

# An Exploration of Stakeholders Perceived Mitigation Measures for Addressing Sanitation Challenges in George Compound in Lusaka Zambia

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## ABSTRACT

The study was guided by an objective which sought to explore the stakeholders perceived mitigation measures for sanitation challenges in Peri-Urban Areas in Lusaka. The researcher adopted the social constructivist ontology, knowledge was co-constructed with participants through an interpretive phenomenological approach, and reflexive thematic analysis was used to analyse in-depth and key informant interviews with beneficiaries, local committees, regulatory bodies, and the Lusaka Water Supply and Sanitation Company. The sample was selected purposively and determined using data saturation, ensuring rich, contextual insights from relevant stakeholders. The study revealed that even if you employ hundred inspectors this still cannot address sanitation because, sanitation starts at the household level. sanitation services have been integrated into the Lusaka Water Supply and Sanitation Company's (LWSC) digital customer service platforms. The sanitation platform allows households to access sanitation services more conveniently, facilitates reporting of issues, and enhances communication between service providers and beneficiaries. Furthermore, the utility company 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. The researcher's application of systems theory highlighted the interdependence of institutions, service providers, and communities, demonstrating that weaknesses in any component can compromise the sanitation system. The systems lens also emphasized that sustainable outcomes require integration of infrastructure, regulation, household participation, and community engagement. The study has theoretical, methodological, policy, practice, and knowledge implications. Theoretically, it corroborates systems theory by illustrating the interrelated roles of stakeholders in sustainable sanitation. Methodologically, it demonstrates the value of interpretive phenomenology in capturing lived experiences and operational nuances. For policy, the study emphasizes integrated, multi-stakeholder interventions informed by practical experiences. Practically, it highlights the need for community sensitization and engagement to ensure sustainability of sanitation innovations. Knowledge-wise, the study provides contextual evidence specific to George Compound, documenting challenges, innovations, and operational insights that can inform similar peri-urban settings. In conclusion, addressing sanitation challenges in peri-urban Lusaka requires a holistic, systems-oriented approach that integrates infrastructure, regulation, education, cultural socialization, and community participation to ensure equitable, sustainable, and effective on-site sanitation services.

**Keywords:** On-Site Sanitation, Sanitation Mitigation Measures, Pit Emptying Services.

## INTRODUCTION

This section presents the introduction, study background and study objective. The main objective was to explore stakeholders perceived mitigation measures for sanitation challenges in the Peri-Urban areas of Lusaka.

## Background of the Study

**Globally**, Water and sanitation services are critical to protecting public health. They are also recognized human rights under international law (UNGA, 2010). Ensuring effective delivery of these services is one of the most basic responsibilities of any government leading to social and economic benefits to the population of their countries. However, as the international monitoring data shows, the world has a long way to go to ensure everyone gets access to safe services.(Howard, 2021). Despite governments' commitment to the United Nations Sustainable Development Goals (SDGs) and the African Union's Agenda 2063, most countries are not on track to meet their objective of ensuring the availability and sustainable management of water and sanitation for all.(United Nations, 2015).Sanitation is a pressing health problem that adversely impacts billions of people around the world. In 2015, over 2.3 billion people all over the world still lacked basic sanitation service, 844 million people still lacked basic drinking water while only two out of five people using safely managed sanitation services (Kivunja and Kuyini, 2017). According to the World Health Organization (WHO), the population of those who do not have basic sanitation facilities such as toilets or latrines is around two billion. Sustainable Development goal 6 (SDG6) 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 8 targets that specify the goals, and the progress towards the 2030 Agenda for sustainable development is measured with 11 indicators as metrics by which the world aims to track whether these targets are achieved, (Rajapakse et al., 2023). Most of the research took place in developed countries, especially the United States of America, although sanitation problems are more serious in developing countries.(Zhou et al., 2018).

According to Srivastava and Mishra, (2022) “global sanitation crisis” the population of those who do not have basic sanitation facilities such as toilets or latrines is around two billion. Most alarmingly, inadequate sanitation results into negative health consequences particularly among children which attests to interlinkages between sanitation, health, and hygiene and “burden of diseases” exemplified through disability-adjusted life years or DALYs.

