to evaluate the efficiency, effectiveness, and environmental impact of waste management systems comprehensively.Addressing the identified gaps through targeted, context-specific research and localized strategic interventions is essential for enhancing the effectiveness of waste management systems in Kabwata Constituency.

3.0 METHODOLOGY

This chapter outlines the qualitative methodology employed to evaluate waste management practices, focusing on Kabwata Constituency. A case study approach was used to thoroughly examine garbage collection systems and their effectiveness, considering operational aspects like efficiency, resources, logistical challenges, and sustainability practices. Additionally, the research incorporated stakeholder perspectives, including residents, waste management personnel, local government officials, and environmental experts, to gain a holistic understanding of the system's impact and challenges.

Purposeful sampling and diverse data collection methods were utilized to ensure in-depth insights from key groups, with a sample size determined by data saturation. This methodology facilitated a comprehensive analysis of both systemic and human factors influencing waste management, paving the way for practical and sustainable solutions. The chosen methodology provided a comprehensive and thorough understanding of the waste management practices, stakeholder perspectives, and systemic challenges in the constituency. Outlined below is the aforementioned methodology:

3.1 Research Approach

The study used a qualitative study design approach to explore the garbage collection systems in Kabwata Constituency. The qualitative study design approach proved suitable, after the literature review conducted, because it allowed for a detailed examination of the specific context of Kabwata Constituency, enabling a comprehensive understanding of the factors that influence the effectiveness of the waste management systems available to the stated community currently, as a whole and in integral parts.

3.2 Research Design

The research design followed a **structured qualitative case study approach**. This design allowed for an in-depth exploration of the waste management practices within a specific context, providing rich, detailed insights into the system's performance and

its impact on the community. The research strategy involved investigation of the phenomenon in its real world context to assist in understanding the task at hand beyond the apparent activities and practices.

Case Study Approach:

Purpose: The diversity of stakeholders considered in Kabwata Constituency, the resulting variable perspectives, the requirement for progressive and sustainable practical solutions to the existing challenges and the evident requirement to inform policy leading to adaptive practice dictated the use of a structured case study research design approach for assessing the effectiveness of Waste Management Units garbage collection systems in Kabwata Constituency. The research design enabled the examination of complex interactions between various elements of the waste management system within the specific context of Kabwata Constituency.

Unit of Analysis:.

Primary Unit of Analysis: Garbage Collection Systems

The primary unit of analysis in this research was the **garbage collection systems** operated by waste management units within **Kabwata Constituency, Lusaka City**. This included a detailed examination of the effectiveness, efficiency, and operations of the systems put in place to manage waste in the area. The evaluation of the systems included the following aspects:

1. **Operational Efficiency**: Assessment of how effectively the waste collection units operate in terms of routes, collection frequency, and coverage of different areas within Kabwata. This analysis would identify delays, under-served areas, and any gaps in service delivery.
2. **Resource Availability**: Evaluation of the resources available to waste management units, such as the number of collection trucks, waste bins, workers, and infrastructure. The adequacy of these resources to handle the waste generated by the constituency was key to understanding operational challenges.

3. **Collection Methods**: This included an analysis of how waste is collected (e.g., door-to-door collection, centralized collection points), as well as the efficiency of these methods in reducing waste overflow, minimizing litter, and preventing contamination of waste streams.
4. **Logistical Challenges**: Analysis of any logistical barriers faced by the waste management units, including traffic congestion, poor road conditions, or limited access to certain areas, especially informal settlements.
5. **Sustainability Practices**: Investigation into whether the garbage collection system incorporates sustainable practices, such as waste segregation, recycling initiatives, and the proper disposal of hazardous waste.

Secondary Units of Analysis: Stakeholders' Experiences and Perceptions

In addition to the primary unit of analysis, secondary units of analysis involved the **experiences** and **perceptions of stakeholders**, which provided a deeper understanding of the effectiveness and impact of the garbage collection system. These stakeholders encompassed:

1. **Residents of Kabwata Constituency**:
    - **Experiences**: This incorporated how residents experience garbage collection in their neighbourhoods, whether it was timely, reliable, and comprehensive. Interviews, observations and surveys revealed the frequency of collection, satisfaction with cleanliness, and issues related to waste disposal.
    - **Perceptions**: Residents' attitudes towards waste management services, their level of participation in waste segregation and their general awareness of the environmental and health implications of improper waste disposal.
2. **Waste Management Personnel**:
    - **Experiences**: The perspectives of waste management workers who were directly involved in the collection and disposal process. The said included their experiences with the physical challenges of their jobs, the resources at their disposal, and any clear and present problems they

faced while performing their duties (e.g., health risks, inadequate protective gear, low morale to name but a few).

- **Perceptions**: How waste management personnel perceived the effectiveness of the systems in place, their challenges in delivering services, and suggestions for improving waste collection efficiency and safety protocols.

3. **Local Officials and Government Representatives**:
   - **Experiences**: These stakeholders offered insights into how waste management policies are designed and implemented at the local government level. They also provided an understanding of the operational and financial constraints faced by waste management units, as well as the challenges in policy enforcement and oversight.
   - **Perceptions**: Officials' views on the broader implications of waste management for public health, environmental sustainability, and urban planning. They may also provide insights into the strategic priorities of the local government in addressing waste management issues.

By analyzing the **garbage collection systems** (primary unit) and the **experiences and perceptions of stakeholders** (secondary units), this research aimed to offer a comprehensive understanding of the effectiveness of waste management in Kabwata Constituency. It can identify both the systemic and human factors contributing to the successes and challenges of waste management in the area.

3.3 Study Population

The study population included several key groups of stakeholders who are directly or indirectly involved in or affected by the waste management system. Each group will provide unique insights into the various dimensions of waste management within the constituency.

1. Residents of Kabwata Constituency:

Description: Residents living in different neighborhoods (Kabwata, Kamwala, Libala and Chilenje) within Kabwata Constituency, including those in residential areas, informal settlements, and commercial zones.

Sample Size: 80 residents, selected to ensure diverse representation across different areas and socioeconomic backgrounds were interviewed. **20 residents** from each named neighbourhood in Kabwata Constituency were interviewed.

2. Waste Management Personnel:

Description: Employees and managers of waste management units responsible for the collection, transportation, and disposal of solid waste in Kabwata Constituency. Waste Management in Kabwata Constituency is conducted in Three (3) Zones namely I, M and N. Each Zone has a specific Waste Management Unit franchisee responsible.

Sample Size: Fifteen (15) individuals, this included frontline staff and management. This constitutes Five (5) representatives from each franchisee.

3. Local Government Officials:

Description: Officials from local government departments responsible for waste management policy, regulation, and oversight in Kabwata Constituency.

Sample Size: Three (3) officials from the Lusaka City Council Physical Planning, Department, Public Health Department and Waste Management Unit.

4. Environmental and Public Health Experts:

Description: Professionals and experts in environmental science, public health, and related fields who provided insights into the broader implications of waste management practices on health and the environment.

Sample Size: Four (4) experts were consulted.

3.4 Sample Size

The sample size was determined based on the principle of data saturation. Data collection continued until no new themes or insights emerged.

3.5 Sampling Techniques

Purposeful Sampling was used to gain in-depth insights from targeted groups of individuals who appeared to possess particular knowledge or experience related to the research topic in the following manner:

3.6 Data Collection/Instruments

In order to assess the effectiveness of waste management units and garbage collection systems in Kabwata Constituency, a range of data collection methods were employed to capture qualitative information. These methods allowed for a comprehensive analysis of the perspectives of various stakeholders, as well as the operational realities of the current systems. Refer to the adopted Data Collection Method structure in Figure 3.1.

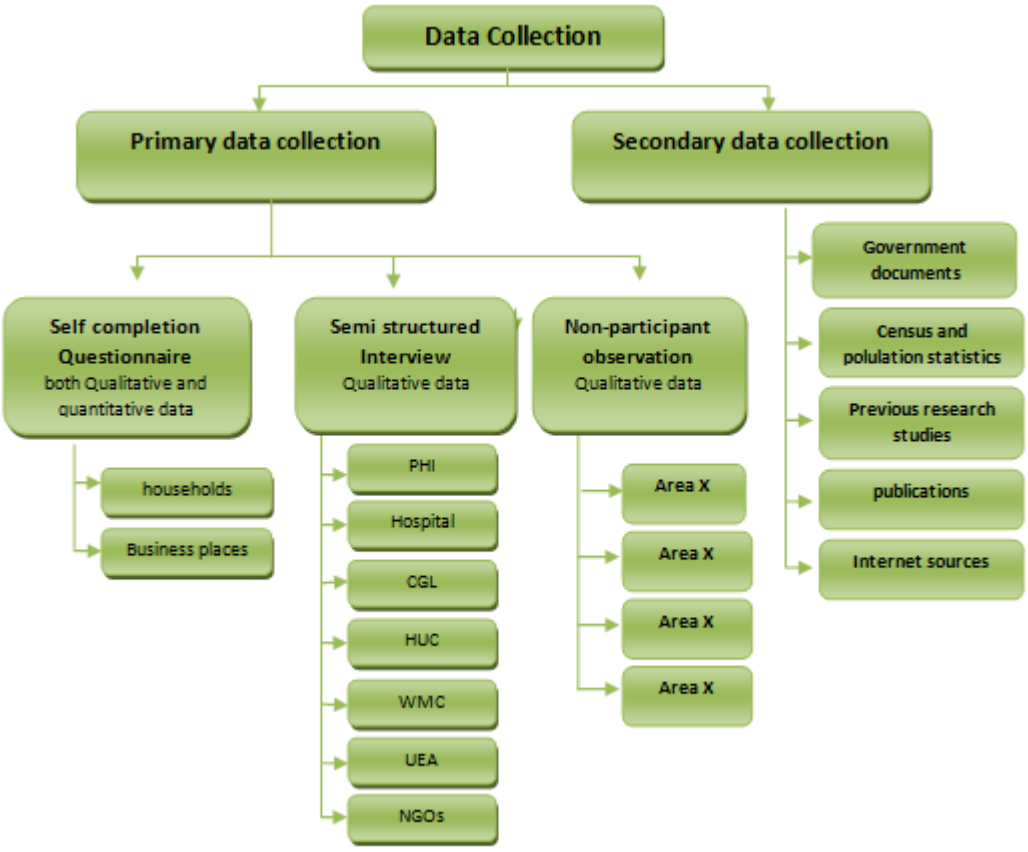

Figure 3.1 Data Collection Methods

(Source: Adapted from Vitharana A.D, 2015)

1. Semi-Structured Interviews

- **Purpose**: Semi-structured interviews were conducted with key stakeholders, including local officials, waste management personnel, and community leaders. These interviews provided in-depth information on stakeholders' perceptions of the garbage collection systems.
- **Focus Areas**:
    - Effectiveness: How well the current garbage collection system meets the needs of the community.
    - Efficiency: The timeliness, frequency, and reliability of garbage collection services.
    - Accessibility: The ease with which residents can access waste collection services.

