

Perceived mitigation measures for sanitation challenges in George Compound, Lusaka, Zambia: A stakeholder perspective

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ABSTRACT

The study is significant as it contributes to Sustainable Development Goal number 6, for which countries are expected by 2030 to achieve sanitation services for all citizens. In response to the global vision and in alignment with the National Water and Sanitation Policy, the government has implemented several sanitation interventions across the country and in Lusaka peri-urban areas. The study was guided by an objective that sought to explore stakeholders' perceived mitigation measures for sanitation challenges in the peri-urban areas in Lusaka. The study was based on an interpretive phenomenological paradigm, which was anchored on the relativist ontological stance, which posits that there is no single reality but rather multiple realities in the understanding of sanitation challenges and their associated mitigation measures. The study's sample size was 29 participants, disaggregated as 10 males, 15 women, and 4 key informants. Data was collected using in-depth interviews targeting community beneficiaries and key informant interviews targeting institutions. The researcher deployed open-ended questions to elicit participants' views on sanitation. The collected raw data was analysed using a reflexive thematic analysis. The thematic analysis adopted Braun and Clarke's six-stage framework for thematic analysis, in which themes were developed through an iterative process and by merging the researchers' experiences with the participants' lived experiences. The study found that despite increasing inspectors' compliments in regulatory institutions, it falls short of the expected effort to mitigate sanitation challenges. Moreover, LWSC is under a new policy direction slanted towards digital integration as a mechanism to facilitate customers paying for on-site sanitation as well as a platform for lodging complaints. Furthermore, the introduction of scheduled desludging offers a panacea for improved pit emptying services. Under this model, households register their pit latrines and make small routine contributions, which enables the service providers to plan for pit emptying services as and when the pit latrines fill up. The part payment option reduces the financial burden on the most affected low-income communities. This model provides mitigatory measures that help avert pit latrines from overflowing. The researcher used systems theory to highlight the interdependence of institutions, service providers, and communities, demonstrating that weaknesses in any component can compromise the sanitation system. The researcher applied a systemic thinking mirror, a coordinated and integrated approach to resolving sanitation challenges. The identified mitigation measures will inform sanitation practices and mitigatory measures for sanitation challenges imminently affecting the peri-urban areas of Lusaka. The study recommends harnessing resources to bolster scheduled desludging and digitalisation of on-site sanitation. The study explored the stakeholders' perceived mitigation measures for sanitation challenges affecting communities in the peri-urban areas of Lusaka.

Keywords: George Compound, Lusaka, On-Site Sanitation, Pit Emptying Services, Sanitation Mitigation Measures, Zambia

I. INTRODUCTION

Most of the peri-urban areas in Lusaka face unique sanitation challenges, particularly at the household level, which often has compromised public health and safety in different areas. To understand these challenges, this paper was guided by an objective that sought to identify stakeholders' perceived sanitation challenges in Lusaka's peri-urban areas. This section covers the study background, methodology, findings, conclusion, and recommendations. The sanitation challenges remain severe in peri-urban areas of Lusaka, where approximately 70% of the city's two million residents reside (Brown et al., 2019). Most households in Lusaka Province rely on on-site sanitation facilities, while only 15% are on the sewerage network. Thirteen percent of the facilities used were improved toilets, such as the Ventilated Improved Pit (VIP) latrines, which can be safely managed if constructed to standard, while 19% of facilities were traditional and considered 'unimproved' sanitation facilities (National Water Supply and Sanitation Council [NWASCO], 2018). Globally, most governments, including Zambia, are committed to the Sustainable Development Goals (SDGs) and the

African Union's Agenda 2063. Sustainable Development Goal 6 is to ensure the availability and sustainable management of safe water and sanitation for all by 2030. The water and sanitation goals are defined by eight targets that specify the objectives, and progress towards the 2030 Agenda for Sustainable Development is measured using 11 indicators as metrics by which the world aims to track whether these targets are achieved (Rajapakse et al., 2023). A study conducted by the United Nations (2015) shows that most countries are not on track to meet their objective of ensuring the availability and sustainable management of water and sanitation for all. The United Nations General Assembly (2010) posits that water and sanitation are recognized as human rights under international law. Furthermore, international monitoring data show that the world still has a long way to go to ensure everyone has access to safe services (Howard, 2021). According to a study conducted by Kivunja and Kuyini (2017), over 2.3 billion people all over the world still lacked basic sanitation service, and 844 million people still lacked basic drinking water. According to the global statistics, there are an estimated 3.4 billion people, or 45% of the population, who used safely managed sanitation services in 2017 (World Health Organization & United Nations Children's Emergency Fund [WHO/UNICEF], 2021).