Globally, an estimated 3.4 billion people or 45% of the population used safely managed sanitation services in 2017. However, data availability is limited, and national estimates were only available for 96 countries, representing 54% of global population. Furthermore, while many countries had national data on treatment of wastewater from households connected to sewers, very few had data on treatment and disposal of waste from on-site facilities. (UNICEF and WHO, 2019).This remains the single biggest data gap for global monitoring of the SDG sanitation target (Bain et al., 2018). Other areas where there is missing or poor-quality data include sanitation system typologies, emptying practices in both urban and rural areas, and the ability to assess the magnitude of the faecal exposure risks associated with the appropriate management of such on-site systems. There are further data gaps around the influence of weather conditions on on-site sanitation management, which are altered further by climate change (World Health Organization, 2018), knowledge of these impacts is limited to small scale study areas.(Frenoux, C. and Tsitsikalis, A., 2015).

After decades promoting sanitation in low and middle-income countries, several countries and the global sanitation community have come to realize that it is time to rethink the approach to accelerating access to quality services. Since 2000, the WHO/UNICEF Joint Monitoring Programme of the Millennium Development Goals (MDGs) has consistently reported that the share of the population in low and middle-income countries that use pit latrines, septic tanks and systems termed as ‘unimproved’ sanitation facilities is growing.(NWASCO, 2018).

It is now estimated that between 2.1 and 2.6 billion people in low and middle-income countries rely on onsite technologies that produce tons of untreated Faecal Sludge (FS) every day. When septic tanks and pit latrines become full, the sludge that is collected from them is largely discharged untreated into open drains, irrigation fields, open lands or surface waters. The amount of untreated FS discharged into the open environment poses serious public health risk. A 5m<sup>3</sup> truckload of FS dumped into the environment is the equivalent of 5,000 people practicing open defecation. Adding to this is the heavy load from raw faeces excreted in the open by an additional 1.1 billion people who still do not have access to any toilet.(NWASCO, 2018).

The consequences of this waste entering the environment are staggering. The World Bank estimates that poor sanitation costs the world 260 billion USD annually. Poor sanitation contributes to 1.5 million child deaths from

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diarrhea each year. Chronic diarrhea hinders child development by impeding the absorption of essential nutrients that are critical to the development of the mind, body and immune system. It can also impede the absorption of life-saving vaccines(NWASCO, 2018).

**Regionally,** 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.(World Health Organization, 2023). The study is anchored on the 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 (*Agenda 2063*, 2015). Moreover, access to proper sanitation is still elusive in many parts of Africa while significant improvement in global sanitation has been realized that the sanitation situation in Africa is still appalling with almost 20% of the population reported to still practice open defecation in Sub Saharan Africa. The impacts of poor sanitation systems range from negatively impacting natural resources water quality, to causing health risks to the populations involved. Obviously, the current sanitation systems have gaps and can barely help the situation, which points to the necessity of a paradigm shift in the wastewater management to include interventions that would make proper sanitation achievable for all. Such interventions include decentralization and resource recovery, which will not only produce environmentally acceptable effluents, but are also pertinent in achieving decreased costs for sanitation systems, hence making them more affordable, (Nansubuga et al., 2016). According to the 2023 Africa Sustainable Development Report, 411 million Africans still lack access to safe water, and almost three-fourths don't benefit from safely managed sanitation services.(United Nations Development Programme, 2023).

**Nationally,** The National Water Supply and Sanitation Council (NWASCO) reports that one of the greatest challenges facing water and sanitation supply utilities in Zambia is poor infrastructure development and maintenance. 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. According to NWASCO, the investments have been skewed towards water supply as opposed to sanitation and this situation has been compounded by lack of a clear policy on sanitation issues. Subsequently, Zambia has developed a comprehensive policy to guide the development and management of 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).

Zambia is no exception to the need to accelerate the provision of adequate and safe sanitation. The country's Vision 2030 states that universal coverage of both water supply and sanitation services should be achieved. A study conducted by Kivunja and Kuyini, (2017), revealed that despite the various measures taken, Zambia with improved sanitation coverage of 44%, was not able to reach Millennium Development Goal (MDG) 7c for water and sanitation (halving the proportion of people without sustainable access to safe drinking water and basic sanitation by 2015. Similarly, another study conducted by United Nations, (2018) disclosed that access to water supply and sanitation (WSS) services remains stubbornly low in Zambia. As of 2017, about 67 percent of Zambians had access to an improved water source, and only about 44 percent had access to an improved sanitation facility. However, there are disparities between rural and urban. Access to improved water in rural areas is at 51 percent, whereas urban is 89 percent. Sanitation access in rural areas is at 19 percent, whereas urban is 49 percent.