  - Environmental Impact: Stakeholders' views on the environmental consequences of current waste management practices.
- **Approach**: The semi-structured format allowed for flexibility, enabling the interviewer to probe deeper based on the responses given while maintaining focus on key topics.

2. Focus Group Discussions (FGDs)

- **Purpose**: FGDs conducted with groups of residents from different neighborhoods within Kabwata Constituency. These discussions helped capture the collective views of residents on the garbage collection services and waste management practices. The formal and informal Market Places proved to be very valuable setups for the FDGs offering unguarded information and feedback.
- **Focus Areas**:
  - Community engagement with the garbage collection system.
  - Experiences with waste segregation and participation in local waste management initiatives.
  - Satisfaction levels with current services and suggestions for improvement.
- **Group Composition**: The Focus groups were diverse in terms of age, gender, and social status to ensure a broad representation of residents' views. Each group composed of approximately 7 to 10 participants.

3. Observations

- **Purpose**: Direct observations were conducted to assess the operational aspects of the garbage collection systems. This process involved observing the daily operations of waste collection teams, including the time taken for collection, the adequacy of the resources used, and the state of the environment before and after collection.
- **Focus Areas**:
  - The effectiveness of waste collection methods (e.g., door-to-door collection, centralized collection points).

  - The conditions of the streets and neighborhoods before and after waste collection.
  - The efficiency of garbage trucks and workers in the field.
- **Approach**: Observations were documented systematically using field notes and photography, ensuring that the operational dynamics of the waste management system were captured accurately.

4. Document Analysis

- **Purpose**: Secondary data was gathered from reports, policy documents, and records from waste management units and local government authorities. This provided background information and insights into the formal structure and policies surrounding waste management in Kabwata Constituency.
- **Focus Areas**:
  - Review of official waste management strategies, policies, and guidelines.
  - Analysis of records on waste collection schedules, funding, and resources allocated to waste management units.
  - Examination of past reports or audits on the effectiveness of waste management services in the constituency.
- **Approach**: Document analysis was used to complement the primary data, offering a broader perspective on the governance and administration of waste management systems.

3.7 Data Analysis

The data collected through interviews, FGDs, observations, and document analysis was analyzed using **thematic analysis**. This method is particularly suited for analyzing qualitative data and allowed for the identification, analysis, and reporting of patterns (themes) within the data.

Steps in Thematic Analysis:

1. **Familiarization with Data:**

The first step in thematic analysis was **familiarization with the data**. This phase involved reviewing the data collected through interviews, focus group discussions (FGDs), and observational notes to develop an in-depth understanding of the content. The goal of this step was to immerse oneself in the data so that meaningful insights can be identified in later stages of the analysis.

Key Activities in Familiarization with Data:

1.1. Initial Reading of Data

- **Objective**: The researcher read through all collected data (transcripts from interviews, notes from FGDs, and observational records) to get a general sense of the information before starting any formal analysis.
- **Process**: This involved reading through the data without focusing on specific patterns or themes. The purpose was to become familiar with the context, tone, and breadth of the data, making it easier to identify important segments during the research process.
- **Action**: Reading through all materials to get a sense of what the participants said and the range of issues that were addressed. This helped in forming an initial understanding of the subject matter.

1.2. Re-reading the Data

- **Objective**: Re-reading allowed the researcher to engage more deeply with the data, paying closer attention to the details.
- **Process**: During the second read-through, the researcher began to notice patterns or recurring ideas that were not obvious in the first reading. Notes were taken, key statements highligted and initial observations on potential themes were made.

- **Action**: Notes to indicate points of interest, ideas that repeated and obvious areas that appeared to be particularly significant for the research questions were taken.

1.3. Note-Taking

- **Objective**: The researcher started jotting down ideas, thoughts, and observations related to what stood out in the data.
- **Process**: As data was re-read, the researcher took detailed notes on what emerged from the interviews, FGDs, and observations. These notes included:
    - Interesting quotes or statements from participants.
    - Recurrent issues raised across different data sources.
    - Observations that hinted at a pattern, problem, or insight into the research question.
- **Action**: An organized system for the notes was created, in a separate document, to refer back to during the analysis phase.

1.4. Immersing in the Context

- **Objective**: A full understanding of the context in which the data was collected was gained.
- **Process**: The researcher reflected on the socio-political, economic, and cultural context in which the waste management systems operate. This contextual immersion helped the researcher understand why certain themes emerged, how they related to local conditions, and what influences are shaping the stakeholders' perceptions.
- **Action**: Take time to consider the setting in which data collection occurred, such as local waste management practices, the community's social dynamics, and the specific issues faced by residents and waste management personnel.

1.5. Identifying Key Ideas and Initial Patterns

- **Objective**: Identifying potential patterns and key ideas that emerge as themes in the data.

- **Process**: The researcher had a clearer sense of the major points or issues that were raised across multiple sources of data. These includde concerns over waste collection frequency, problems with infrastructure and community satisfaction levels with services.
- **Action**: A rough list of key issues and patterns observed in the data was made. These were related to various aspects such as operational challenges, community involvement, environmental impact, or governance.

Familiarization with the data set is the foundation for the entire thematic analysis process. It allowed the researcher to become comfortable with the data and understand the nuances of participants' experiences and perceptions. This stage ensured that the researcher was thoroughly prepared to identify and analyze themes in a systematic and insightful manner, as the study progressed into more detailed coding and thematic exploration.

2. Generating Initial Codes:

During the thematic analysis of the research on assessing the effectiveness of waste management and garbage collection systems in Kabwata Constituency, various **codes** were typically generated from the data to help categorize and identify key patterns. These codes were derived from interviews, focus group discussions (FGDs), observations, and document analysis. The codes represent recurring ideas, topics, or concepts that emerged from the data.

Based on the focus of the study, some potential **codes** generated during the thematic analysis included:

1. Effectiveness of Garbage Collection

- **Timeliness of Collection**: Refers to how frequently and consistently waste is collected from neighborhoods.
- **Coverage of Areas**: Whether all areas within Kabwata are served by the garbage collection system.
- **Service Availability**: The extent to which waste management services are accessible to all residents, including those in informal settlements.

- **Waste Segregation**: Whether residents are engaged in sorting their waste and the effectiveness of such initiatives.

2. Operational Efficiency

- **Fleet Availability**: The number and condition of garbage collection vehicles.
- **Manpower and Training**: The adequacy and preparedness of waste management personnel to carry out their duties.
- **Routing and Scheduling**: The system for scheduling and routing collection vehicles and how effective it is in reducing delays.
- **Waste Overflow and Spillage**: Instances where waste is left uncollected, leading to environmental hazards.

3. Community Engagement

- **Public Awareness**: The level of awareness among residents about waste management practices, including segregation, recycling, and proper disposal.
- **Resident Participation**: The extent to which residents are actively involved in the waste management process, including community clean-ups or waste separation.
- **Incentive Programs**: The presence or absence of programs that encourage residents to participate in proper waste disposal practices.
- **Perception of Cleanliness**: Residents' perception of the cleanliness of their neighborhood based on waste management services.

4. Environmental Impact

- **Pollution**: Observations and perceptions regarding the environmental impact of improper waste management, such as contamination of water bodies or air pollution.
- **Health Concerns**: Residents' concerns related to health issues arising from poor waste management, such as the spread of diseases.
- **Waste Disposal Methods**: How waste is disposed of (e.g., landfills, illegal dumping, incineration) and its long-term environmental impact.

5. Resource Availability

- **Financial Resources**: The adequacy of financial resources allocated for waste management operations.
- **Infrastructure and Equipment**: The availability and condition of infrastructure and equipment necessary for efficient waste collection and disposal (e.g., bins, trucks, sorting facilities).
- **Support from Local Government**: The role and level of support from local government authorities in providing resources and funding for waste management.

6. Logistical and Operational Challenges

- **Traffic and Access**: Issues related to traffic congestion, road conditions, and restricted access to certain areas that hinder efficient waste collection.
- **Garbage Dumping Points**: The accessibility and number of garbage collection points, especially in densely populated areas.
- **Informal Settlements**: The unique challenges faced in waste collection in informal settlements, such as lack of infrastructure and informal dumping sites.

7. Governance and Policy

- **Regulatory Framework**: The existence and enforcement of policies or regulations governing waste management practices in Kabwata.
- **Collaboration Between Stakeholders**: The level of coordination between local authorities, waste management units, and other community-based organizations.
- **Policy Gaps**: Gaps or weaknesses in current waste management policies and their impact on the effectiveness of the system.
- **Enforcement and Compliance**: How effectively waste management laws and regulations are enforced, including penalties for non-compliance.

8. Challenges Faced by Waste Management Personnel

- **Health and Safety**: The safety risks faced by waste management workers during garbage collection and disposal, such as exposure to hazardous materials or injury.
- **Morale and Motivation**: The levels of job satisfaction and motivation among waste management personnel, influenced by working conditions, compensation, or public perception.
- **Training and Capacity Building**: The availability and effectiveness of training programs for waste management personnel.

9. Technology and Innovation

- **Use of Technology in Waste Management**: The incorporation of technology (e.g., apps for scheduling or monitoring) to optimize garbage collection services.
- **Recycling and Waste Minimization**: Innovations in waste recycling and minimizing waste generation, such as community recycling programs or waste-to-energy initiatives.
- **Data Collection and Monitoring**: The extent to which data is collected and used to monitor waste management operations, including tracking waste volumes and collection schedules.

10. Stakeholder Perceptions

- **Satisfaction Levels**: The overall satisfaction of residents, waste management personnel, and local officials with the current waste management system.
- **Trust in Local Authorities**: How much residents trust local government authorities to provide adequate waste management services.
- **Perceived Effectiveness**: Stakeholders' views on whether the current waste management system is meeting the needs of the community.

11. Policy Recommendations

- **Suggestions for Improvement**: Common themes that emerged from stakeholders' suggestions on how to improve the waste management system.

- **Policy Gaps**: Suggestions for addressing policy shortcomings or gaps in the current waste management framework.

