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ASSESSING THE EFFECTS OF SOLID WASTE MANAGEMENT PRACTICES IN AREA 36, LILONGWE, MALAWI

***George Gwaza, Ms. Treazer Kabiya**

Bachelor of Social Work in Project Monitoring and Evaluation, DMI-St. John the Baptist University – Lilongwe Campus.

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***Corresponding Author: George Gwaza**

Bachelor of Social Work in Project Monitoring and Evaluation, DMI-St. John the Baptist University – Lilongwe Campus.

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ABSTRACT

This study assessed the effects of current solid waste management (SWM) practices in Area 36, Lilongwe, Malawi. Rapid urbanization and inadequate infrastructure have led to a crisis characterized by improper waste disposal, environmental degradation, and public health risks. The specific objectives were to identify existing SWM practices, determine their effectiveness, and propose sustainable solutions. Employing a mixed-methods research design, data were collected from 40 participants, including 36 households and businesses via questionnaires and 4 key informants through interviews. The findings revealed a heavy reliance on informal disposal methods: 38.9% used communal dumping sites, 27.8% disposed of waste directly into the Lilongwe River, and only 19.4% accessed formal collection services. The effectiveness of these practices was deemed low, with 43% of respondents rating their immediate environment as dirty or very dirty. Key challenges included financial constraints (68%), infrastructure gaps (62%), and service unreliability (50%). Despite these systemic failures, the community demonstrated strong awareness and willingness to engage in solutions, with 61.1% expressing readiness to pay a modest fee for reliable services and 56% supporting regular community clean-ups. The study concludes that the SWM system in Area 36 is failing due to institutional weaknesses, infrastructural deficits, and entrenched behavioural patterns. However, the identified community agency presents a vital opportunity for change. It is recommended that the Lilongwe City Council, in collaboration with community leaders, residents, and NGOs, implement an integrated strategy involving improved service delivery, strategic infrastructure placement, continuous public education,

and the promotion of local initiatives like composting. This multi-stakeholder approach is essential for developing a sustainable and effective waste management system in Area 36.

KEYWORDS: Solid Waste Management, Area 36 Lilongwe, Environmental Sustainability, Community Participation.

INTRODUCTION

Solid waste management plays a crucial role in maintaining environmental sustainability and public health in urban areas. Rapid urbanization and population growth have led to increased waste generation, posing significant challenges to effective waste disposal. In the context of Lilongwe, Malawi, the issue of waste management is of particular concern, especially in Area 36. This residential and commercial hub experiences substantial waste management challenges due to inadequate infrastructure, limited waste collection services, and low public awareness about proper waste disposal practices.

The Lilongwe River, which passes through Area 36, is heavily polluted by waste, affecting ecosystems and communities downstream. Despite efforts by the Lilongwe City Council and private waste collectors, significant gaps persist in waste collection, disposal, and community engagement. This study seeks to assess the effects of current solid waste management practices in Area 36, Lilongwe, with the aim of identifying gaps and proposing sustainable solutions. The research focuses on three key dimensions: existing practices, their effectiveness, and proposed sustainable solutions. These elements were selected due to their direct impact on environmental quality, public health, and community wellbeing. The study's purpose and objectives aim to generate actionable insights for improving SWM through evidence based recommendations.

Background of the Study

Global waste generation is increasing at an alarming rate, with the World Bank (2018) reporting that the world annually generates 2.01 billion tonnes of municipal solid waste, of which at least 33 percent is not managed properly. Future projections indicate that global waste will rise by 70 percent to 3.40 billion tonnes by 2050. In Sub-Saharan Africa, waste generation is expected to triple by 2050, with only 44 percent of waste collected in urban areas.

Malawi exemplifies these challenges, producing approximately 633 fifteen-ton truckloads of waste each day. Major cities like Lilongwe struggle with inadequate infrastructure, low public awareness, and insufficient funding, resulting in 70 percent of waste being improperly

disposed of in undesignated sites. Open dumpsites, such as those at Area 38 in Lilongwe, contribute to soil and water contamination, increasing the risk of diseases like cholera and malaria (UN-Habitat, 2018).