A study conducted by United Nations, (2018) disclosed that approximately 19 percent of Zambians practice open defecation. Zambia is one of the countries that missed the Millennium Development Goals (MDGs) on access to water and sanitation and is on track to miss the more ambitious Sustainable Development Goals (SDGs). Access rates have remained almost stagnant over the past 15 years. Even where there is access, the quality of service is poor, especially in small rural towns and peri urban areas. Households receive an average of 16 hours of water supply per day, 6 percent of water samples in urban areas fail bacteriological tests, and sanitation and sewer collection and treatment remain poor.

Further, the vision 2030, underscored that, access to clean and safe water by most Zambians remains a challenge. At the national level about 52 percent of households had access to clean and safe water supply in 1990 while in 2000, the percentage had increased to 64, but it dropped to 57 percent in 2003. Accessibility has been higher in urban areas at 88 percent in 1990 and 2000 compared to 28 percent and 48 percent in rural areas in the respective years. In 2004, access to safe water supplies was estimated at 86 percent of the population in urban areas and 37

percent of the population in rural areas. In the peri-urban areas, where 50-70 percent of the urban-population live, water supply and sanitation services are poor, inadequate and unreliable. By 1990, 63 percent of the population had access to improved sanitation facilities, increasing to 78 percent in 2000. Accessibility has been higher in urban areas at 86 percent and 99 percent, compared to 48 percent and 64 percent in rural areas in 1990 and 2000 respectively. (GRZ, 2006).

Water and sanitation infrastructure (WSS), which was primarily built to cater to a small sub-sector of developing city populations, is increasingly coming under excessive strain. In the rapidly growing cities of the developing world, infrastructure expansion does not always keep pace with population demand, leading to waterborne diseases such as cholera (*Vibrio cholerae*) and typhoid (*Salmonella* serotype *Typhi*) ((Gething et al., 2023).

Moreover, about sanitation, the percentage of households with access to an improved sanitation facility at national level increased to 54.4 percent in 2018 from 35.5 percent in 2007. The improvement was attributed to consistent public sector investments in water and sanitation, coupled with support from cooperating and development partners. Despite the gains made in improving access to water and sanitation in urban areas, the increase in unplanned settlements were a major drawback on Government efforts to provide safe water and adequate sanitation. There is, therefore, need to improve town and country planning and implement decentralization that will entrench participatory planning with communities in various constituencies and wards, (GRZ, 2022).

The practices indicate that NWASCO is regulating sanitation service provision only through sewerage systems and not onsite sanitation, while ZEMA licenses the exhauster trucks and the construction and operation of wastewater treatment plants. The Zambia Environmental Management Agency (ZEMA) regulates onsite sanitation for environmental protection purposes; however, the provision of onsite sanitation services is not regulated. Sanitation service provision tools such as service level guarantees and agreements between the regulator NWASCO and the commercial utilities (CUs), which were created to provide urban WSS services, do not include onsite sanitation and faecal sludge management. ZEMA has developed effluent standards, but faecal sludge standards are not in place. ZEMA does not regulate community emptying either. Unsafe emptying of pit latrines, especially in peri-urban areas, results in public health risk and potential environmental pollution. Existing building codes are outdated and require updating.(NWASCO, 2018).

The Zambia Water and Sanitation Act No. 28 of 1997 establishes onsite and offsite sanitation as a service under the responsibility of Water and Sanitation Utilities and regulated by NWASCO. However, the Act did not provide sufficient clarity on the roles and responsibilities of all the relevant actors across the sanitation chain. Other issues that lacked comprehensive guidance and/or provision for regulation included: Standards on the types of onsite sanitation systems allowed within a given jurisdiction, Use of onsite sanitation systems and emptying frequency, offloading of faecal sludge at treatment sites and management of transfer stations and offloading bays, Treatment, re-use, and disposal of faecal sludge, Powers of authorized officers and penalties for incompliance.(SNV, 2024).

Foreseen obligations for sanitation systems owners include the specification of the sanitation system planned within new construction permits requests, which is to be approved by LA. For existing buildings, the established sanitation system will go through an inspection and approval process from LA. All households will have to comply, within a certain period, with the standards prescribed by LA. Further, the household owner will proceed with the safe emptying of the facility within the time threshold set by the LA. When the number of users exceeds the limit determined by the Regulation, the owner of the household is required to notify the LA that shall specify the remedial measures to be taken if necessary. Owners will have to ensure that their containments have a provision for emptying without the utility or a service provider resorting to breaking any part of the toilet or any other structure surrounding the containment.(SNV, 2024).