Codes provided a structure for analyzing the key themes that emerged from the data, helping to identify specific challenges, opportunities, and areas for improvement in Kabwata Constituency's waste management system. Through the thematic analysis, it was possible to identify patterns in the data and draw conclusions on the effectiveness of current practices, the perceptions of stakeholders, and the areas that require policy interventions or resource allocation.

Axial Codes

Axial codes represent the relationships among categories or themes in the study (William. M, 2019). For this research, the axial codes included:

1. **Service Reliability**
    - Collection frequency
    - Service coverage
2. **Resource Challenges**
    - Operational capacity of waste management units
    - Availability and functionality of garbage trucks
3. **Community Impact**
    - Community satisfaction with garbage collection
    - Effects of service inconsistencies in underserved areas
4. **Environmental Management**
    - Environmental sustainability of waste collection practices
    - Compliance with national waste management regulations
5. **Stakeholder Dynamics**
    - Perceptions of local authorities and waste management units
    - Community engagement and feedback mechanisms

Selective Codes

Selective codes integrate axial codes to form the core themes or overarching narratives of your study (Mohajan.D, 2022). These codes included:

1. **Effectiveness of Waste Management Units**
    - Encompasses service reliability, resource challenges, and operational efficiency.
2. **Equity in Service Delivery**
    - Focuses on the disparities in service coverage between different socioeconomic groups.
3. **Sustainability and Compliance**
    - Captures efforts toward environmental sustainability and adherence to regulatory standards.
4. **Community-Centered Waste Management**
    - Highlights the role of community satisfaction and participation in improving waste management systems.
5. **Systemic Barriers to Efficiency**
    - Reflects the challenges posed by logistical constraints and resource limitations.

These codes provide a structured lens for analyzing and interpreting the data, ensuring comprehensive and meaningful insights.

3. **Searching for Themes**:

Based on the codes generated in the thematic analysis, the following **themes** were outlined to represent the main patterns and areas of focus that emerged from the data in the study of the effectiveness of waste management and garbage collection systems in Kabwata Constituency.

1. Effectiveness of Garbage Collection Systems

- **Timeliness and Frequency of Collection**: This theme focuses on how well the garbage collection system adheres to schedules and whether waste is collected regularly and on time.

- **Coverage of Service Areas**: Examines the extent to which the garbage collection system covers all neighborhoods in Kabwata, including informal settlements and areas with limited access.
- **Satisfaction with Service Delivery**: Includes residents' overall satisfaction with the garbage collection services and whether their needs are being met.

2. Operational Efficiency

- **Resources and Infrastructure Availability**: This theme highlights the adequacy of resources, including the number of waste collection vehicles, staff, and waste bins, to meet the demands of the constituency.
- **Waste Collection Methods**: Focuses on the effectiveness of the methods used to collect waste (e.g., door-to-door collection, centralized collection points) and how well these methods meet community needs.
- **Logistical Barriers**: Examines challenges related to traffic, road conditions, and access to certain areas that impact the efficiency of garbage collection.

3. Community Engagement and Participation

- **Public Awareness and Education**: Explores the level of awareness among residents regarding waste segregation, recycling, and proper waste disposal practices.
- **Resident Participation in Waste Management**: Looks at the active involvement of residents in waste management, such as participation in community clean-up initiatives or recycling efforts.
- **Incentives for Participation**: Investigates whether there are any programs or incentives that encourage residents to engage in waste management activities.

4. Environmental Impact and Health Concerns

- **Pollution and Contamination**: Focuses on the environmental consequences of improper waste management, including pollution, littering, and contamination of water bodies or land.

- **Health Implications**: Looks at how waste mismanagement affects public health, such as the spread of diseases or the impact of waste-related hazards on residents' well-being.
- **Sustainability Practices**: Examines efforts made to minimize environmental impact through recycling, waste minimization, and sustainable disposal methods.

5. Governance and Policy Implementation

- **Regulatory and Policy Framework**: Analyzes the existing policies and regulations governing waste management in Kabwata and how effectively they are being implemented.
- **Policy Gaps and Challenges**: Identifies shortcomings or weaknesses in the waste management policy or regulatory framework that affect the effectiveness of the system.
- **Stakeholder Collaboration**: Explores how different stakeholders (local authorities, waste management units, community organizations) collaborate to improve waste management services.

6. Operational Challenges and Issues Faced by Waste Management Personnel

- **Work Conditions and Safety**: This theme covers the health and safety challenges faced by waste management personnel, including exposure to hazardous waste, lack of protective equipment, and poor working conditions.
- **Morale and Motivation**: Explores the job satisfaction, motivation, and morale of waste management personnel, influenced by factors such as pay, public perception, and working conditions.
- **Training and Professional Development**: Examines the availability and quality of training programs aimed at enhancing the skills and capacity of waste management workers.

7. Resource Allocation and Financial Sustainability

- **Funding and Budget Allocation**: Focuses on the financial resources allocated to waste management units and how these funds are used for infrastructure, operations, and waste management services.
- **Resource Gaps**: Identifies the gaps in resources, such as inadequate funding or equipment, that hinder the effectiveness of the garbage collection system.
- **Financial Sustainability of Services**: Explores whether the current waste management system is financially sustainable in the long term and what measures are needed to ensure continued service delivery.

8. Stakeholder Perceptions and Satisfaction

- **Resident Satisfaction with Services**: Focuses on residents' views of the garbage collection system, including their satisfaction with the frequency, cleanliness, and overall waste management services.
- **Perceptions of Local Authorities and Waste Management Units**: Examines residents' trust in and perceptions of the local government and waste management units in terms of their competence and effectiveness in providing waste management services.
- **Community Trust and Engagement**: Explores the level of trust the community has in waste management services and local government and how this trust influences their participation and behavior.

9. Innovation and Technological Integration

- **Technological Solutions in Waste Management**: Examines the use of technology (such as apps for scheduling, waste monitoring, or smart bins) to improve waste collection efficiency and service delivery.
- **Recycling and Waste Minimization Innovations**: Explores any innovative strategies in waste reduction, recycling, or waste-to-energy programs aimed at minimizing environmental impact and promoting sustainability.

- **Data Utilization and Monitoring**: Investigates the role of data collection and analysis in monitoring the effectiveness of waste management services and identifying areas for improvement.

10. Policy Recommendations and Improvement Suggestions

- **Community-Driven Suggestions**: Includes suggestions and feedback from residents and stakeholders on how to improve the garbage collection system, including changes in collection schedules, infrastructure, or communication strategies.
- **Policy and Infrastructure Recommendations**: Focuses on the recommendations for policy changes, resource allocation, and infrastructure improvements to enhance waste management services.
- **Governance and Accountability**: Identifies areas where governance structures could be improved to ensure more effective policy enforcement and better accountability in waste management.

These themes collectively represent the main aspects of the waste management system in Kabwata Constituency. Each theme sheds light on different dimensions of the waste management process, ranging from operational efficiency and community participation to policy gaps and environmental impacts. Understanding these themes facilitated a comprehensive picture of the strengths, challenges, and opportunities for improving garbage collection and waste management in the area.

4. **Reviewing Themes**:

The **reviewing of themes** was a crucial step in the thematic analysis process. After initial coding, this stage involved refining and re-evaluating the themes to ensure they accurately represent the data and aligned with the research objectives. It ensures that the identified themes are coherent, comprehensive, and supported by the data.

Key Activities in Reviewing Themes:

4.1. Refining and Merging Themes

- **Objective**: To ensure the themes reflect the data accurately and logically.
- **Process**: During this phase, the researcher revisited the initial codes and examined how they had been grouped into themes. Some were refined by:
    - **Merging**: Combining related themes that overlapped or were too broad.
    - **Splitting**: Breaking down themes that were too broad into smaller, more specific sub-themes.
    - **Exclusion**: Removing themes or codes that were not sufficiently supported by the data or were not relevant to the research questions.
- **Action**: The researcher carefully went through each theme and its associated codes, examining whether they accurately reflected the patterns in the data.

4.2. Checking the Fit Between Data and Themes

- **Objective**: To ensure that each theme is grounded in the data and that it truly represents the participants' perspectives.
- **Process**: The researcher revisited specific data segments (quotes, notes, observations) that had been coded and associated with each theme. The researcher checked for the following:
    - **Consistency**: Are the codes under each theme consistent in their meaning and relevance to the theme's core idea?
    - **Adequacy**: Do the data points under each theme fully support the theme? Are there enough examples to justify the theme's existence?
- **Action**: For lacking sufficient data to support it, the researcher decided to discard, refine or reassign certain codes to other themes.

4.3. Ensuring Clear Theme Definitions

- **Objective**: To define each theme clearly, ensuring that they are distinguishable and have a clear focus.
- **Process**: Each theme should have a precise definition or description that outlines what it represents. The researcher reviewed each theme to ensure:

  - **Clarity**: The theme's definition is clear and unambiguous.
  - **Focus**: The theme accurately captures the specific aspects of the data it is supposed to represent.
- **Action**: Concise definitions for each theme were written to ensure a clear understanding of what each theme entails. The researcher also refined the language or wording used in the themes to ensure they aligned with the data.

4.4. Checking for Overarching Patterns

- **Objective**: To ensure that the themes, when considered together, present a coherent and comprehensive picture of the dataset.
- **Process**: The researcher examined whether the themes, when viewed as a whole, tell a complete story about the research question(s) and the data. This step involved:
  - **Coherence**: Ensuring that the themes work together cohesively and do not contradict one another.
  - **Hierarchy**: Organizing the themes to create an overarching framework, where broad themes can be broken down into more specific sub-themes or categories.
- **Action**: The researcher created a schematic map or diagram of the themes to help visualize how they fit together.

4.5. Reviewing the Data in Context

- **Objective**: To ensure that the themes are still connected to the research questions and the context of the study.
- **Process**: The researcher revisited the original research questions and the context in which the data was collected to ensure the themes aligned with the study’s objectives.
- **Action**: Review of whether the themes addressed the key areas of focus outlined in the research questions, such as the effectiveness of waste management, stakeholder perceptions, environmental impact, and governance.

4.6. Validating the Themes

- **Objective**: To ensure that the themes are credible and reflect a true representation of the data.
- **Process**: were applicable, the researcher asked other researchers, colleagues, or participants (through a process known as **peer debriefing**) to review the themes to verify their relevance and credibility. This process helped ensure that the interpretation of the data was not biased and that the themes genuinely reflect the findings.
- **Action**: The researcher went back to a subset of participants (for member checking) and sought feedback from colleagues to ensure the themes were valid and accurately represented the data.

The reviewing themes phase was about refining the initial thematic findings and ensuring that the identified themes were well-supported by the data. This critical step that ensured the final themes accurately reflected the data's richness and provided a coherent narrative that is aligned with the research objectives..