Moreover, the World Health Organization and UNICEF (2017) established that the available data are limited, and national estimates were only available for 96 countries, representing 54% of the global population. Regionally, water and sanitation are anchored on Agenda 2063, whose aspiration is that Africa shall have equitable and sustainable use and management of water resources for socio-economic development, regional cooperation, and the environment (Africa Union, 2015). Moreover, global think tank institutions, such as the World Health Organization, observed that safe water and sanitation are essential to the health of all Africans as well as to the social and economic development of their countries, yet millions lack access to both. Nationally, the country's water and sanitation regulatory institution, the National Rural Water Supply and Sanitation Program (2006), reveals that inadequate water and sanitation infrastructure is mainly due to low financial investments in the sector, with an annual allocation of less than 3% of the national budget. Moreover, the National Rural Water Supply and Sanitation Program (2006) further notes that the investments have been skewed towards water supply as opposed to sanitation, and this situation has been compounded by a lack of a clear policy on sanitation issues. Subsequently, Zambia has developed a comprehensive policy to guide the development and management of the sanitation and water sectors. The specific policy measures for rural water supply and sanitation include a community-based approach, the promotion of appropriate technology, and capacity building at all levels (National Rural Water Supply and Sanitation Program, 2006). The study aim was to explore sanitation programs' lived experiences among the stakeholders in Lusaka's George Compound.

1.1 Statement of the Problem

The Government of Zambia remains committed to accelerating universal access to water supply and sanitation to achieve a healthy and productive nation (NWASCO, 2018). Pit latrines are the dominant form of sanitation in peri-urban areas, used by about 88% of households (ECA, 2018). Thus, to improve public health, the government, with the support of AfDB, constructed 5,000 household toilets in peri-urban areas.

The sanitation challenges remain severe in peri-urban areas of Lusaka, where approximately 70% of the city's two million residents reside (Brown et al., 2012). Most households in Lusaka Province rely on on-site sanitation facilities, while only 15% are on the sewered network. Thirteen percent of the facilities used were improved toilets, such as the Ventilated Improved Pit (VIP) latrines, which can be safely managed if constructed to standard, while 19% of facilities were traditional and considered as 'unimproved' sanitation facilities (NWASCO, 2018).

Moreover, sanitation is compounded by poor infrastructure coupled with weak regulatory enforcement in most peri-urban areas (Lerebours et al., 2021). Equally, the roles and enforcement mandates among key regulatory actors remain poorly defined, resulting in fragmented implementation of sanitation laws and standards (SNV, 2024).

As a result of the poor sanitation situation in Lusaka, there have been recurrent outbreaks of cholera, typhoid, and dysentery, contributing to significant morbidity and mortality (Brown et al., 2012). Furthermore, the disease outbreak makes the government lose an estimated US\$194 million annually due to poor sanitation—equivalent to 1.3% of GDP (Brown et al., 2012). Similarly, approximately 3.4 million deaths occur each year from water-related diseases at a global level (WHO/UNICEF, 2017). Therefore, the researcher explored the stakeholders' lived experiences in sanitation programmes in Lusaka's George Compound.

1.2 The Study Purpose

The study objective was to explore the lived experiences of stakeholders in sanitation programmes in Lusaka's George Compound.

1.3 Research Objective

The objective of the paper was to address the identified stakeholders' perceived sanitation challenges in Lusaka's peri-urban areas.

1.4 Research Question

The paper answered how stakeholders' perceived identified sanitation challenges can be mitigated in Lusaka's peri-urban areas.

II. LITERATURE REVIEW

2.1 Theoretical Framework

2.1.1 Systems Theory

The researcher adopted systems theory, which was first introduced in the 1940s by biologist Ludwig von Bertalanffy. Systems theory is a conceptual framework based on the principle that the component parts of a system can best be understood in the context of their relationships with each other and with other systems, rather than in isolation (Wilkinson, 2011). Systems theory has significantly influenced our understanding of organizational behaviour and change, and a systems approach can increase our ability to identify the underlying causes of problems and determine the optimal solution (Wilkinson, 2011). Systems thinking is the examination of systems from the perspective of the entire system, interrelated subsystems, and repetitive patterns occurring among subsystems. Systems thinking provides a holistic analytical method to analyse how a system's integral components relate and function over time and within the context of larger systems. Systems thinking is useful for complex or complicated problems that cannot be solved by a single entity, because complex systems cannot be effectively understood from only one perspective.

The theory is in alignment with the study's ontological position, which holds that reality is multiple and requires understanding of the whole by its various parts. In this context, applying systemic thinking would help in understanding various stakeholders' experiences of sanitation programme implementation, as well as how systems interact to address sanitation programme challenges in the study area, thus helping the researcher in the interpretation and discussion of findings.

2.2 Empirical Review

2.2.1 Pollution Control and Sanitation

A study conducted by Strande et al. (2014) revealed that services that operate to empty and transport fecal sludge from on-site sanitation containment systems—without which sludge would be left on-site, pits and septic tanks would overflow, and sludge would not reach treatment or safe disposal sites—are crucial to enable a safely managed sanitation chain. Similarly, a study conducted by Lawrence and Macdonald (2001) highlighted this risk when they reported that most pathogens that affect humans are derived from human waste transmitted by the faecal-oral route, and that transmission may occur through a variety of routes, including food, water, poor personal hygiene, and flies. In Kanyama, as in other parts of the city, residents sell foodstuffs including fruits and meat on the streets, and most of these are not properly covered. Hence, flies can come into contact with these foodstuffs and contaminate them. Moreover, Lawrence et al. (2001) reported that where hydraulic loads are high, the liquid part of the waste infiltrates into the soil and represents a hazard to groundwater. Banerjee (2010), in his study, reported that pollution travels from pits in both horizontal and vertical directions, and that a minimum travel of pollutants of 2.055 metres was found in clay silt soil, whereas a maximum travel of 10.20 metres was observed in gravel/sand composition of soils in a ten-day period. Furthermore, another study conducted by Dzwauro et al. (2006) noted that the shallow water table increases the pollution potential from pit latrines. Used oil has the potential to cause health problems because it produces a pungent smell, which pollutes the air and may lead to residents falling over because it is slippery.