Water and Sanitation Utilities are already fully responsible for the provision of faecal sludge management (FSM) services, though they may, with the approval of the Council, enter into agreements with service providers for this end. It is anticipated that the strengthened regulations will enable the Commercial Utility to apply a fine to sanitation systems owners that dispose of unsuitable materials such as solid waste into their containments. The strengthened regulations will also determine the methods and reuse products that can be generated from faecal sludge, and establish the related product standards, testing procedures and reporting mechanisms to the competent Government Agencies.(SNV, 2024).

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## STUDY METHODOLOGY

### Research Paradigm

The study was anchored on social constructivist paradigm and viewed reality from a relativist ontology who believes in multiple realities. (Scotland, 2012), asserts that reality is relative to how individuals experience it at any given time and place. According to Scotland, (2012), ontology is defined as a branch of philosophy concerned with the assumptions, we make to believe that something makes sense or is real, or the very nature or essence of the social phenomenon we are investigating. Further, (Scotland, 2012). Therefore, collaborating with the above definition, the researcher studied reality by integrating multiple perspectives. Moreover, in terms of epistemology, the researcher adopted a subjective epistemological stance in which knowledge is generated through the researcher's personal experiences and interaction with participants.(Kivunja & Kuyini, 2017). Using this epistemological stance, the researcher generated knowledge through co-construction and interpreting meaning from the participants' experiences.

Further, the researcher adopted a value bound axiological stance hence acknowledging that once positionality in terms of personal background, experience, values and beliefs influenced the study while prioritizing ethical considerations. (Kivunja & Kuyini, 2017) defines axiology as the ethical issues that need to be considered when planning a research proposal. Given the nature of the study approach adopted, the research was value bound, hence was part of what was being researched, and could not be separated.(Saunders et al., 2009). Therefore, positionality in this study, helped in integrating the researchers' beliefs and experiences in the co-construction of meaning during the study. Lastly, the researcher deployed a methodology stance which covered the research approaches, designs, methods and procedures used in an investigation that is well planned to find out something. (Keeves, 1997). The inductive reasoning is a logical process in which multiple premises, believed true or found true most of the time, are combined to obtain a specific conclusion or to supply evidence for the truth of conclusion.(Sauce & Matzel, 2017). The researcher applied inductive logic in data collection and data analysis by reasoning from the specific that were participants sampled to the general study area.

### The Research Design

The interpretive phenomenological lens which sought to describe the essence of a phenomenon by exploring it from the perspective of those who experienced it was adopted in this study. (Neubauer et al., 2019) note that the goal of phenomenology was to describe the meaning of this experience both in terms of what was experienced and how it was experienced. Given the philosophical underpinning of this study, the researcher was able to generate meanings, and the participants lived experiences.

### Sampling, Location, Population and Procedure

#### Study Location

The study was conducted in George Compound one of the Peri Urban areas located West of Lusaka. The study area was selected premised on the Sanitation Programmes interventions which were implemented there by the government of Zambia through the Lusaka Sanitation Program.

#### 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 population comprised the beneficiaries of sanitation programmes, the Ward Development Committee, the water and Sanitation Committee, the Lusaka City Council (Public Health Department), Zambia Environmental Management Agency (Inspectorate), National Water Supply and Sanitation Council, and 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.

## 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 a 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.

## Sampling Procedure

The Purposive Sampling is intentional selection of informants based on their ability to elucidate a specific theme, concept, or phenomenon, (Robinson, 2014). Furthermore, the researcher employed criterion-based purposive sampling 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. These participants were handpicked for such reasons because the criterion is set to enable the relevant data to be collected, (Haruna, 2023). The researcher selected samples from the 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), Zambia Environmental Management Agency (Inspectorate), National Water Supply and Sanitation Council, and Lusaka Water Supply and Sanitation Company- (Peri-Urban Department).

## Data Collection Instruments

The collection of primary raw data from the field was based on the deployment of the Key Informant Interviews targeting government officials and Community Opinion Leaders and the In-Depth Interviews targeting the sanitation programmes beneficiaries.

### Key Informant Interviews

The researcher deployed the key informants Interviews based on its 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 that the researcher intends to use. The Key Informant Interviews (KII) 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 involves 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 researcher deployed this method targeting the government officials and community leaders based on their experience working in the sector or experiencing the sanitation programme interventions in the study area.