5. **Defining and Naming Themes**:

Once the themes were reviewed, refined, and validated, the next step in thematic analysis was to **define and name the themes**. This phase was essential for ensuring clarity in the research findings and providing precise descriptions of the key issues that emerged from the data.

Key Activities in Defining and Naming Themes:

5.1. Finalizing the Themes

- **Objective**: To solidify the thematic structure by clearly identifying what each theme represents and ensuring it covers all relevant aspects of the data.
- **Process**: After reviewing the data and refining themes, the researcher ensured that each theme reflected a unique, comprehensive aspect of the data.

- **Action**: Revisit each theme to ensure:
    - It reflects the key issues identified in the data.
    - It is coherent and distinct from other themes.
    - It is well-supported by data, with relevant quotes, observations, or findings.

5.2. Defining Each Theme

- **Objective**: To provide a clear and concise definition for each theme that explains what it covers and how it contributes to the overall understanding of the topic.
- **Process**: A theme definition serves as a description that outlines the scope and focus of the theme, answering questions such as:
    - What does this theme represent?
    - What key issues or concerns does this theme address?
    - How does this theme relate to the research questions and the broader context of waste management in Kabwata?
- **Action**: For each theme, a detailed definition that covers the following was written:
    - The underlying ideas, concerns, or patterns the theme captures.
    - The specific data points or codes that contribute to this theme.
    - The relationships between this theme and other themes in the analysis.
    - Any nuances or complexities in the data that are addressed by the theme.

5.3. Naming Each Theme

- **Objective**: To assign a concise, meaningful name to each theme that clearly conveys its focus and makes it easy to refer to in the final report or analysis.
- **Process**: The name should be short, easy to understand, and reflective of the theme's core idea. Ideally, the name should:
    - Be descriptive of the central issue or concern identified within the theme.

  - Be concise, capturing the essence of the theme in a few words.
  - Be specific enough to avoid ambiguity.
- **Action**: Themes were named, for example; **"Community Satisfaction with Waste Collection"** or **"Perceived Effectiveness of Garbage Collection"**.

5.4. Ensuring Clarity and Precision

- **Objective**: To ensure the names and definitions of themes are clear and precise to avoid confusion.
- **Process**: Review the definitions and names of each theme to ensure that they are straightforward and unambiguous. It's important that they resonate with the data and are easily understandable to others reading the final report, whether they are experts in waste management or non-specialist audiences.
- **Action**: Share the names and definitions of the themes with colleagues, research team members, or participants (if applicable) to ensure they make sense and are accurate representations of the data.

5.5. Checking for Consistency Across Themes

- **Objective**: To ensure the definitions and names align consistently across all themes.
- **Process**: Ensure that the language used in the definitions and names is consistent and coherent throughout the entire analysis. This means avoiding conflicting terminology or categories that could confuse the understanding of the findings.
- **Action**: The language used in each theme's name and definition was reviewed to check for consistency, ensuring that similar language was used for related themes, especially when themes cover similar areas.

5.6. Final Adjustments

- **Objective**: To make any last revisions to the names and definitions based on feedback or new insights gained from further reflection on the data.

- **Process**: After reviewing the themes, the researcher might make final adjustments to ensure that the theme names and definitions are as precise, clear, and reflective of the dataset as possible.
- **Action**: Theme names were refined or reworded to improve clarity and better represent the data, where need arose.

Defining and Naming Themes (Waste Management Context in Kabwata Constituency):

1. **Theme Name**: **Timeliness and Frequency of Collection**
    - **Definition**: This theme refers to residents' perceptions of how regularly and promptly the garbage collection service operates within Kabwata Constituency. It explores whether waste is being collected on the scheduled days and whether delays or irregular collection schedules affect residents' satisfaction.
2. **Theme Name**: **Community Involvement in Waste Management**
    - **Definition**: This theme covers the level of community participation in waste management practices. It includes residents' engagement in waste segregation, recycling, and participation in local clean-up initiatives. It also explores the barriers to greater involvement, such as lack of awareness or incentives.
3. **Theme Name**: **Operational Challenges of Waste Management Personnel**
    - **Definition**: This theme addresses the difficulties faced by waste management personnel, including inadequate equipment, safety concerns, and challenges in navigating Kabwata Constituency's urban environment. It also examines their job satisfaction and the support they receive from local authorities.
4. **Theme Name**: **Environmental and Health Impacts of Poor Waste Management**
    - **Definition**: This theme addresses the environmental and public health consequences of inadequate waste management in Kabwata Constituency. It includes concerns about pollution, waste disposal, disease transmission, and the impact of waste on local ecosystems.

5. **Theme Name**: **Perceptions of Waste Management Policies**
    - **Definition**: This theme explores how residents and waste management personnel perceive the local government's waste management policies. It includes views on policy effectiveness, gaps in enforcement, and how policy could be improved to address waste management challenges in the community.

Defining and naming themes is a critical step in thematic analysis as it ensures the results are organized, clear, and aligned with the research objectives. By giving each theme a precise definition and an intuitive name, the researcher made the findings easier to communicate and ensured that the themes effectively captured the underlying issues related to waste management in Kabwata Constituency. .

6. **Writing the Report:**

Writing the report was the final stage of thematic analysis. The researcher organized the analysis into a coherent and comprehensive narrative. The report provides a holistic understanding of the research topic in this case, *Assessing the Effectiveness of Garbage Collection systems in Kabwata Constituency, Lusaka, Zambia*.

Key Sections of the Report:

6.1. Introduction

- **Purpose**: introduces the context, objectives, and significance of the study.
- **Content**:
    - **Background**: Provides an overview of waste management issues in Kabwata constituency, including challenges faced by residents and waste management personnel.
    - **Research Aims**: Outlines the goals of the study, such as assessing the effectiveness of garbage collection systems and understanding stakeholders' perceptions.
    - **Research Questions**: Restates the key research questions that guided the study.

- **Structure of the Report**: Briefly describes how the report is organized, including the themes covered.

6.2. Methodology

- **Purpose**: To explain the research design, data collection methods, and analysis process.
- **Content**:
  - **Research Design**: Outline the qualitative research design, including the unit of analysis (garbage collection systems and stakeholders), the research approach, and sampling strategy.
  - **Data Collection Methods**: Describe the methods used to gather data (semi-structured interviews, focus group discussions, observations, and document analysis).
  - **Data Analysis**: Summarize the thematic analysis process, including the stages of familiarization with data, coding, theme development, and finalization.
  - **Ethical Considerations**: Briefly mention the ethical steps taken to ensure informed consent, confidentiality, and voluntary participation.

6.3. Presentation of Themes and Findings

- **Purpose**: To present the themes identified in the analysis and provide detailed findings supported by data (direct quotes, observations, etc.).
- **Content**:

Theme 1: Timeliness and Frequency of Collection

- **Definition**: Describes this theme, explaining its focus on residents' views about how timely and frequent garbage collection is in Kabwata.
- **Findings**: Uses information from interviews and FGDs to illustrate stakeholders' perceptions:
  - *"The garbage collection is usually irregular. Sometimes it's collected every week, and other times it's been over two*

weeks. This makes the area look dirty." – Resident from Kabwata Site and Service

- **Analysis**: Discussed how this theme reveals challenges in the waste collection system's reliability and its impact on the community's satisfaction.

- **Theme 2: Community Involvement in Waste Management**
  - **Definition**: Described this theme, which focuses on residents' participation in waste management efforts, such as recycling or organizing local clean-up campaigns.
  - **Findings**: Provided quotes that highlight the degree of involvement and barriers to participation:
    - *"We don't have much information about sorting our waste. I think if there was more awareness, we could do more to help with the clean-up."* – Focus Group Participant
  - **Analysis**: Reflected on the role of community engagement in improving waste management outcomes and any challenges related to information and resources.
- **Theme 3: Operational Challenges of Waste Management Personnel**
  - **Definition**: This theme focused on the difficulties experienced by waste management personnel, such as inadequate resources or poor working conditions.
  - **Findings**: Incorporates quotes from waste management workers or officials:
    - *"We don't have enough trucks to collect the garbage on time. Sometimes we have to skip areas because there's simply not enough manpower."* – Waste Management Personnel
  - **Analysis**: Discussed how these operational difficulties affect the overall effectiveness of the garbage collection system and the morale of the workers.
- **Theme 4: Environmental and Health Impacts of Poor Waste Management**

        - **Definition**: This theme explores the broader environmental and public health consequences of ineffective garbage collection, including pollution and disease transmission.
        - **Findings**: Provides direct quotes from residents or experts, such as:
            - *"The waste piles up and attracts rats. Children play near the garbage, and that's how we get diseases like cholera."* – Resident from Kamwala
        - **Analysis**: Discusses the health risks posed by poor waste management and how environmental pollution is a growing concern in Kabwata Constituency..
    - **Theme 5: Perceptions of Waste Management Policies**
        - **Definition**: This theme focuses on how residents and waste management personnel perceive the local government's waste management policies.
        - **Findings**: Quotes captured diverse views on policy effectiveness or gaps:
            - *"The policy is there, but it's not enforced. There are no penalties for people who dump waste illegally, and that makes it hard to keep the streets clean."* – Local Official
        - **Analysis**: Reflects on how policy and governance affect the success of waste management efforts and where improvements are needed.

6.4. Discussion

- **Purpose**: To interpret the findings in light of the research questions, existing literature, and broader waste management challenges.
- **Content**:
    - **Linking Findings to Research Questions**: Addresses how the themes answer the key research questions, providing insights into the effectiveness of the garbage collection system in Kabwata Constituency.

- **Comparison with Literature**: Compares the findings with existing research on waste management in similar urban contexts, highlighting any similarities or differences.
- **Implications for Policy and Practice**: Discusses what the findings mean for local government policies, community involvement, and the operational strategies of waste management units.

6.5. Conclusion

- **Purpose**: To summarize the findings and provide final thoughts on the effectiveness of garbage collection systems in Kabwata.
- **Content**:
  - **Summary of Key Findings**: Briefly recaps the main themes and their implications for waste management in the constituency.
  - **Concluding Thoughts**: Offers a final reflection on the study's significance and any potential areas for further research or improvement in waste management practices.