2.2.2 Enforcing Building Regulations

One of the studies conducted by Mawejje et al. (2018) disclosed that the country's environmental regulator, the National Environmental Authority (NEMA), needs to enhance effective monitoring of service providers to ensure compliance with waste transportation regulations. With the support of local leaders and community activation teams in each informal settlement, emptying schedules can be locally arranged, as was piloted with mobile transfer stations. Moreover, in large multi-household units, the study suggests that the number of toilets provided is close to inadequate (in-house units with toilets: if every resident uses the toilet, the average number of users per seat is eight). On the regulatory side, there are tools available to create incentives for improved household provision (such as enforcing the building regulations that require the provision of suitable sanitation). However, given the risks to low-income households if rents are raised to cover costs, these interventions should be seen within the wider context of sustainable housing supply for Kumasi. Legal or social/economic instruments that ensure landlords provide adequate, well-serviced toilets for each household or a minimum number of tenants, coupled with appropriate financial incentives, could also address this (Peprah et al., 2015). The foregoing study conducted in Kumasi noted that legal or socio-economic instruments might help landlords to provide adequate sanitation, coupled with financial incentives. This study was conducted in Ghana, whereas few studies have been conducted in Lusaka, the study area, addressing those aspects; hence, this study might help in addressing those aspects in the area, filling the contextual as well as the knowledge gap.

The regulations developed in the three cities have some similarities, such as emptiers in each city should register their businesses, obtain licenses to operate from the local government and/or the utility, and licenses for their trucks. They must follow standard operating procedures, key performance indicators or minimum operating standards, and report on their work. The bylaws developed by the three local governments (two pending approval) cover the entire sanitation chain and emphasize health and safety requirements, mandatory sites for disposal, and operational standards. All three cities have set up call centres, together with monitoring and information systems (under development in Lusaka and Freetown). They all gather customer feedback through their call centres and other complaint hotlines. Local government and other regulators monitor emptiers through this feedback and spot checks, including visits to emptying sites. However, mapping sanitation facilities (even if only partial), standards for sanitation facilities, licenses from the environmental regulator, self-reporting by emptiers, and regulation by contract—where emptiers are under contract with the municipality or utility to provide a specific service with measurable performance indicators—can only be found in Kampala and Lusaka. Lusaka is the only city in which pit emptiers are not allowed to operate without a contract and consequently charge a specific fee set by the utility. In Kampala, emptying prices are not fixed, except when the service is subsidized by Kampala Capital City Authority (KCCA) (Lerebours et al., 2022). This study was conducted in the peri-urban area where limited studies have been conducted on the subject, thereby contributing to empirical evidence as well as bridging the contextual gap.

2.2.3 Scheduled Desludging

The scheduled desludging model has benefits for all stakeholders along the FSM chain and has the potential to improve the functionality of the service chain. This can enable informal settlement dwellers to adequately plan for desludging their sanitation facilities, as opposed to emptying their pit latrines or septic tanks only when they are overflowing. This will reduce the risk of environmental pollution as a result of not emptying faecal matter into streams during the rainy season, as noted by Kulabako et al. (2007).

2.2.4 Incentives and Subsidies

All three cities have taken steps to support emptiers and incentivize them to operate in a formal and regulated manner. They were engaged early in the regulatory process to ensure the acceptability of the regulation and buy-in from emptiers. Initiatives to increase demand for services included marketing of safe services, call centres, and in Kampala and Lusaka, subsidies to empty pits and tanks and to build or upgrade toilets that are emptiable. Support to formalize businesses took the form of training and the supply of personal protective equipment (PPE) and tools in the three cities. Business clinics or equivalents were provided in Kampala and Lusaka, and mobile transfer stations were occasionally provided in Kampala (Lerebours et al., 2022b). The above study conducted in Freetown disclosed some of the steps that have been taken to operate in a regulated manner; however, there is limited empirical evidence in the study area on these nuances. Hence, undertaking this study ascertained if such measures were being undertaken for services offered in the peri-urban areas, thus bridging the contextual gap.

III. METHODOLOGY

3.1 Research Paradigm

The study adopted an interpretive phenomenological paradigm, which viewed reality from a relativist ontology, holding that reality is multiple and contextual. Scotland (2012) asserts that reality is relative to how individuals experience it at any given time and place. Moreover, in terms of epistemology, the researcher adopted a subjective epistemological stance, in which knowledge is generated through personal experiences and interaction with participants (Kivunja & Kuyini, 2017). Using this epistemological stance, the study generated knowledge by interpreting meaning from the participants' experiences. Further, the study adopted a value-bound axiological stance, hence acknowledging that one's positionality in terms of personal background, experience, values, and beliefs influenced the study while prioritizing ethical considerations. Kivunja and Kuyini (2017) define axiology as the ethical issues that need to be considered when planning a research proposal. The study applied inductive logic in data collection and data analysis, reasoning from the specific (participants sampled) to the general study area.