### In-Depth Interviews

The researcher deployed in-depth Interviews in generating 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 unrestricted manner as opposed to structures instruments which restrict participants responses.

## Data Collection Procedures

The researcher deployed the self-administer interviews in the field to elicit for the participant's views and experiences. The interviews were conducted either English or translated into local language spoken by the participant. The study participants to be interviewed were selected using the criterion purposive sampling. The

interviews duration lasted between 50 to 60 minutes. Data Collection devices such as audio-recording were used after obtaining consent from the study participants.

## Data Analysis

The researcher analysed raw data manually using a Reflexive Thematic Analytical Research Approach. According to (Kiger & Varpio, 2020) defines 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 Braun and Clarke framework for conducting thematic analysis which involves a six-step process namely data familiarization, generating initial codes, themes 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 study purpose.

## The Study Trustworthiness

The researcher achieved rigor by employing trustworthiness which according to Lincoln and Guba relied on four general criteria in their approach to trustworthiness. These are credibility, transferability, dependability, and confirmability. (Ahmed, 2024). The researcher achieved credibility of the study findings by building trust and rapport with participants over time thus allowed the researcher to gain nuanced insights into their experiences, behaviours, and beliefs, (Ahmed, 2024). Further, the step helped in capturing rich data that might not be immediately evident during brief interactions, (Ahmed, 2024). Moreover, transferability was achieved by thoroughly describing the research context, participants, and methods allows readers to evaluate the similarities between their context and the study, enabling them to judge the applicability and relevance of findings to their own settings or situations, (Ahmed, 2024). Further, the researcher achieved dependability by thoroughly documenting each step of the research process, which helped to ensure transparency and allowed others to replicate the study or assess the dependability of the findings by following the same procedures and understanding the rationale behind decisions made (Ahmed, 2024). Further, Eryilmaz (2022) notes that creating and preserving an audit trail, which consists of a comprehensive log documenting the decisions made throughout the research process, allows other researchers to reproduce the study, therefore guaranteeing the dependability of the results. The researcher achieved confirmability by employing member checking to ensure that the verification of their viewpoints and experiences was accurately represented, thereby strengthening the confirmability of the findings by providing participants with an opportunity to validate or correct the interpretations. Further, by keeping a journal helps researchers track their evolving thoughts, biases, and reflections during the research process. This reflective practice enhances transparency and provides insights into the researcher's subjectivity, contributing to the confirmability of the findings, (Ahmed, 2024).

## STUDY FINDINGS

This section presents the study findings and the participants verbatims which were coded and anonymised by initials of the study area i.e. George Compound (GC) for beneficiaries and KII for the Key informants. The collected raw data from the field employed the open-ended interview guides in which the interview scripts were analysed thematically in line with the study objectives and the research questions. The presentation of the study findings sought to answer the question on, stakeholders lived experiences of Pit Emptying Services in Lusaka's Peri-Urban areas.

### Stakeholders Perceived Mitigation Measures for addressing Sanitation Challenges

#### Increase in Education

The key informant expressed that the laws are not failing but there is a failure on the part of communities in complying with sanitation laws. The key informants further disclosed that even if you employ hundred inspectors, sanitation starts at the household level. The key informant expressed that.

*'There is need for an increase of education at an early childhood level'. If you follow resources, it not possible to do sanitation for the whole country. Increase in sensitisation is*

*what is required to address sanitation challenges. The available regulations are adequate but there are two aspects to it, and this is enforcement and the public. Regulations give power for enforcement, but the big part is played out by the population. (Source KII from ZEMA).*

### **Strictness and Prohibitive Laws**

There is need to revise the regulations to make them stricter and more prohibitive. The laws are there we just need to strengthen them. One of the key informants interviewed revealed that:

*The key informant further disclosed the need to revise our regulations to ensure that there is strictness in terms of prohibitive measures for those not complying with the sanitation laws. (Source KII from ZEMA).*

### **Strengthening of the D-WASH**

There are enough laws, and the only 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).*

### **Adherence to Personal Protective Clothing**

There is need to ensure that service providers adhere to the personal protective clothing which is enforced through the regular compliance inspections. One of the key informants interviewed disclosed that:

*There is need to ensure adherence to PPE through regular inspections by the commercial utility company and the local authority. The regulator inspects the utility company who are licensed by the regulator to provide sanitation services. (Source KII NWASCO).*