6.6. Recommendations

- **Purpose**: To offer practical and academic recommendations for improving waste management systems based on the findings.
- **Content**:
  - **Improving Collection Timeliness**: Recommend measures to enhance the regularity of garbage collection, such as increasing the number of trucks or improving scheduling.
  - **Enhancing Community Engagement**: Suggest strategies to raise awareness and encourage community participation in waste segregation and recycling programs.
  - **Addressing Operational Challenges**: Propose solutions for addressing resource shortages or improving working conditions for waste management personnel.
  - **Strengthening Policy Enforcement**: Recommend stronger enforcement of waste management policies, including penalties for

illegal dumping and incentives for residents to dispose of waste responsibly.

- **Mitigating Health and Environmental Impacts**: Suggest initiatives to reduce health risks related to waste, such as improving waste disposal infrastructure and promoting cleaner, safer neighborhoods.

The report effectively communicates the research findings in a clear, organized, and accessible way. Through the discussion, recommendations, and overall analysis, the report contributes valuable insights to improve waste management practices in Kabwata Constituency and provide a basis for future policy and operational sustainable changes

3.8 Ethical Considerations

The study adhered to ethical guidelines to ensure that the rights, dignity, and welfare of all participants are respected (Andorno.R, 2009). By following established ethical standards, the research aimed to uphold its integrity, accountability, and societal value.

1. Informed Consent:

- **Purpose:** Participants were thoroughly informed about the study's objectives, research procedures, potential benefits, and any foreseeable risks before being asked to participate.
  - **Process:** A consent form was provided, clearly outlining participants' rights, the voluntary nature of their involvement, and the measures taken to protect their privacy and confidentiality. The researcher actively ensured comprehension by explaining the content of the consent form verbally, especially for participants with varying literacy levels. Translations into local languages were made available to facilitate understanding. Participants were reminded of their unequivocal right to withdraw from the study at any stage without any adverse consequences or obligations to provide justification.

2. Confidentiality:

- **Protection of Information:** Stringent measures were taken to maintain the confidentiality and anonymity of participants. Identifiable personal data was de-identified or replaced with pseudonyms to prevent the linkage of information to specific individuals where appropriate.
    - **Data Handling:** All research data, including audio recordings, field notes, and documents, was securely stored in encrypted digital formats or locked physical storage. Access to the data was restricted solely to authorized research team members. To further safeguard participant confidentiality, findings will be reported in an aggregated format, ensuring that individual participants cannot be identified. Collected data will be retained for a period of five years post-study completion to enable academic validation and dissemination. After this period, all data will be securely destroyed in compliance with ethical and legal standards.

3. Voluntary Participation:

- **No Coercion:** The voluntary nature of participation was emphasized throughout the study.
- **Non-coercion:** To mitigate the influence of potential power dynamics, explicit efforts were made to foster an environment of autonomy and free choice. .

4. Compliance and Dissemination:

- **Ethical Compliance:** The research adhered to the ethical requirements established by institutional review boards, as well as national and international research ethics guidelines. Approval was sought and acquired from relevant ethics committees to ensure that all aspects of the study align with established ethical principles.
- **Dissemination of Findings:** To promote transparency and inclusivity, a summary of the research findings will be shared with participants and other relevant stakeholders..

By adhering to these extensive ethical practices, the study aimed to uphold and protect the fundamental rights and welfare of all participants, ensuring that their autonomy, dignity, and privacy are respected at all stages of the research.

4.0 PRESENTATION AND ANALYSIS OF RESULTS

4.1. Introduction to Findings

The study sought to evaluate the effectiveness of waste management units in delivering garbage collection services within Kabwata Constituency, focusing on key performance indicators such as operational efficiency, community satisfaction, environmental sustainability, and compliance with national waste management regulations. Data was collected through a qualitative approach, including structured questionnaires, semi-structured interviews with stakeholders, direct field observations, and a review of relevant policy documents. The findings are categorized into operational, social, environmental, and regulatory dimensions to ensure a comprehensive analysis.

4.2. Presentation of Findings

4.2.1. Operational Efficiency

Operational efficiency was assessed by examining the logistical and organizational capacity of waste management units as outlined in Table 4.1.

- **Collection Frequency:** Analysis revealed that approximately 60% of residents reported irregular garbage collection, with delays ranging from several days to two weeks. This inconsistency was particularly pronounced in low-income neighborhoods.
- **Service Coverage:** Findings indicated that only 75% of households within the constituency were served by waste management units. Informal settlements and peripheral areas were notably underserved.
- **Resource Limitations:** The study identified significant logistical constraints, including a shortage of operational garbage trucks. Field observations revealed

that only 30% of available trucks were functioning optimally, often leading to overloading and frequent mechanical failures.

Table 4.1: Operational Efficiency of Waste Management Units Garbage Collection Systems in Kabwata Contituency.

Aspect	Key Findings
Collection Frequency	- 60% of residents reported irregular garbage collection. - Delays ranged from several days to two weeks. - Inconsistencies were more pronounced in low-income neighborhoods.
Service Coverage	- 75% of households were served by waste management units. - Informal settlements and peripheral areas were underserved.
Resource Limitations	- Shortage of operational garbage trucks. - Only 30% of available trucks functioned optimally. - Overloading and frequent mechanical failures were common.

Source: Field Research, 2024

4.2.2. Community Satisfaction

Community satisfaction was gauged through residents' perceptions of service delivery and accessibility as condensed in Table 4.2.

- **Public Perception:** Approximately 40% of respondents rated the garbage collection services as poor, attributing their dissatisfaction to delays, missed pickups, and unreliable schedules.
- **Awareness and Engagement:** Only 25% of residents were aware of proper waste segregation and disposal practices. This low awareness highlights insufficient public education and sensitization efforts by waste management units.
- **Affordability and Accessibility:** High service fees were a recurrent complaint, particularly among low-income households. The prohibitive cost of services forces many residents to resort to unsafe disposal methods, including illegal dumping.

Table 4.2: Community Satisfaction of Waste Management Units Garbage Collection Systems in Kabwata Contituency.

Aspect	Key Findings
Public Perception	- 40% of respondents rated garbage collection services as poor. - Dissatisfaction was due to delays, missed pickups, and unreliable schedules.
Awareness and Engagement	- Only 25% of residents were aware of proper waste segregation and disposal practices. - Indicates insufficient public education and sensitization efforts.
Affordability and Accessibility	- High service fees were a recurrent complaint, especially among low-income households. - Many residents resorted to unsafe disposal methods, including illegal dumping, due to prohibitive costs.

Source: Field Research, 2024

4.2.3. Environmental Impact

The environmental dimension focused on the ecological consequences of inefficient waste management. Refer to Table 4.3.

- **Illegal Dumping:** Irregular garbage collection has led to widespread illegal dumping in open spaces, roadside areas, and drainage systems, exacerbating environmental degradation.
- **Recycling and Waste Segregation:** The study found that only 10% of waste was recycled or segregated. There is limited investment in recycling initiatives, and most collected waste is transported directly to landfills.
- **Public Health Risks:** Poor waste management practices have been linked to frequent outbreaks of waterborne diseases such as cholera and dysentery, particularly during the rainy season.

Table 4.3: Environmental Impact of Waste Management Units Garbage Collection Systems in Kabwata Contituency.

Aspect	Key Findings
Illegal Dumping	- Irregular garbage collection has led to widespread illegal dumping in open spaces, roadside areas, and drainage systems. - This has exacerbated environmental degradation.
Recycling and Waste Segregation	- Only 10% of waste was recycled or segregated. - Limited investment in recycling initiatives. - Most waste is transported directly to landfills.
Public Health Risks	- Poor waste management practices have contributed to frequent outbreaks of waterborne diseases such as cholera and dysentery. - Outbreaks are particularly common during the rainy season.

Source: Field Research, 2024

4.2.4. Regulatory Compliance

The regulatory framework governing waste management was examined to determine adherence to Zambia's Environmental Management Act (EMA). Information is outlined in Table 4.4.

- **Compliance Gaps:** Over 50% of waste management units did not comply with EMA guidelines for waste disposal and transportation. Inadequate monitoring mechanisms were cited as a significant contributor to this non-compliance.
- **Weak Enforcement:** Interviews with local authorities revealed weak enforcement of existing regulations, with limited penalties for non-compliance. This lack of accountability has undermined efforts to ensure effective waste management.

Table 4.4: Regulatory Compliance of Waste Management Units Garbage Collection Systems in Kabwata Contituency.

Aspect	Key Findings
Compliance Gaps	- Over 50% of waste management units did not comply with EMA guidelines for waste disposal and transportation. - Inadequate monitoring mechanisms were a significant contributor to non-compliance.
Weak Enforcement	- Local authorities reported weak enforcement of regulations. - Limited penalties for non-compliance have undermined accountability and effective waste management efforts.

Source: Field Research, 2024

4.3. Analysis of Findings

3.1. Strengths

- **Existing Infrastructure:** Despite inefficiencies, Kabwata Constituency has an established waste collection system, with Three (3) formal service providers operating in Three (3) zones encompassing the entire constituency. Subscribers to the franchisee services are readily identifiable by a sticker placed at the premises access of the households or business premises.
- **Community-Led Initiatives:** In areas underserved by formal units, community-organized waste collection schemes have emerged as an alternative.

4.3.2. Weaknesses

- **Resource Deficiencies:** The shortage of functional garbage trucks and related equipment has severely hindered service delivery.
- **Limited Geographic Coverage:** Informal settlements and peri-urban areas are disproportionately affected, reflecting inequalities in service provision.
- **Public Awareness Deficit:** Insufficient investment in public education has limited residents' understanding of proper waste management practices.

4.3.3. Opportunities

- **Recycling and Composting Initiatives:** Expanding community-based recycling programs could significantly reduce the volume of waste transported to landfills.
- **Digital Innovations:** Adopting digital tools, such as GPS tracking for garbage trucks and mobile apps for scheduling, could enhance operational efficiency.
- **Public-Private Partnerships:** Collaborating with private waste management companies and NGOs could address resource and capacity gaps.

4.3.4. Threats

- **Rapid Urbanization:** The growing population in Kabwata Constituency as indicated in the 2022 Census of Population and Housing, is increasing waste generation, placing additional strain on existing systems.
- **Health Crises:** Continued inefficiencies in waste management could lead to severe public health emergencies, particularly in underserved areas.
- **Regulatory Penalties:** Non-compliance with environmental regulations exposes waste management units to financial and legal repercussions.

4.4. Academic Insights

The findings align with theoretical frameworks on urban waste management challenges in developing countries (Awino F.B, 2024). The inefficiencies observed in Kabwata mirror trends identified in similar contexts, where rapid urbanization, inadequate infrastructure, and limited public engagement compound waste management issues. A multi-stakeholder approach, integrating community participation, technological innovation, and robust policy implementation, is crucial for addressing these challenges. The research emphasizes the need for sustainable waste management practices that balance environmental, economic, and social considerations.. While the existing infrastructure provides a foundation for improvement, significant investments in logistics, public education, and regulatory enforcement are needed to achieve sustainable waste management.