3.2 The Research Design

The study adopted the exploratory case study design to gain in-depth insights about sanitation by focusing on a single case. Gerring (2004) emphasizes that a case study is an intensive study of a single unit for understanding a larger class of (similar) units, where the unit connotes a spatially bounded phenomenon observed at a single point in time or over some delimited period. According to Cresswell (2007), a case study is a good approach when the inquirer has identifiable cases with boundaries and seeks to provide an in-depth understanding of the cases or a comparison of several cases.

3.3 Sampling, Location, Population, and Procedure

3.3.1 Study Location

The study was conducted in George Compound, one of the peri-urban areas located west of Lusaka. The location was selected based on the sanitation programmes, which involved the construction of household toilets. The programme was implemented there by the government of Zambia through the Lusaka Sanitation Program.

3.3.2 The Study Population

The study population is defined as a set of cases, determined, limited, and accessible, that constituted the subjects for the selection of the sample, and must fulfill several characteristics and distinct criteria (Arias-Gómez et al., 2016). The study sampled the beneficiaries of sanitation programmes, the Ward Development Committee, the Water and Sanitation Committee, the Lusaka City Council (Public Health Department), the Zambia Environmental Management Agency (Inspectorate), the National Water Supply and Sanitation Council, and the Lusaka Water Supply and Sanitation Company (Peri-Urban Department). The population was selected based on the participants' experiences working on the sanitation programmes in the peri-urban areas.

3.3.3 The Study Sample Size

The researcher adopted a qualitative research approach in which the sample size was determined based on the principle of data saturation. Suri (2011) notes that data saturation is associated with the situation when further collection of data provides little in terms of 'further themes, insights, perspectives or information'. Therefore, the researcher determined sample size after conducting interviews with 29 participants (10 males and 15 women) and 4 key informants.

3.3.4 Sampling Procedure

Purposive sampling was employed, which is the intentional selection of informants based on their ability to elucidate a specific theme, concept, or phenomenon (Robinson, 2014). Furthermore, criterion-based purposive sampling was employed in this study. This type of sampling calls for the researcher to set a specific criterion which should be followed for participants to take part in the study. Samples were selected from participants who have experienced and benefited from the sanitation programmes that were implemented by the government for the past ten years. The government stakeholders were selected based on their experience implementing sanitation programmes in the study areas. The selected study participants comprised the beneficiaries of sanitation programmes, the Ward Development Committee, the Water and Sanitation Committee, the Lusaka City Council (Public Health Department), the Zambia Environmental Management Agency (Inspectorate), the National Water Supply and Sanitation Council, and the Lusaka Water Supply and Sanitation Company (Peri-Urban Department).

3.4 Data Collection Instruments

The collection of primary raw data from the field was based on the deployment of key informant interviews targeting government officials and community opinion leaders, and in-depth interviews targeting the sanitation programme beneficiaries.

3.4.1 Key Informant Interviews

Key informant interviews were deployed based on their quality to conduct intensive individual interviews with a small number of respondents to explore their perspectives on a particular idea, program, or situation. This choice of data-collecting tool is appropriate for open-ended questions for a qualitative study. The key informant interviews (KIIs) are a valuable qualitative research method aimed at collecting in-depth insights and viewpoints from individuals who possess specialized expertise in a particular field. This method involved conducting one-on-one interviews with key informants to gain a comprehensive understanding of their knowledge, experiences, and perspectives, thus providing valuable qualitative data for research and analysis (Akhter, 2022). The study deployed this method targeting government officials and community leaders based on their experience working in the sector or experiencing the sanitation programme interventions in the study area.

3.4.2 In-Depth Interviews

The study also deployed in-depth interviews to generate qualitative data. The in-depth interviews can be quite unpredictable and varied and are well suited to exploratory research and other research interested in meaning and experiences (Osborne & Grant-Smith, 2021). The data collection instrument is suited for this study as it leans on gathering sanitation beneficiaries' lived experiences in an unrestricted manner as opposed to structured instruments which restrict participants' responses.

3.4.3 Data Collection Procedures

Self-administered interviews were deployed in the field to elicit the participants' views and experiences. The interviews were conducted either in English or translated into the local language spoken by the participant. The study participants to be interviewed were selected using the criterion of purposive sampling. The interview duration lasted between 50 to 60 minutes. Data collection devices such as audio recording were used after obtaining consent from the study participants.

3.5 Data Analysis

Raw data was manually analysed using a reflexive thematic analytical research approach in line with the study's philosophical paradigm. According to Kiger and Varpio (2020), thematic analysis is an appropriate method of analysis for seeking to understand experiences, thoughts, or behaviours across a data set. Themes are actively constructed patterns (or meanings) derived from a data set that answer a research question, as opposed to mere summaries or categorizations of codes. The study adopted the Braun and Clarke framework for conducting thematic analysis, which involves a six-step process: data familiarization, generating initial codes, theme identification, reviewing themes, defining and naming themes, and producing the report (Kiger & Varpio, 2020). The above themes helped in building patterns for interpreting the study findings in line with the study objectives and purpose.