Area 36 in Lilongwe represents a microcosm of these broader challenges. The area's proximity to the Lilongwe River makes it particularly vulnerable to pollution-related health risks. Despite some community initiatives and private-sector partnerships, systemic issues persist, including weak policy enforcement, infrastructure gaps, and limited community participation.

General Objective of the Study

To access the effects of solid waste management practices in Area 36, Lilongwe.

Specific Objectives

1. To identify the existing solid waste management practices in Area 36.
2. To determine the effectiveness of the current waste management practices.
3. To propose solutions to mitigate identified issues.

These objectives are explored through the integrated theoretical frameworks of Behavioural Change Theory, Institutional Theory, and Systems Theory, providing a comprehensive approach to understanding the technical, social, and governance dimensions of waste management.

Literature Review

Globally, 33% of waste is improperly managed, with Sub-Saharan Africa facing acute challenges due to weak infrastructure and funding (World Bank, 2018). In Malawi, only 30% of waste is formally collected, leading to widespread open dumping and river pollution (Logistics Cluster, 2023). Studies in Lilongwe highlight low collection rates, inadequate vehicles, and community reliance on informal methods (Kasauka & Sithik, 2024). Effective solutions noted in literature include community participation, public-private partnerships, and circular economy approaches such as composting and recycling.

The literature on solid waste management reveals significant disparities between high-income and low-income countries. High-income countries employ advanced technologies and achieve recycling rates of 30–60%, while low-income countries, particularly in Sub-Saharan Africa, rely heavily on informal disposal methods (World Bank, 2018). Key themes emerging from the literature include:

Waste Generation and Disposal Trends: Global waste generation is positively correlated with income levels, with the fastest growth occurring in Sub-Saharan Africa, South Asia, and the Middle East. In these regions, more than half of waste is openly dumped due to inadequate collection services and infrastructure limitations (World Bank, 2018).

Environmental and Health Impacts: Improper waste disposal triggers cascading environmental and health crises. Open dumps generate methane, a potent greenhouse gas, while leachate contaminates soil and groundwater resources. Health impacts include respiratory diseases, gastrointestinal infections, and vector-borne diseases like malaria and cholera (Government of Malawi, 2022).

Policy and Infrastructure Frameworks: Effective SWM requires robust policy frameworks and adequate infrastructure. However, many African cities allocate insufficient budgets to waste management. Lilongwe City Council, for instance, allocates only 7% of its budget to infrastructure, significantly below the 25% benchmark recommended by the World Bank (World Bank, 2020).

Community Participation and Public-Private Partnerships: Community-led initiatives and public-private partnerships show promise but face scalability challenges. Rwanda's Umuganda program (UN-Habitat, 2018) and Kenya's plastic ban (Paul and Mironga, 2020) demonstrate the potential of community engagement and policy interventions, though enforcement remains a challenge.

Theoretical Framework: This study integrates three theoretical frameworks: Behavioural Change Theory, Institutional Theory, and Systems Theory to analyse SWM practices holistically. Behavioural Change Theory explains how attitudes, norms, and perceived control influence waste disposal behaviours. Institutional Theory examines the role of policies, enforcement, and governance in SWM efficiency. Systems Theory views SWM as an interconnected system where failures in one component affect the entire chain.

These frameworks help explain why informal disposal persists, how institutional gaps enable illegal dumping, and how systemic inefficiencies exacerbate environmental and health risks. Together, they provide a multidimensional lens for diagnosing root causes and designing interventions.

Research Methodology

This study employed a mixed-methods research approach, combining quantitative and qualitative data collection and analysis. The research design enabled comprehensive understanding of both numerical patterns and contextual insights.

Research Setting and Population: The study was conducted in Area 36, Lilongwe, selected for its urban diversity, environmental vulnerability, and documented SWM challenges. The target population included households near the Lilongwe River and dumpsites, local businesses, and key informants from Lilongwe City Council, private waste collection companies, and community leadership.

Sampling Method and Size: A mixed sampling strategy was employed, combining stratified random sampling for households and purposive sampling for businesses and key informants. The strategic use of both stratified random sampling and purposive sampling in this study creates a robust methodological framework that achieves three critical research objectives: representativeness, depth, and feasibility. The total sample consisted of 40 participants: 33 households, 3 businesses, 2 Lilongwe City Council officials, 1 private waste collector, and 1 community leader.