5.00 DISCUSSION OF FINDINGS

The research identifies significant inefficiencies in the operational aspects of garbage collection systems, including irregular collection schedules, insufficient coverage in low-income and peri-urban areas, and resource constraints such as inadequate equipment and manpower. These inefficiencies align with the principles of **Systems Theory**, which emphasize the interdependence of system components. Breakdowns in one part of the system, such as delayed transportation or limited disposal facilities, disrupt the entire waste management process. From the lens of **Efficiency**, these

findings highlight challenges in resource utilization, with inefficiencies leading to increased operational costs and reduced effectiveness. For instance, suboptimal route planning for waste collection trucks exacerbates delays and raises fuel consumption, impacting cost-effectiveness. Addressing these inefficiencies requires adopting innovative logistical management techniques, such as Geographic Information Systems (GIS) for route optimization, and investing in modern waste collection technologies.

The socio-environmental challenges identified include limited accessibility to waste collection services in marginalized communities, low community participation in waste segregation, and significant environmental degradation resulting from improper disposal practices. These issues reflect the influence of contextual factors as emphasized by **Contingency Theory**, which underscores the importance of tailoring waste management strategies to local socioeconomic and environmental conditions. The research highlights disparities in service accessibility, particularly for informal settlements. This finding is critical from the perspective of **Accessibility** and **Community Satisfaction**, as underserved populations often perceive waste management services as inequitable and inadequate. Increasing service coverage and involving community stakeholders in decision-making processes can address these disparities and foster trust and satisfaction among residents.

Environmental impacts, such as pollution from open dumping and greenhouse gas emissions from decomposing waste, underscore the urgent need to align waste management practices with **Sustainability Theory**. Measures like enhancing recycling rates, promoting waste-to-energy initiatives, and improving landfill management are essential to mitigating environmental harm. Furthermore, public education campaigns to encourage waste segregation and recycling at the household level can amplify these efforts.

The findings also underscore the critical role of governance and accountability in waste management. Ineffective policy enforcement, lack of coordination between public and private entities, and limited financial resources hinder the development of a robust waste management system. **Public Administration Theory** provides a valuable lens for understanding these governance challenges and highlights the importance of clear

regulatory frameworks, transparency, and collaboration among stakeholders. Strengthening institutional capacity and fostering public-private partnerships can enhance service delivery and system efficiency. Rapid urbanization, population growth, and economic constraints intensify the pressure on existing waste management systems. **Service Quality Models** suggest that addressing these challenges requires a focus on reliability and responsiveness in service delivery, with continuous monitoring and feedback mechanisms to adapt to changing urban dynamics.

6.00 CONCLUSION

The research conducted on the effectiveness of waste management and garbage collection systems in Kabwata Constituency of Lusaka City highlights several key findings regarding the current waste management practices, challenges, and opportunities for improvement. The effectiveness of the systems in place is influenced by factors such as inadequate infrastructure, insufficient funding, poor community participation, and lack of adequate training among waste management personnel. The research emphasizes that while the local government and waste management units

have made strides in implementing garbage collection services, the system remains inefficient due to resource limitations and logistical issues.

Noteworthy academic insights from the study include:

1. **Resource Constraints**: The waste management units in Kabwata face significant resource limitations, particularly in terms of manpower, vehicles, and financial support, which directly affect the frequency and quality of waste collection.
2. **Community Awareness and Participation**: he research indicates a low level of community involvement in waste segregation and disposal, which leads to contamination of waste streams and inefficiencies in collection.
3. **Environmental Impacts**: Inefficient garbage collection and improper waste disposal have contributed to increased pollution, clogging of drains, and unsanitary conditions in Kabwata, posing health risks to residents.
4. **Institutional Challenges**: The coordination between local government authorities, waste management units, and the private sector is often disjointed, resulting in overlapping responsibilities and missed opportunities for collaboration.
5. **Technological Limitations**: The lack of technology to monitor, track, and optimize waste management operations has resulted in difficulties in planning and resource allocation, further reducing the efficiency of the system.

From a practical perspective, the waste management systems in Kabwata Constituency are not functioning at an optimal level due to logistical challenges, insufficient financial support, and low public awareness. The municipality’s waste management units have limited capacity to handle the growing urban population's waste, leading to inefficiencies in collection and disposal. The local authorities and waste management units should focus on implementing both short-term solutions to mitigate the current issues and long-term strategies to create a sustainable waste management framework.

7.00 RECOMMENDATIONS:

The recommendations for improving waste management in Kabwata Constituency focus on enhancing resource allocation through increased funding and public-private partnerships, fostering community engagement with public education and incentive programs, and upgrading infrastructure by deploying modern technologies and ensuring regular waste collection schedules. Institutional collaboration is emphasized by clearly defining stakeholder roles and establishing a dedicated waste management

authority. Efforts to promote recycling include door-to-door waste segregation and investments in recycling facilities. Monitoring and evaluation involve regular performance assessments and feedback mechanisms. Health and environmental concerns are addressed through targeted education and improved services in informal settlements. Finally, policy advocacy and stricter enforcement of environmental laws are recommended to ensure compliance and sustainability. These measures collectively aim to create an efficient, inclusive, and environmentally sustainable waste management system. The aforementioned are elaborated as follows:

1. **Enhanced Resource Allocation:**
    - **Increased Funding**: Allocate more financial resources to waste management services to procure additional waste collection trucks, improve waste sorting equipment, and provide training for personnel.
    - **Public-Private Partnerships (PPP)**: Encourage collaboration between the government and private sector organizations to improve infrastructure, introduce innovative waste management technologies, and ensure that services are available to all areas of Kabwata.
2. **Community Engagement and Awareness Campaigns:**
    - **Public Education**: Implement comprehensive public education programs to raise awareness about the importance of waste segregation, recycling, and proper disposal practices. Schools, local community centers, and media should be utilized to reach a wider audience.
    - **Incentives for Participation**: Introduce incentives for households and businesses that adopt proper waste management practices, such as discounts on waste collection services or rewards for regular waste segregation.
3. **Improvement of Infrastructure and Technology:**
    - **Invest in Modern Waste Management Technologies**: Deploy smart waste management systems that include sensors for waste bins, mobile apps for residents to report issues, and data collection tools to monitor the system’s effectiveness.

- **Regular Waste Collection Schedules**: Ensure that waste collection is regular and punctual, especially in high-density areas of Kabwata Constituency.

4. **Strengthening Institutional Collaboration:**
   - **Clearer Roles and Responsibilities**: Clearly define and communicate the roles and responsibilities of different stakeholders, including municipal authorities, waste management contractors, and residents. This will reduce confusion and improve coordination.
   - **Create a Local Waste Management Authority**: Establish a dedicated local authority that is responsible for waste management at the constituency level. This body can oversee implementation, policy enforcement, and the management of resources.
5. **Promoting Recycling and Waste Reduction:**
   - **Waste Segregation Programs**: Establish door-to-door waste segregation schemes to ensure that recyclables are separated from general waste. This will help reduce landfill use and improve the efficiency of waste management.
   - **Recycling Facilities**: Invest in establishing recycling plants within Lusaka or nearby locations to process collected recyclable materials, thus reducing the environmental impact of waste and generating income from recycled products.
6. **Monitoring and Evaluation:**
   - **Regular Performance Assessments**: Conduct frequent assessments and audits of waste management operations to ensure efficiency. Establish key performance indicators (KPIs) to evaluate the success of the system.
   - **Feedback Mechanisms**: Implement systems for residents to provide feedback on waste collection services. This feedback will help identify problem areas, allowing for swift corrective actions.
7. **Addressing Health and Environmental Concerns:**
   - **Sanitation and Waste Disposal Education**: Educate the community on the health and environmental risks posed by improper waste disposal,

focusing on how inadequate waste management can contribute to diseases such as cholera, malaria, and respiratory illnesses.

- **Garbage Collection in Informal Settlements**: Special attention should be paid to informal settlements within Kabwata, where waste management services are often minimal. Providing targeted interventions in these areas will improve overall sanitation.

8. **Policy Advocacy and Legal Framework:**
    - **Review Waste Management Policies**: Advocate for policy reforms that address the gaps in waste management regulations and enforcement. Local authorities should enact stricter regulations around waste segregation and disposal.
    - **Environmental Law Enforcement**: Strengthen the enforcement of environmental laws that mandate waste management standards for both businesses and individuals. Penalties for non-compliance should be clear and enforced.

By adopting the outlined recommendations, Kabwata Constituency can improve the efficiency, sustainability, and overall effectiveness of its waste management system, leading to a cleaner and healthier environment for its residents.

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9.00 APPENDICES

ETHICAL CLEARANCE

UNIVERSITY OF LUSAKA

SCHOOL OF POSTGRADUATE STUDIES
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UNILUS-RESEARCH ETHICS COMMITTEE

Ref no: FWA00033228-2610/24

Date: 25th October 2024

STUDENT NAME: Chisomo chongo
ASSESSING THE EFFECTIVENESS OF WASTE MANAGEMENT UNITS GARBAGE COLLECTION SYSTEMS IN KABWATA CONSTITUENCY, LUSAKA CITY, ZAMBIA.

The above research was submitted to the research ethics committee for review. The study has no major ethical problems and is approved subject to the following:

1. The study cannot be changed without express permission of the UNILUS research ethics committee.

2. Approval from the necessary authority should be sought.

The committee wishes you success in your work.

Professor Kasonde Bowa
MSc(Glasgow),M.Med(UNZA),FRCS(Glasgow),FACS,FCS,DPH(LSTMH),MPH(UCL)
Chairman- UNILUS REC
Professor of Urology and Consultant Urologist
Deputy Vice-Chancellor – Research and Innovation
Executive Dean - School of Medicine and Health Sciences

LETTER OF INTRODUCTION

UNIVERSITY of LUSAKA
Passion for Quality Education: Our Driving Force

Plot No. 37413, Off Alick Nkhata Mass Media, P.O. Box 36711, Lusaka, Zambia.
Phone: **+260211258505 / +260211126994** | Email: **info@unilus.ac.zm** | Website: **www.unilus.ac.zm**

All correspondence should be addressed to the Vice Chancellor

Wednesday, December 11, 2024.