3.6 The Study Trustworthiness

The study employed Lincoln and Guba's criteria to ensure trustworthiness. The scholars identified four criteria: credibility, transferability, dependability, and confirmability (Ahmed, 2024). Ahmed (2024) notes that credibility and trust are built through rapport with participants over time, which allowed the researcher to gain deeper insights into their experiences, behaviours, and beliefs. This approach helped the researcher capture rich data that might not emerge during brief interactions. Moreover, the study achieved transferability by thoroughly describing the research context, participants, and methods, allowing readers to assess similarities between the study and their own contexts and judge whether the findings might apply to their settings (Ahmed, 2024). The study also detailed the sampling methods and participant selection criteria so others could determine if the findings might transfer to similar populations or settings. Ahmed (2024) observes that documenting each step of the research process ensures transparency and allows others to replicate the study or assess the reliability of the findings. Furthermore, according to Kakar et al. (2023), dependability refers to the consistency of findings over time. Moreover, Eryilmaz (2022) postulates that maintaining an audit trail—a detailed log of decisions made throughout the research—allows other researchers to reproduce the study, ensuring dependable results. Finally, the study ensured confirmability through member checking, giving participants the opportunity to verify that their viewpoints and experiences were accurately represented. Furthermore, Ahmed (2024) postulates that keeping a reflective journal helped to track evolving thoughts, biases, and reflections during the research process. This practice enhanced transparency and provided insights into the researcher's own subjectivity, contributing to the confirmability of the findings.

3.7 Ethical Consideration

The researcher conducted this study by ensuring the protection of human rights through the following guiding principles: dignity, integrity, right to self-determination, privacy, anonymity, beneficence, and confidentiality (Yip et al., 2016). The researcher navigated ethical issues by obtaining consent from the University of Zambia (UNZA), School of Humanities & Social Science Research Ethics Committee under the Directorate of Research and Post Graduate Studies (DGRS). Furthermore, the researcher obtained consent from the institutions and the community participants who consented to participate in the study voluntarily and without coercion. Moreover, the researcher provided an information sheet to the participants to furnish them with more information on the procedures to participate in the research study as well as to withdraw, thus highlighting potential risks.

IV. FINDINGS & DISCUSSION

4.1 Findings

4.1.1 Increase in Education and Awareness

There is a need to intensify education communication materials and ensure that we always get feedback from the beneficiaries and the service providers. Sanitation is a capital project which requires huge financial injection. Moreover, the houses in the peri-urban areas are not planned; hence, to navigate these settlements, there is a need to work with the local authority because sanitation projects may lead to demolition of some houses, which might trigger compensation to the affected persons. One of the key informants interviewed disclosed that:

"We need to intensify the information education communication materials because that's the only way to give sufficient information in terms of prices and feedback, because there hasn't been a room to have a feedback loop when the service provider is not following standard procedures during emptying. We need additional investments

to build more sanitation facilities, which always could not reach or given capital investments required. People are now aware about the sanitation model, hence the need to build more toilets and collaborate with the local authority to navigate most of the peri-urban areas in terms of roads and access issues, to do with demolition and compensation, and to increase water provision to the areas due to the direct link between water and sanitation. Invest more in communal sanitation facilities to address open defecation. There are two faecal sludge management facilities, hence there is a need for the central government to construct more of these facilities.” (Source: KII- LWSC)

4.1.2 Strengthening of the D-WASH

There are enough sanitation laws, although the main recommendation is to ensure that the D-WASH institutions are strengthened in the peri-urban areas; this will help to ensure compliance. The following is an extraction from one of the key informants:

“Mmm, now, we have enough laws and the only thing that we need to work on is the strengthening of the D-WASH, which are not active. The local authority needs to actively take up this role.” (Source: KII-LCC)

4.1.3 Flooding and Pollution Control

There is a need to regularly empty pit latrines when they fill up, because if they are not emptied, climate change-induced flooding tends to move faecal matter into the open environment, affecting shallow wells and thus causing unsanitary conditions. The following is an extraction from one of the key informants:

“Climate change issues is one of the causes of flooding, hence when toilets are not emptied, pit latrines tend to overflow, causing pollution of the underground water and creating unhealthy environments.” (Source: KII-LCC)

4.1.4 Enforcement, Inspections, and Adherence to Law

The study disclosed that enforcement of sanitation laws is conducted through inspections of premises, especially public premises. The following is an extraction from one of the key informants:

“Lusaka City Council (LCC) also, in terms of enforcement, we also conduct inspections of premises that are just for public places, just to ensure that there is proper sanitation.” (Source: KII-LCC)

4.1.5 Limited Access to Sanitation

The study identified critical challenges related to access to clean water, which significantly impacts sanitation in the area. Key informants emphasized the need to prioritize clean water supply, noting that:

“Lack of access to clean water should also be prioritized in the areas.” (Participant GC 22)

4.1.6 Improved On-Site Sanitation Infrastructure

The study, through one of the key informants, explained that LWSC has introduced lined pit latrines in peri-urban areas to replace traditional pits that were commonly misused as dumping sites for solid waste. The facilities are designed to allow only sludge to be collected. One respondent stated that the new pit latrines are constructed in a way that:

“Only captures sludge to avoid compromising the structural integrity of the FSTP.”