Data Collection Instruments and Procedures: Data were collected through structured questionnaires administered to households and businesses, and semi-structured interviews with key informants. The questionnaires gathered data on waste generation patterns, disposal methods, perceived effectiveness, and community attitudes. Interviews explored institutional perspectives, operational challenges, and potential solutions.

Data Analysis: Quantitative data were analysed using descriptive statistics in SPSS, including frequency distributions and percentage calculations. Qualitative data underwent thematic analysis to identify recurring patterns and insights.

Ethical Considerations: The study adhered to ethical principles including informed consent, confidentiality, and anonymity. Approval was obtained from DMI-St. John the Baptist University and Lilongwe City Council. All participants were fully informed about the study's purpose and their rights.

Data Analysis & Interpretation

Response Rate

All 36 distributed questionnaires were completed and returned (100% response rate), and all 4 scheduled interviews were conducted successfully.

Demographic Profile

The socio-demographic characteristics of the respondents included age, gender, educational level, and proximity to Lilongwe River. The researcher included this, in order to have different overview from households with different social characteristics to have their perception and understanding in the subject matter as shown in the table below

Table 1: Demographic Profile of Respondents.

Characteristic	Category	Frequency	Percentage
Age	18 - 30	20	55.6%
	31 - 40	8	22.2%
	41 - 50	4	11.1%
	51 – 60	2	5.6%
	61 +	2	5.6%
Gender	Male	15	41.4%
	Female	21	58.3%
Education	Primary	6	16.7%
	Secondary	22	61.1%
	Tertiary	8	22.2%
Proximity to River	Within 100m	15	41.7%
	100 – 50 0m	10	27.7%
	>500m	11	30.6%

Source: Primary data

Demographic data showed that respondents were predominantly young (55.6% aged 18–30), with a slightly higher proportion of females (58.3%). Most respondents (83.3%) had secondary or tertiary education, and 41.7% lived within 100 meters of the Lilongwe River.

Existing Solid Waste Management Practices

Waste Composition

Table 2: Waste Composition,

Type of Waste	Frequency	Percentage
Food scraps	21	58.3%
Plastics	29	80.6%
Paper	11	30.6%
Glass	2	5.6%
Others	12	33.3%

Source: Primary data

Food scraps (58.3%) and plastics (80.6%) were the most frequently reported waste types. Most households (94.4%) generated less than one 50kg bag of waste daily.

Waste Disposal Methods

Below are the findings of the disposal methods

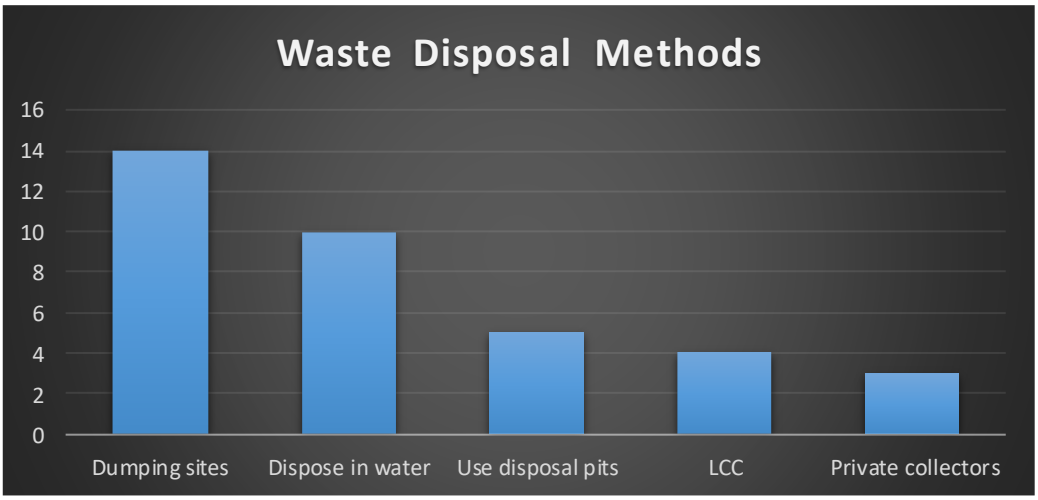

Figure 1: Waste Disposal Methods.