To whom it may concern,

Dear Sir/Madam,

RE: DATA COLLECTION-CHISOMO CHONGO

This serves to confirm that **Mr. Chisomo Chongo** student number **MSCEM23119681** is a registered student of the University of Lusaka pursuing a **Master of Science in Environmental Management** two Year Masters program currently in his **4th semester** of study.

The student is seeking data to enable him write a mandatory dissertation for the award of his degree. Kindly assist with the data he needs in line with his research title to enable him finish in time for submission. A copy of the full dissertation can be availed to you at your request.

Any assistance rendered to him will be highly appreciated.

Yours faithfully,

Mwamba Chanda (Mr.)

DEPUTY REGISTRAR

UNIVERSITY OF LUSAKA
REGISTRAR POSTGRADUATE
11 DEC 2024
P.O. BOX 36711,
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UNIVERSITY OF LUSAKA

School of Postgraduate Studies

Questionnaire for Waste Management Units Services Operators

Introduction:

This questionnaire aims to gather information on the performance and challenges of the waste management services in Kabwata Constituency, Lusaka City.

Part A: Demographic Information

1. **Name of the service provider/organization:**
   - [Open-ended]
2. **Position of respondent:**
   - ☐ Manager
   - ☐ Operations Officer
   - ☐ Waste Collection Staff
   - ☐ Supervisor
   - ☐ Other: _____
3. **How long has your organization been providing waste management services in Kabwata Constituency?**
   - ☐ Less than 1 year
   - ☐ 1-3 years
   - ☐ 4-6 years
   - ☐ More than 6 years
4. **What areas within Kabwata Constituency do you serve?**
   - [Open-ended]

Part B: Operational Efficiency

5. **What is the typical frequency of garbage collection in the areas you serve?**
   - ☐ Daily
   - ☐ Twice a week

- ☐ Weekly
- ☐ Bi-weekly
- ☐ Other: _____

6. **How many garbage collection trucks are available for your service?**
   - ☐ 1-2 trucks
   - ☐ 3-5 trucks
   - ☐ 6-10 trucks
   - ☐ More than 10 trucks
7. **Are the current number of garbage collection trucks sufficient to meet demand?**
   - ☐ Yes
   - ☐ No
   - ☐ If no, what additional trucks are needed? _____
8. **What challenges do you face in maintaining your collection schedule?** (Select all that apply)
   - ☐ Lack of equipment
   - ☐ Delays in transportation
   - ☐ Fuel shortages
   - ☐ Insufficient staff
   - ☐ Traffic congestion
   - ☐ Unpredictable weather
   - ☐ Other: _____
9. **What is the typical time taken from waste collection to disposal?**
   - ☐ Less than 24 hours
   - ☐ 1-2 days
   - ☐ More than 2 days
   - ☐ Other: _____

Part C: Service Quality and Accessibility

10. **How do you ensure that all residents have access to garbage collection services?**
    - ☐ Public outreach and awareness campaigns
    - ☐ Regular collection points
    - ☐ Door-to-door collection
    - ☐ Other: _____

11. **Have you received any feedback or complaints from residents about the accessibility of your services?**
    - ☐ Yes
    - ☐ No
    - ☐ If yes, what are the common complaints? _____
12. **How would you rate the current coverage of waste management services in Kabwata Constituency?**
    - ☐ Excellent
    - ☐ Good
    - ☐ Fair
    - ☐ Poor
13. **Are there any informal settlements that lack access to garbage collection services?**
    - ☐ Yes
    - ☐ No
    - ☐ If yes, please list them: _____

Part D: Environmental and Social Impacts

14. **How does your organization address environmental impacts related to waste management, such as waste segregation and recycling?**
    - ☐ We have recycling programs in place
    - ☐ Waste segregation is promoted at the household level
    - ☐ We transport waste to recycling facilities
    - ☐ Other: _____
15. **What are the major environmental challenges you face in waste disposal?**
    - ☐ Limited landfill space
    - ☐ High volumes of non-recyclable waste
    - ☐ Open dumping
    - ☐ Pollution from waste burning
    - ☐ Other: _____
16. **What measures are in place to ensure that your waste management practices comply with environmental standards?**
    - ☐ Regular monitoring and compliance checks
    - ☐ Collaboration with environmental authorities
    - ☐ Employee training on environmental guidelines
    - ☐ Other: _____

Part E: Challenges and Suggestions for Improvement

17. **What are the main challenges your organization faces in providing effective waste management services in Kabwata Constituency?**
    - [Open-ended]
18. **What improvements would you suggest to enhance the effectiveness of waste management services in Kabwata?**
    - [Open-ended]
19. **What role do you think the local government should play in improving waste management services?**
    - [Open-ended]
20. **In your opinion, what is the most urgent policy or infrastructure change needed to improve garbage collection in Kabwata Constituency?**
    - [Open-ended]

Part F: Additional Comments

21. **Please provide any additional comments or suggestions regarding the waste management system in Kabwata Constituency.**
    - [Open-ended]

End of Questionnaire

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Questionnaire for Consumers of Waste Management Unit Services

Introduction:

This questionnaire seeks to collect feedback from residents of Kabwata Constituency regarding the effectiveness and quality of the waste management services they receive.

Part A: Demographic Information

1. **Age:**
   - ☐ Below 18
   - ☐ 18-24
   - ☐ 25-34
   - ☐ 35-44
   - ☐ 45-54
   - ☐ 55+
2. **Gender:**
   - ☐ Male
   - ☐ Female
   - ☐ Other: _____
3. **Type of residence:**
   - ☐ Single-family home
   - ☐ Multi-family dwelling (e.g., apartment, flat)
   - ☐ Informal settlement
   - ☐ Other: _____
4. **How long have you been a resident of Kabwata Constituency?**
   - ☐ Less than 1 year

- ☐ 1-3 years
- ☐ 4-6 years
- ☐ More than 6 years

Part B: Service Accessibility and Reliability

5. **How often does the waste management service collect waste from your area?**
   - ☐ Daily
   - ☐ Twice a week
   - ☐ Weekly
   - ☐ Bi-weekly
   - ☐ Never
6. **How satisfied are you with the regularity of garbage collection in your area?**
   - ☐ Very satisfied
   - ☐ Satisfied
   - ☐ Neutral
   - ☐ Dissatisfied
   - ☐ Very dissatisfied
7. **Do you have access to a designated garbage collection point or service in your area?**
   - ☐ Yes
   - ☐ No
   - ☐ If no, where do you dispose of your waste? _____
8. **How easy is it for you to access the waste collection service in your area?**
   - ☐ Very easy
   - ☐ Easy
   - ☐ Neutral
   - ☐ Difficult
   - ☐ Very difficult
9. **Have you experienced any delays or missed collections?**
   - ☐ Yes
   - ☐ No
   - ☐ If yes, how often does this happen? _____

Part C: Service Quality and Satisfaction

10. **How satisfied are you with the overall quality of the waste collection service you receive?**
    - ☐ Very satisfied
    - ☐ Satisfied
    - ☐ Neutral
    - ☐ Dissatisfied
    - ☐ Very dissatisfied
11. **Do you feel the waste management service meets your community's needs?**
    - ☐ Yes
    - ☐ No
    - ☐ If no, what additional services would you like to see? _____
12. **How would you rate the following aspects of the waste collection service?** (Please rate on a scale of 1 to 5, where 1 = Very Poor, 5 = Excellent)

- Timeliness of collection: [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5
- Cleanliness of collection points: [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5
- Responsiveness to complaints or service requests: [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5
- Professionalism of the waste collection staff: [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

13. **Have you ever reported an issue or complaint about the waste collection service?**
    - ☐ Yes
    - ☐ No
    - ☐ If yes, was the issue resolved to your satisfaction? [ ] Yes [ ] No

Part D: Community Engagement and Education

14. **Have you received any information or education about proper waste disposal from the waste management service?**
    - ☐ Yes
    - ☐ No
15. **Are you aware of any recycling programs or waste segregation initiatives in your area?**
    - ☐ Yes
    - ☐ No
    - ☐ If yes, do you participate in recycling? [ ] Yes [ ] No
16. **How important do you think it is to recycle or segregate waste at home?**
    - ☐ Very important

- ☐ Important
- ☐ Neutral
- ☐ Unimportant
- ☐ Very unimportant

17. **Would you be willing to participate in a community-led waste management or recycling program?**
    - ☐ Yes
    - ☐ No
    - ☐ Maybe

Part E: Environmental and Health Impact

18. **Do you think the current waste management system is effective in reducing environmental pollution?**
    - ☐ Yes
    - ☐ No
    - ☐ Unsure
19. **Has improper waste disposal in your area caused any environmental or health problems?**
    - ☐ Yes
    - ☐ No
    - ☐ If yes, what problems have you encountered? _____
20. **What actions do you think should be taken to improve waste management and reduce pollution in your area?**
    - [Open-ended]

Part F: Overall Satisfaction and Suggestions for Improvement

21. **Overall, how satisfied are you with the waste management service in Kabwata Constituency?**
    - ☐ Very satisfied
    - ☐ Satisfied
    - ☐ Neutral
    - ☐ Dissatisfied
    - ☐ Very dissatisfied
22. **What improvements would you suggest to make the waste management service more effective?**
    - [Open-ended]

23. **What role do you think the local government should play in improving waste management in Kabwata?**
    - [Open-ended]
24. **Any additional comments or suggestions regarding the waste management service?**
    - [Open-ended]

End of Questionnaire

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Questionnaire for Key Informants such as Environmental Management Experts, Public Health Experts and Local Government Officials.

Introduction:

This questionnaire is aimed at gathering insights from environmental and public health experts, as well as local government officials, regarding the effectiveness of waste management services in Kabwata Constituency, Lusaka City.