The presence of these new facilities has also influenced behavioural shifts through neighbour demonstration effects. As one informant noted:

“So when neighbours see that the facility is emptiable, they also build it in the same way their neighbour built.” This shows that sanitation adoption is strengthened through community-based modelling and imitation.

4.1.7 Scheduled Desludging and Household Participation

Scheduled desludging was introduced to ensure predictable and affordable pit emptying. Households register their pit latrines and make small routine contributions. A key informant described that:

“A customer in the peri-urban area must register that they have a pit latrine; once they register, they pay a small amount towards desludging. So that when the toilet fills up, they just call the service provider.”

This system empowers residents and encourages the construction of lined and emptiable toilets. As further noted:

“It brings the peri-urban residents to participate in sanitation service provision.” (Source: KII-LWSC 1)

4.1.8 Digitalization of Sanitation Customer Services

Sanitation services have been integrated into LWSC’s digital customer service platforms. A key informant reported that:

“LWSC has gone online, with a call centre, to get payment for service; they have included a component for on-sanitation service, hence bringing the service closer to the customer.”

This increases convenience and creates a direct communication channel between households and service providers.

4.1.9 Subsidized Service Delivery

Subsidies were introduced to help service providers and households manage sanitation costs during early implementation. A key informant indicated that:

“What the subsidy did was to cover the losses, since in the initial phase the business is concerned with marketing to raise customer base.”

This approach ensured reduced service charges, so that desludging prices were kept at “manageable levels.”

4.2 Discussions

4.2.1 Increase in Education

The study revealed the need for awareness and education, and this finding aligns with a study conducted by Cairncross (2003), which avers that laws and regulations are only as effective as the public’s knowledge of, and willingness to comply with, them. Hence, behavioural change, household-level hygiene practices, and community engagement are essential complements to formal enforcement mechanisms. Without these educational interventions, regulatory efforts may have limited impact, particularly in peri-urban areas where households face competing priorities and limited resources. Another study highlighted that sanitation is a capital-intensive intervention requiring substantial financial investment. In peri-urban areas where housing is often unplanned, implementing sanitation projects can present additional challenges. According to WaterAid (2013), well-designed education materials, combined with community engagement and feedback mechanisms, improve acceptance, proper usage, and maintenance of sanitation facilities. Integrating communication strategies with technical planning and regulatory compliance ensures that sanitation interventions are both effective and socially sustainable.

4.2.2 Strengthening of the D-WASH

The study highlighted that effective implementation of on-site sanitation in peri-urban areas requires active and well-coordinated community-based water and sanitation structures. Participants emphasized that sanitation cannot be achieved by a single institution, and applying a systems theory perspective helps illustrate the importance of coordinated efforts across multiple actors. The local authority plays a critical role in ensuring that sanitation laws and standards are established and enforced. Simultaneously, regulators monitor utility companies to ensure they comply with licensing conditions, while community stakeholders are responsible for paying for sanitation services and maintaining facilities. Hence, the findings suggest that while the regulatory framework and laws exist, gaps in compliance and coordination often undermine sanitation outcomes. Strengthening District Water, Sanitation, and Hygiene (D-WASH) structures at the community level would enhance oversight, promote adherence to standards, and facilitate collaboration among stakeholders. According to Tidwell et al. (2018), functional community-based structures are essential for sustaining sanitation interventions, particularly in peri-urban settings where service delivery faces logistical, social, and infrastructural challenges. Thus, reinforcing D-WASH institutions is a strategic recommendation that focuses not on creating new laws but on operationalizing and coordinating existing regulations. A strengthened D-WASH framework would ensure greater accountability, improve compliance with sanitation laws, and foster sustainable management of on-site sanitation facilities.

4.2.3 Flooding and Pollution Control

Due to lack of emptying of the pit latrines in most peri-urban areas, overflow occurs during rainy seasons when it floods. The study conducted by Strande et al. (2014) revealed that regular emptying of pit latrines is critical to prevent environmental contamination, particularly in the context of climate change and increased flooding in peri-urban areas. Participants highlighted that when pits are not emptied promptly, flooding can cause faecal matter to overflow into the open environment, contaminating shallow wells and creating unsanitary conditions that pose significant public health risks.

Moreover, the study further revealed that services that operate to empty and transport fecal sludge from on-site sanitation containment systems—without which sludge would be left on-site, pits and septic tanks would overflow, and sludge would not reach treatment or safe disposal sites—are crucial to enable a safely managed sanitation chain. Similarly, a study conducted by Lawrence & Macdonald (2001) highlighted this risk when they reported that most pathogens that affect humans are derived from human waste transmitted by the faecal-oral route and that the transmission may occur through a variety of routes, including food, water, poor personal hygiene, and flies. In Kanyama, as in other parts of the city, residents sell foodstuffs including fruits and meat on the streets, and most of these are not properly covered. Hence, flies can come into contact with these foodstuffs and contaminate them.