Source: Primary data

Disposal methods revealed heavy reliance on informal systems: 38.9% used communal dumping sites, 27.8% disposed of waste directly into the Lilongwe River, 13.9% used disposal pits within compounds, and only 19.4% accessed formal collection services. Primary reasons for informal disposal included "no alternative available" (48%), "it is cheap" (31%), and "it is convenient/easy" (21%).

Effectiveness of Current Practices

Perceived Cleanliness

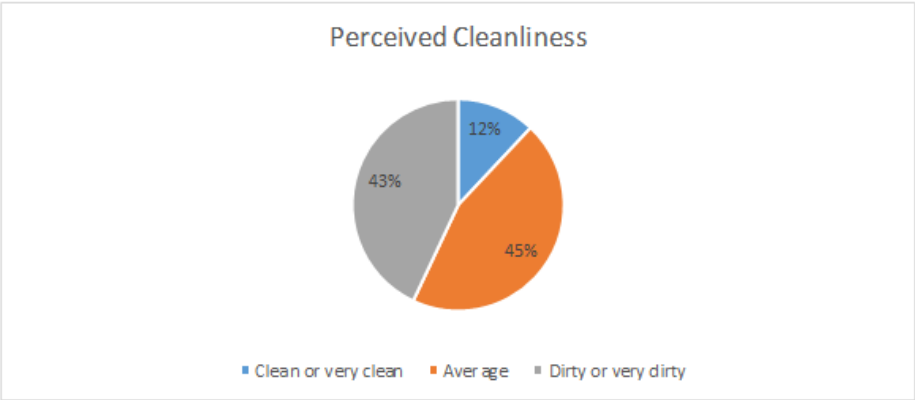

Figure 2: Perceived Cleanliness of Immediate Environment

Source: Primary data

Only 12% of respondents rated their immediate environment as "clean" or "very clean," while 4 3% described it as "dirty" or "very dirty." Of the few using formal services, only 2 out of 7 reported satisfaction.

Identified Key Challenges

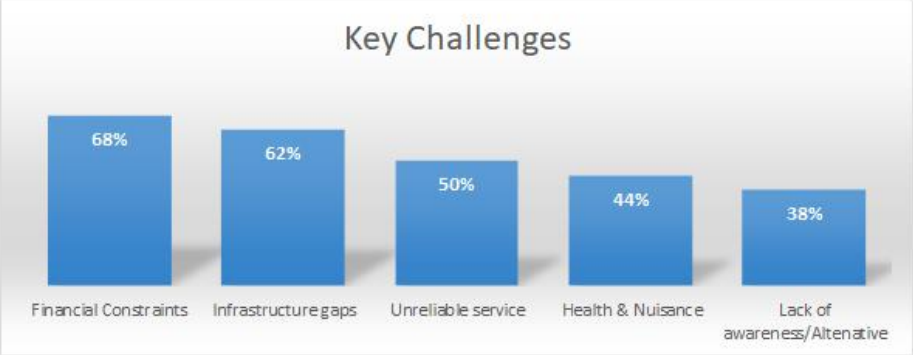

Figure 3: Key Challenges identified.

Source: Primary data

Key challenges identified included financial constraints (68%), infrastructure gaps (62%), service unreliability (50%), health and nuisance issues (44%), and lack of awareness/alternatives (38%). Respondents attributed primary responsibility for improving waste management to Lilongwe City Council (58%), followed by community members themselves (27%) and health officials (15%).

Community Perspectives and Proposed Solutions

Respondents expressed strong support for various interventions: more reliable collection services (85%), additional public bins (79%), regular community clean-up campaigns (56%), and stricter laws against illegal dumping (48%). Motivations for participating in clean-ups included disease prevention (65%), incentives (22%), and community togetherness (13%). Notably, 61.1% expressed willingness to pay a monthly fee for reliable waste collection, with amounts ranging from MK 500 to over MK 2,000.