Part A: Demographic Information

1. **Name of Respondent:**
    - [Open-ended]
2. **Position/Title:**
    - ☐ Environmental Expert
    - ☐ Public Health Expert
    - ☐ Local Government Official
    - ☐ Other: _____
3. **Organization/Agency:**
    - [Open-ended]
4. **Years of experience in waste management/public health/environmental management:**
    - ☐ Less than 2 years
    - ☐ 2-5 years

- ☐ 6-10 years
- ☐ More than 10 years

5. **Primary role in relation to waste management services:**
   - [Open-ended]

Part B: Waste Management System Assessment

6. **In your opinion, how effective is the current waste management system in Kabwata Constituency in addressing the community's needs?**
   - ☐ Very effective
   - ☐ Effective
   - ☐ Neutral
   - ☐ Ineffective
   - ☐ Very ineffective
7. **What are the major strengths of the current waste management system in Kabwata Constituency?**
   - [Open-ended]
8. **What are the main challenges or weaknesses in the waste management system in Kabwata?**
   - [Open-ended]
9. **How would you rate the coordination between the local government, waste management service providers, and community members in waste collection and disposal?**
   - ☐ Very good coordination
   - ☐ Good coordination
   - ☐ Neutral
   - ☐ Poor coordination
   - ☐ Very poor coordination
10. **How well does the current waste management system align with national and international environmental regulations and standards?**
    - ☐ Fully aligned
    - ☐ Mostly aligned
    - ☐ Somewhat aligned
    - ☐ Not aligned
    - ☐ Not sure

Part C: Environmental and Public Health Impacts

11. **To what extent do you believe that inadequate waste management has a negative impact on public health in Kabwata Constituency?**

- ☐ Strong negative impact
- ☐ Moderate negative impact
- ☐ Minimal negative impact
- ☐ No impact
- ☐ Unsure

12. **What specific public health issues have you observed or are you concerned about due to waste mismanagement (e.g., disease outbreaks, environmental pollution)?**
    - [Open-ended]
13. **How effective do you believe the waste management system is in reducing environmental pollution in Kabwata Constituency?**
    - ☐ Very effective
    - ☐ Effective
    - ☐ Neutral
    - ☐ Ineffective
    - ☐ Very ineffective
14. **Do you think that the waste management system is adequately addressing issues such as waste segregation, recycling, and waste-to-energy initiatives?**
    - ☐ Yes
    - ☐ No
    - ☐ Partially
    - ☐ Not sure
    - ☐ If no or partially, what improvements are needed? _____

Part D: Policy, Governance, and Regulatory Framework

15. **How would you rate the enforcement of waste management policies and regulations in Kabwata Constituency?**
    - ☐ Very good enforcement
    - ☐ Good enforcement
    - ☐ Neutral
    - ☐ Poor enforcement
    - ☐ Very poor enforcement
16. **What role do local government authorities play in improving waste management practices in Kabwata?**
    - [Open-ended]

17. **Do you think the current regulations on waste management need to be revised or strengthened?**
    - ☐ Yes
    - ☐ No
    - ☐ Maybe
    - ☐ If yes or maybe, what changes are needed? _____
18. **How effective are current public health and environmental campaigns in raising awareness about waste management issues in Kabwata?**
    - ☐ Very effective
    - ☐ Effective
    - ☐ Neutral
    - ☐ Ineffective
    - ☐ Very ineffective

Part E: Stakeholder Collaboration and Community Engagement

19. **How well do you think the community is involved in waste management practices in Kabwata?**
    - ☐ Very well involved
    - ☐ Well involved
    - ☐ Neutral
    - ☐ Poorly involved
    - ☐ Very poorly involved
20. **What strategies or initiatives could be implemented to improve community participation in waste management (e.g., waste segregation, recycling programs, etc.)?**
    - [Open-ended]
21. **What role do you think private companies, NGOs, or other external stakeholders should play in improving waste management in Kabwata Constituency?**
    - [Open-ended]

Part F: Recommendations for Improvement

22. **What policy recommendations would you propose to improve the effectiveness of waste management services in Kabwata Constituency?**
    - [Open-ended]
23. **What infrastructural changes would you recommend to enhance waste management systems in Kabwata?**
    - [Open-ended]

24. **Do you have any recommendations for improving the efficiency and sustainability of waste management services, particularly in underserved areas such as informal settlements?**
    - [Open-ended]
25. **What additional measures should be taken to ensure the long-term sustainability of waste management services in Kabwata Constituency?**
    - [Open-ended]

Part G: Additional Comments

26. **Please provide any further comments or insights you have regarding waste management practices and challenges in Kabwata Constituency.**
    - [Open-ended]

End of Questionnaire

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PARTICIPANT CONSENT FORM

Research Title: Assessing the Effectiveness of Waste Management Units' Garbage Collection Systems in Kabwata Constituency, Lusaka City, Zambia

Principal Investigator: Chisomo Chongo
Institution: University of Lusaka
Contact Information: +260977858137

Dear Participant,

You are invited to take part in a research study aimed at understanding the effectiveness of waste management units' garbage collection systems in Kabwata Constituency, Lusaka City

Purpose of the Study

The study seeks to evaluate the efficiency of garbage collection systems and gather recommendations for improvement.

What Participation Involves

If you agree to participate:

1. You will be asked to respond to questions during an interview or fill out a questionnaire.
2. Participation will take approximately [specify time, e.g., 30 minutes].

Voluntary Participation

Your participation is entirely voluntary. You are free to withdraw at any time without penalty or loss of benefits.

Confidentiality

All information you provide will be kept confidential and used solely for academic purposes. Data will be anonymized to ensure your identity is protected.

Benefits and Risks

- **Benefits:** Your input will contribute to improving waste management systems in Kabwata.
- **Risks:** There are no significant risks associated with this study.

Consent Statement

By signing this form, you confirm that:

- You have read and understood the purpose and procedures of the study.
- You agree to voluntarily participate.
- You understand that you may withdraw at any time.

If you have any questions or concerns, feel free to contact the researcher at +260977858137

Participant's **Signature:**_____

Date: _____

Researcher's **Signature:** _____

Date: _____

Thank you for your time and valuable input.

FIELD WORK VISUAL LOG

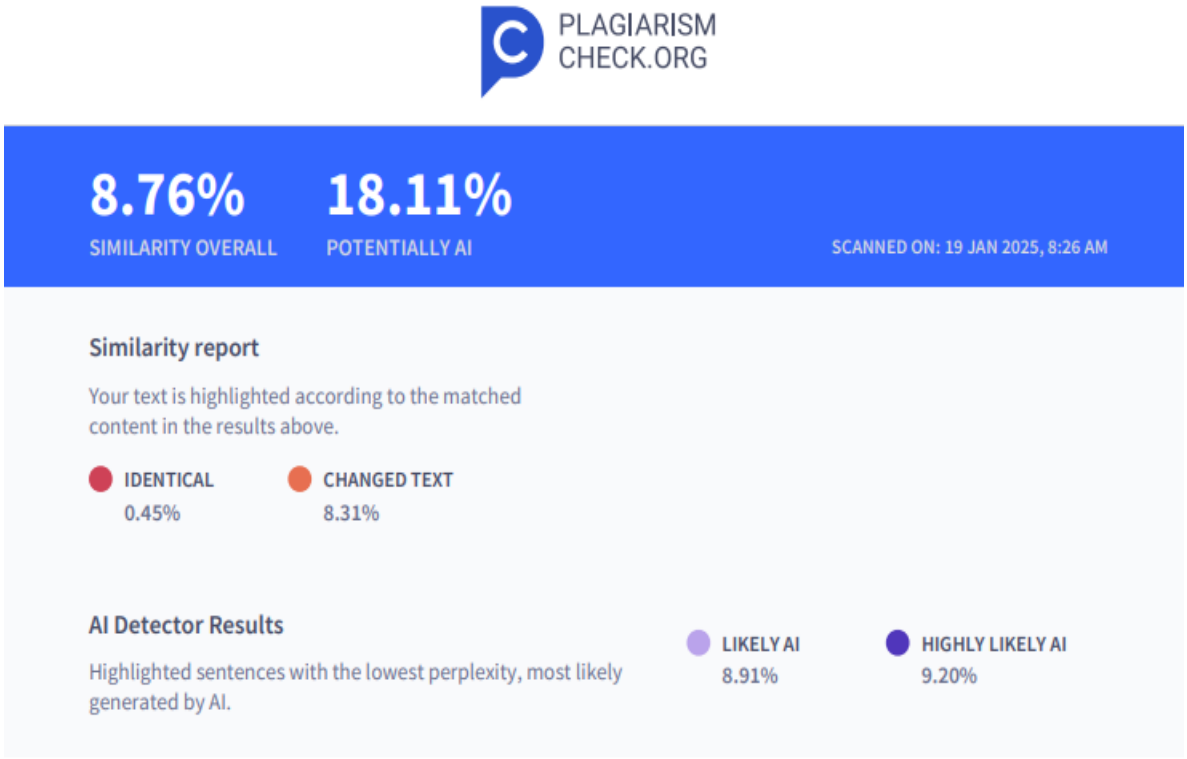
Plate 1: Waste Management Unit in action in Kabwata Constituency






Plate 2: Indiscriminate waste disposal in stormwater management system.

PLAGIARISM SIMILARITY REPORT



Report #24465587

1.1 SCHOOL OF POSTGRADUATE STUDIES MASTER OF SCIENCE IN ENVIRO NMENTAL MANAGEMENT (MSCEM) I.DECLARATION I, Chisomo Chongo, hereby declare that this dissertation, titled "Assessing the Effectiveness of Waste Management Units' Garbage Collection Systems in Kabwata Constituency, Lusaka City, Zambia," is my original work and has not been submitted for a degree or any other academic qualification at any other institution of learning. I affirm that all sources consulted and cited in this dissertation are duly acknowledged, and all data collected and analyzed for the study were obtained ethically and in compliance with international research standards. Name of student:: CHISOMO CHONGO Stud ent number: MSCEM23119681 Programme of study: MASTER OF SCIENCE IN ENVIRONMEN TAL MANAGEMENT (MSCEM) Dissertation title: ASSESSING THE EFFECTIVENESS OF WAST E MANAGEMENT UNITS GARBAGE COLLECTION SYSTEMS IN KABWATA CONSTITUENCY, LUSAKA CITY, ZAMBIA. Signature of student: Date: Friday,17thJanuary, 2025. Name of Supervisor: PROFESSOR FELIX KALABA Signature : ..... Date: Friday,

SUPERVISOR'S SUBMISSION APPROVAL

UNIVERSITY of LUSAKA

CHISOMO CHONGO <mscem23119681@stud.unilus.ac.zm>

Re: MSCEM23119681 CHISOMO CHONGO GBS800 DISSERTATION -FOR SUPERVISOR APPROVAL AND SIGNATURE : Assessing the effectiveness of Waste Management Units Garbage Collection Systems in Kabwata Constituency, Lusaka City, Zambia

Felix Kanungwe Kalaba <kanungwe@gmail.com> Tue, Jan 21, 2025 at 9:52 AM
To: CHISOMO CHONGO <mscem23119681@stud.unilus.ac.zm>

Good morning. We can now proceed to submit. I will share the signature with the office when in Lusaka as has been the trend. Keep well

Felix Kanungwe Kalaba, PhD
Professor of Ecosystem Services and Climate Change
Mobile: +260971771043
https://scholar.google.com/citations?user=dJ5bH6wAAAAJ&hl=en&oi=ao Scopus Author ID: 35292157100

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