Moreover, Lawrence et al. (2001) reported that where hydraulic loads are high, the liquid part of the waste infiltrates into the soil and represents a hazard to groundwater. Banerjee (2010), in his study, reported that pollution travels from pits in both horizontal and vertical directions and that a minimum travel of pollutants of 2.055 metres was found in clay silt soil, whereas a maximum travel of 10.20 metres was observed in gravel/sand composition of soils in a ten-day period. Furthermore, another study conducted by Dzwauro et al. (2006) noted that the shallow water table increases pollution potential from pit latrines. Used oil has the potential to cause health problems because it produces a pungent smell, which pollutes the air and may lead to residents falling over because it is slippery.

The study also corroborates reviewed literature, which notes that pit latrines in many peri-urban settlements are poorly constructed, often lacking concrete lining or adequate slabs. This inadequate construction facilitates the seepage of faecal matter into groundwater and surrounding soils, further exacerbating environmental and health hazards (Kennedy-Walker et al., 2015). The combination of climate-induced flooding and substandard latrine construction underscores the vulnerability of these communities to waterborne diseases and environmental pollution. These findings suggest that effective faecal sludge management must integrate both technical and behavioural interventions. Properly designed and maintained latrines, regular emptying schedules, and community awareness on sanitation practices are essential to mitigate pollution and reduce the health impacts associated with pit latrines in flood-prone peri-urban areas.

4.2.4 Enforcement, Inspections, and Adherence to Law

The study revealed that one of the primary mechanisms for ensuring compliance with sanitation laws is through systematic inspections of public and private premises. Key informants indicated that these inspections are essential for monitoring adherence to sanitation standards, identifying non-compliance, and initiating corrective actions. Enforcement inspections provide regulators with a tangible way to assess the condition of sanitation facilities and ensure that households and institutions maintain hygienic practices. This finding aligns with existing literature, which emphasizes that regular inspections are a cornerstone of effective sanitation governance. According to Mensah et al. (2023), routine enforcement inspections help detect violations early, reduce the prevalence of unsafe sanitation practices, and reinforce the credibility of regulatory frameworks. Inspections also serve as an opportunity for sensitization, reminding stakeholders of their responsibilities and the health risks associated with poor sanitation. Moreover, when conducted consistently and combined with educational outreach, these inspections can improve compliance, promote proper facility maintenance, and enhance overall public health outcomes in peri-urban communities.

The study further revealed that joint operations among sanitation stakeholders are critical for ensuring compliance with sanitation laws. Participants noted that many District Water, Sanitation, and Hygiene (D-WASH) structures are currently inactive, which limits the ability to monitor and enforce household adherence to sanitation standards. Coordinated enforcement efforts, such as collaborative inspections and community monitoring, are therefore necessary to improve compliance and address gaps in service delivery. This finding is consistent with global literature emphasizing the importance of multi-stakeholder coordination in sanitation governance.

4.2.5 Limited Access to Sanitation

The study revealed that limited access to clean water poses a significant barrier to effective sanitation in peri-urban areas. Participants reported that both men and women experience difficulties in obtaining sufficient water for toilet use, but the burden disproportionately falls on women, who often remain at home while men are at work. The challenge becomes even more pronounced during menstruation, when access to water is critical for hygiene. The study also highlighted that load-shedding and unreliable electricity supply disrupt borehole operations, further limiting water availability and compromising sanitation services.

This finding underscores the interdependence of water and sanitation: inadequate water supply directly affects toilet functionality and the ability to maintain hygienic conditions. According to WaterAid (2013), water scarcity in peri-urban settlements undermines sanitation practices, increases the risk of disease transmission, and exacerbates gendered burdens, as women typically manage household water and sanitation needs. Moreover, these findings suggest that sanitation interventions must integrate water supply planning, paying particular attention to the specific needs of women and other vulnerable groups. Ensuring reliable access to water, including during power outages, is essential to maintain safe and functional sanitation facilities, reduce health risks, and promote equitable access in peri-urban communities.

4.2.6 Improved On-Site Sanitation Infrastructure

The study revealed that the Lusaka Water Supply and Sanitation Company (LWSC) has introduced lined pit latrines in peri-urban areas to improve on-site sanitation infrastructure. Key informants explained that these facilities are designed to replace traditional pit latrines, which were often misused as dumping sites for solid waste, leading to rapid fill-up, unsafe emptying practices, and environmental contamination. The new design allows only sludge to be collected, thereby reducing the risks associated with solid waste mixing and improving the efficiency of pit-emptying services.

This finding aligns with the literature, which highlights that the introduction of improved pit latrines with proper lining and design features enhances safety, operational efficiency, and public health outcomes in high-density peri-urban settlements (Tomoi et al., 2025). By restricting solid waste from entering the pits, these improvements facilitate safer and faster emptying processes, reduce occupational hazards for pit emptiers, and contribute to sustainable management of on-site sanitation. Overall, upgrading sanitation infrastructure with well-designed, lined pit latrines represents a critical intervention for mitigating environmental contamination, protecting public health, and promoting responsible waste management practices in peri-urban communities.