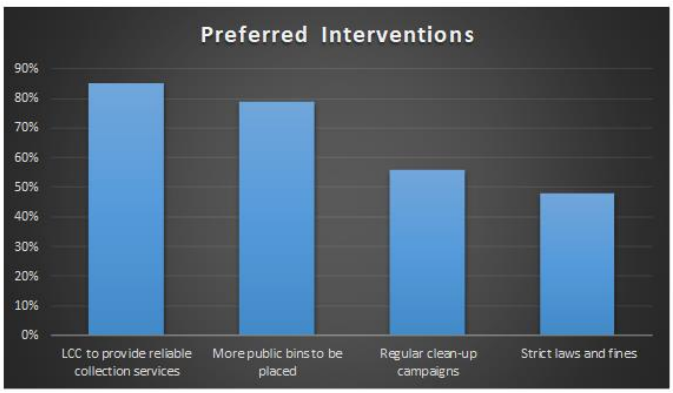

Figure 4: Preferred Interventions

Source: Primary data

Key Informant Insights

Lilongwe City Council officials described the SWM situation in Area 36 as "terrible," citing limited resources, few collection vehicles, and citizen non-compliance as major challenges. The private waste collect or operating in the area reported operational difficulties including poor roads, non-payment by customers, and vehicle maintenance issues. The community leader acknowledged ongoing awareness campaigns but noted inconsistent public cooperation.

DISCUSSION

The findings align closely with the study's theoretical frameworks. Behavioural Change Theory helps explain the prevalence of informal disposal methods driven by convenience, cost, and lack of alternatives. The expressed willingness to pay for services and participate in clean-ups indicates potential for behavioural change through targeted interventions.

Institutional Theory is reflected in the institutional failures identified, including unreliable municipal services and weak enforcement of bylaws. The community's attribution of responsibility to Lilongwe City Council points to unmet expectations of state-led service delivery.

Systems Theory is evident in the fragmented nature of SWM in Area 36, with broken links between waste generation, collection, and disposal. The reliance on informal subsystems exacerbates environmental and health risks through pollution pathways.

The environmental and health implications are significant, particularly the practice of river dumping by 27.8% of respondents, which confirms earlier reports of severe pollution in the Lilongwe River. This practice not only degrades aquatic ecosystems but also increases risks of waterborne diseases.

Socio-economic dimensions reveal financial constraints as the foremost barrier to improved SWM. However, the willingness of 61.1% of respondents to pay for services suggests that cost-sharing models could be feasible if coupled with reliable service delivery.

Despite systemic failures, the study reveals strong community awareness and readiness to engage. The high support for community clean-ups (56%) and willingness to participate reflect social capital that could be harnessed through locally led initiatives.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The solid waste management system in Area 36, Lilongwe, is failing to meet basic environmental and public health standards. Heavy reliance on informal disposal methods, particularly river dumping, poses severe ecological and health risks. This failure is rooted in institutional weaknesses, systemic infrastructure gaps, financial limitations, and entrenched behavioural patterns. However, the study identifies a critical asset: a community that is aware of the problems and motivated to engage in solutions. This social readiness, combined with expressed willingness to contribute financially, presents a tangible opportunity for co-designed, sustainable interventions.

Recommendations

For Lilongwe City Council: Install public waste collection bins strategically in high density zones, particularly along vulnerable riverbanks and near markets. Develop a reliable, scheduled collection system through performance-based contracts with accredited private operators. Strengthen enforcement of anti-dumping bylaws while ensuring accessible legal disposal alternatives. Explore innovative financial mechanisms such as cross-subsidization or earmarked local taxes for sustainable SWM funding.

For Community Leaders and Local Organizations: Facilitate formation of neighbourhood waste committees to organize clean-ups and monitor dumping hotspots. Implement ongoing awareness campaigns using local media and community networks. Promote local composting initiatives through pilot projects to reduce organic waste.

For Residents and Businesses: Cease river dumping and utilize designated bins or collection services. Begin simple waste segregation at source. Participate actively in community clean-ups and support local waste management initiatives. Consider contributing financially through cost-sharing arrangements where feasible.

For NGOs and Academic Institutions: Partner with council and communities to design and monitor decentralized waste management models. Facilitate regular multi-stakeholder dialogues to foster collaboration. Build local capacity through training programs on SWM best practices and behavioural change communication.

Area for Further Study

Future research could focus on informal sector integration by studying the socio-economic role of waste pickers and exploring models for their integration into formal recycling systems.

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