4.2.7 Scheduled Desludging and Household Participation

The study revealed that the introduction of scheduled desludging has improved predictability and affordability in pit emptying services. Under this system, households register their pit latrines and make small, routine contributions, which enables service providers to plan operations efficiently and reduces the risk of full pits overflowing or being emptied unsafely. This approach promotes household participation, accountability, and cost-sharing, fostering a sense of ownership and responsibility among community members.

This finding aligns with global literature emphasizing that routine and scheduled pit emptying enhances the sustainability of on-site sanitation systems, particularly in peri-urban areas where informal settlements complicate service delivery (Strauss, 2002). Regular contributions by households not only make desludging services financially viable but also reduce the reliance on emergency or ad-hoc emptying, which is often more expensive and less safe. Moreover, scheduled desludging combined with active household participation ensures a more reliable, safe, and cost-effective approach to faecal sludge management. This strategy strengthens community engagement, supports formal service provision, and contributes to improved public health outcomes in peri-urban settlements.

4.2.8 Digitalization of Sanitation Customer Services

The study revealed that sanitation services have been integrated into the Lusaka Water Supply and Sanitation Company's (LWSC) digital customer service platforms. Key informants highlighted that this integration allows households to access sanitation services more conveniently, facilitates reporting of issues, and enhances communication between service providers and beneficiaries. Digital platforms also enable the tracking of service delivery, timely scheduling of pit emptying, and efficient management of customer accounts, improving overall operational efficiency. This finding aligns with global evidence emphasizing the role of digital technologies in enhancing sanitation service delivery. According to Dijk (2012), digitalization in utility services promotes transparency, accountability, and responsiveness, particularly in peri-urban areas where informal settlements and rapid population growth can complicate service provision. Integrating sanitation services into digital platforms ensures that households can actively participate in service planning, monitor desludging schedules, and make payments conveniently, fostering better compliance and satisfaction. Therefore, digitalization strengthens the management, accessibility, and efficiency of sanitation services. By leveraging technology, utilities like LWSC can improve customer engagement, streamline operations, and support sustainable on-site sanitation in peri-urban communities.

4.2.9 Subsidized Service Delivery

The study revealed that subsidies were introduced to support both service providers and households in managing sanitation costs during the early stages of program implementation. Key informants highlighted that these financial incentives significantly reduced the economic burden on households, encouraged timely pit emptying, and promoted participation in formal sanitation services. For service providers, subsidies improved operational feasibility, enabling them to deliver consistent, reliable services while maintaining affordability for residents. This finding is in tandem with global evidence emphasizing the role of subsidies in enhancing access to sanitation in low-income peri-urban communities. According to Dijk (2012), targeted financial support can lower barriers to service adoption, improve compliance with sanitation standards, and encourage the formalization of previously informal services. Subsidies are particularly effective in settings where households face economic constraints that would otherwise delay or prevent the uptake of proper sanitation services. Thus, subsidized service delivery facilitates equitable access, encourages participation in formal sanitation programs, and strengthens the sustainability of on-site sanitation interventions. By reducing financial barriers for both households and service providers, subsidies contribute to improved public health outcomes and environmental protection in peri-urban settlements.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

The objective of the paper was to explore the stakeholders' views about sanitation programme implementation in George Compound of Lusaka, Zambia. The study identified measures to address sanitation challenges, including the introduction of lined pit latrines, faecal sludge treatment plants, scheduled desludging, digital customer service

platforms, and subsidies for households and service providers. Emphasis on education, cultural socialization, gender inclusion, and the adoption of a human rights approach were highlighted as critical strategies to promote behavioural change, awareness, and equitable participation. Applying the systems theory lens, the study underscores that sanitation is not a standalone service but a complex system involving interdependent actors, including regulators, utility companies, service providers, and community stakeholders. Coordinated efforts across these actors are essential for sustainable sanitation outcomes. The study objective was to explore the stakeholders' views about sanitation programme implementation in George Compound of Lusaka, Zambia.

5.2 Recommendations

5.2.1 Government through NWASCO

There is a need for realignment of the licensing regime for on-site sanitation to a single sanitation license. Currently, there are multiple permits and licenses required by on-site sanitation service providers to operate in different jurisdictions not covered by the license. Furthermore, there is a need to ensure that the sanitation players are coordinated to avert fragmentation of roles, and to formalize community stakeholders' bottom-up regulatory enforcement of on-site sanitation.

5.2.2 Water and Sanitation Utility Companies

Integrate solar-powered lighting in the pit latrines constructed under the project to optimize night-time safety during load-shedding. Furthermore, there is a need to incorporate residents and artisans at each stage of toilet design and siting to prevent pit depth problems and shallow lining failures. Additionally, there is a need to intensify community sensitization programs on preventing vandalism, misuse, and unauthorized design changes, which were highlighted as major implementation setbacks in the study.

5.2.3 Community Stakeholders

Conduct community sensitisation programmes against vandalism of the sanitation infrastructure in the peri-urban areas. Moreover, there is a need for community stakeholders to coordinate with service providers and regulators to ensure community participation in sanitation services.

Declaration of Interest

The author declares that she does not have any known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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