### **Roll out of Pit emptying Facilities**

The study revealed that there is need to roll out investments in vaccination and in constructing faecal sludge facilities. One of the interviewees interviewed expressed that:

*Roll out of pit emptying is not a cheap venture because it requires investments in vaccinations and other associated costs. There are limited faecal sludge treatment facilities which creates a challenge for disposing of the faecal sludge. (Source KII NWASCO).*

### **Minimum Standards**

The study disclosed that the statutory instruments is under development and once finalised would help to address minimum standards design to guide on the type of pit latrines to be constructed and facilitation of compliance. One of the interviewees disclosed that:

*The statutory instrument under development will help to address aspects to do with minimum standards and compliance such as design and construction of the facilities. It will also address treatment of the sludge from the pathogens before it is disposed of. (Source KII NWASCO).*

### **Education and Sensitisation**

The study revealed that there is need for political which will be achieved by bring on board the politicians to help with sensitisation on the on-site sanitation services as opposed to working in silos. The following is an extraction

from one of the key informants:

*Of course, the issues of sensitization because some customers are not aware about on-site sanitation services. There is also need for political will and buy-in of other stakeholders rather than working in silos which has always been a challenge. (Source KII NWASCO).*

The sanitation laws awareness is inadequate hence there is need to address the awareness raising issue among the stakeholders. Moreover, education also plays a key role in raising awareness on sanitation services. One of the informants expressed that:

*The recommended measures to Pit emptying services includes awareness raising and stakeholders' engagement. There is need to incorporate the sanitation laws in the education curriculum such as civic education which needs to be updated immediately. Sanitation laws need to be linked to education so that it's easier to implement at the household level. (Source KII- LCC).*

### **Communication through Education Materials**

There is 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 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 feedback because there hasn't been a room to have a feedback loop when to get feedback if they serve service provider is not following standard procedures during emptying. We need the additional investments to build more sanitation which always could not reach or given capital investments required people are now aware about 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 increase water provision to the areas due to death due to direct link with the water and the sanitation invest more in communal sanitation facilities to address open defecation there are two faecal sludge management facilities hence there is need for the central government to construct more of the facilities. (Source KII- LWSC).*

### **Flooding and Pollution Control**

There is need to regularly empty Pit latrines when they fill up because if they are not emptied because of climate change flooding tends to move faecal 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 tends to overflow hence causing pollution of the underground water creating unhealthy environment. Source KII- LCC).*

### **Construction of Road Access**

The study disclosed that there was need to have access roads in the Peri-Urban areas for easy pit emptying and other sanitation services. There is a need to have a scheduled pit emptying before the toilets fill up. Moreover, the key informants expressed the need to address the design issues, planning and enforcement. The following is a verbatim from one of the interviewees:

*The road access is required and moreover, there is need to have a schedule for Pit emptying before they fill up. There is also needed to address the design issues, planning education and enforcement. Source KII- LCC).*

## Sanitation and Cultural Socialisation

The key informant expressed that there is need to entrench culture early enough to ensure that sanitation is appreciated hence making it easier to comply among the stakeholders. One of the key informants expressed that:

*The key informant expressed that sanitation should be embedded in culture at an early stage and this will make it easier for inspectors to enforce the sanitation laws. The knowledge from the people will also help to make people appreciate the importance of sanitation compliance. (Source KII from ZEMA).*

Similarly, another key informant interviewed disclosed that:

*What could make sanitation compliance is through enabling officers with logistics hence will be able to get compliance from the public. (Source-KII-LCC).*

## Joint Operations

One of the strategies for ensuring compliance with sanitation laws is through having joint operations for example most of the D-WASH are not active hence making it difficult to ensure compliance by most of the households to sanitation. One of the key informants interviewed disclosed that:

*The only thing is working together through joint operations which are not working. D-WASH which are not active hence making it difficult to ensure compliance. (Source-KII-LCC).*

## Enforcement Inspections and Adherence to Law

Further it was disclosed by another key informants that enforcement of sanitation laws is conducted through inspections of the premises for the 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 inspection of premises that are just for the public places just to ensure that there is proper sanitation. (Source KII- LCC).*

The key informant interview conducted with LCC revealed that the public health Act compels households and provides guidance and failure to comply with them might to courts litigations. Hence the law compels the people to have sanitation facilities, hence this helps in improving household sanitation. The key informants narrated that:

*yeah so in terms of the laws to the public Health Act it compels for people to comply and provides guidance to the people once they don't comply can even end up being taken before the courts of law so these laws are able to compel people to connect to their networks and it really helps in improving the household sanitation situation in residential areas like the situation. (Source KII- LCC).*

## Participation and Decision Making

The study highlighted that men are often away from home, which complicates household decision-making, particularly regarding financial matters related to sanitation. This irregular participation hinders effective sanitation decisions, as men are less aware of the impacts of inadequate toilet facilities. A male community beneficiary suggested that addressing gender inclusion challenges could involve encouraging women to take on leadership roles and actively participate in meetings. The following is the community participants extract:

*"I think it's important for women, whether educated or not, to be allowed to become chairpersons of groups. Women need to be encouraged to participate in the meetings.  
"Participant (GC 6).*

## 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).*

Both men and women face difficulties in obtaining sufficient water for their toilets, but this issue disproportionately affects women, who often stay at home while men are at work. One of the female community beneficiaries disclosed that:

*"The other challenge we face is lack of water, and this affects us women more than men because men go to work and it's the women who remain at home." Participant (GC 19).*

The Lusaka Water Supply and Sanitation Company (LWSC) must consider women's specific needs, particularly regarding access to water for toilet use, especially during menstruation. One of the community beneficiaries submitted that:

*"LWSC needs to seriously consider supplying water in the area because despite not supplying water, they bill us. Most of our money is spent on buying water for household use." Participant (GC 19).*

Sanitation is further compromised by load-shedding, which disrupts water supply from boreholes that rely on electricity. A key informant suggested:

*"There is a need to invest in solar-powered energy sources." Participant (GC 22).*

Financial challenges also hinder sanitation development, with a call for payment structures that allow for instalments: One of the key informants submitted that:

*"There is a need to provide part payment or pay in instalments because many beneficiaries lack initial capital. " Participant (GC 22).*

Women often resort to shared pit latrines, which can lead to health issues due to poor hygiene and limited access. One of the key informants noted:

*"Poor sanitation can lead to vaginal infections or urinary tract infections, which affect women more due to their biological makeup. Women fear to rehydrate because they don't have access to toilets, leading to health risks." Participant (GC 22).*

To improve access, flexible payment plans for constructing toilets were suggested. One of the community beneficiaries expressed that:

*"I think the plan of payment should be made flexible to allow many men and women to construct the toilets. " Participant (GC 19).*

## Poor Housing Planning

There is a need to have a deliberate and structured community engagement for both women and men by the policymakers. The key informant narrated that:

*'Deliberateness like a structured way of engagement by policymakers. They need to be guided by a mode of engagement of women and men. Both women and men need to be engaged. Increased population and people have nowhere to dispose of solid waste which ends up in the toilets. The Lusaka City Council should come up with disposal plans on how to dispose of waste.' Participant (GC 11).*

The community beneficiary interviewed expressed that the government needs to provide other alternative sources of energy to address the challenges of those relying on the boreholes as their source of water. The community beneficiary submitted that:

*'The government needs to provide solar energy; this will help to reduce reliance on hydroelectricity which is affected due to droughts, and this will help those that are pumping water from the boreholes.' Participant (GC 6).*

There is a lack of access in the area hence posing a challenge to construct sanitation facilities and this is because of lack of proper planning hence creating a sanitation challenge in the area. The key informant expressed that:

*'The local authorities need to create access roads in many peri-urban areas, demolish some of the structures, and compensate the affected to create access roads'. Participant (GC 24).*

### **Environmental and Design Challenges**

The study highlighted that many of the newly constructed toilets have shallow pits, leading to rapid filling and increased burden on women, who are primarily responsible for household sanitation. A female community beneficiary, aged 37, asserts that:

*"The new toilets that were constructed face the challenge of shallow pits, which makes them fill up fast. " Participant (GC6).*

This feedback indicates a need for more thoughtful design and construction practices to ensure the longevity and usability of sanitation facilities. A male community beneficiary expressed frustration, noting that the shallow design and poor planning have discouraged some community members from participating in the project:

*"To my side, the toilets that were constructed are not deep, hence they fill up fast. There is also no clear access due to poor demarcation and planning." Participant (GC 6).*

### **Education Curriculum**

Cultural vices that hinder inclusion in sanitation development projects cannot be effectively addressed through a one-time effort; instead, there is a need for systemic change, particularly in education. A key informant noted:

*"Cultural challenges cannot be corrected in a one-off effort. There is need to look at our education system. We need to engage with schools so that some of the cultural vices can be addressed." Participant (GC 11).*

Lack of education significantly impacts gender inclusion, as many individuals, especially women, are often deemed unable to contribute to discussions due to perceived illiteracy. This results in their exclusion from important sanitation meetings, leading to biased decision-making favouring men. One informant submitted that:

*"Lack of education does affect inclusion because for gender inclusion to happen, there is a need for understanding social inclusion. Most of the time, people pass comments that women are illiterate and can't understand what is being discussed, hence they are excluded." Participant (GC 11).*

Changing poor sanitation practices requires a shift in mindset, ideally starting with children. A focus on education and awareness can transform community attitudes over time. Addressing the high illiteracy levels, particularly among women in peri-urban areas, is essential for enhancing participation and inclusion in sanitation initiatives. Another key informant emphasized:

*"I think our biggest challenge is mindset, we need to change through awareness raising to both men and women. There is a need to change the young ones for future benefits through the education curriculum." Participant (GC 11).*

## Adopt the Human Right Approach

This strategy not only fosters awareness of rights but also equips community members with the skills necessary to engage with duty bearers and hold them accountable for providing adequate sanitation facilities. One of the key informants highlighted that adopting a human rights approach is essential for addressing gender discrimination in toilet construction. This approach empowers both men and women to advocate for their sanitation needs effectively. One of the key informants expressed that:

*"One of the strategies used to address gender discrimination is a human rights-based approach. There is a need to build capacity in men and women so that they can demand their sanitation rights." Participant (GC 22).*

## Improved On-Site Sanitation Infrastructure

The Key informant 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.*

## Broadening of the Utilities Mandate

The mandate of LWSC expanded from focusing solely on water supply and sewerage system to also covering sanitation service delivery. This institutional shift closed a long-standing service gap. A key informant emphasized that:

*"The government changed the mandate of the utility to include both water and sanitation. Previously there was no role to provide on-sanitation." This redefinition enables LWSC to play a more proactive role in planning, regulating, and ensuring sanitation compliance in Peri-Urban settlements.*

## Construction of the Faecal Sludge Treatment Plants (FSTPs)

Another measure highlighted was the establishment of Faecal Sludge Treatment Plants to support formal pit emptying services. Key informants emphasized the newness of this infrastructure. One respondent stated:

*"To start with, the capital investment in constructing FST these are new; we have never had them in the country. We have FSTP at Matero and Manchinchi. These are there to support the pit emptying services in the peri-urban areas which we never used to have in previous years." These facilities serve as the backbone for safe sludge transport, treatment, and disposal.*

## 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 paid a small amount towards desludging. So that when the toilet fills up, they just call the service provider." This system empowers residents and encourages 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).*

The desludging will help address the environmental and public health benefits by preventing the pit latrines from overthrowing due to delayed pit emptying by most customers. The key informants expressed that:

*We are trying to strengthen the sanitation service delivery model by piloting the scheduled desludging model which is an organised way of pit emptying frequency which is being piloted in George, Kanyama and chawama. This model enables the customers to pay small contributions which makes it easier for their pit to be emptied once they fill up. This has a direct benefit for environmental and public health by curtailing pit overthrow. (Source KII LWSC 2).*

### **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 center, 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.*

Further, the key informants disclosed that:

*digitalisation of the on-site sanitation in which the service providers are expected to open an online account with the utility company has helped reduce cash-based payments hence enhanced accountability of on-site sanitation resources as well as increased efficiency. (Source KII LWSC 2).*

### **Strengthening Regulation and Compliance**

Sanitation enforcement is being strengthened through regulatory inspection and structured oversight. One respondent stressed that:

*"Sanitation cannot be addressed only at household level but a holistic approach which includes application of sanitation laws which mandates the utility to address sanitation." LWSC inspectors now play a role in infrastructure compliance and registration of service providers, including matters related to "MOU, training, medical fitness, and registering them with ZEMA."*

### **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."*

## **DISCUSSION OF FINDINGS**

### **Increase in Education**

The study revealed that while sanitation laws exist and are generally adequate, compliance at the community level remains a critical challenge. Key informants emphasized that enforcement alone is insufficient, noting that even employing many inspectors cannot ensure improved sanitation outcomes if households do not understand or follow the laws. According to one key informant, "even if you employ a hundred inspectors, sanitation starts at the household level," highlighting the importance of individual and collective responsibility in maintaining hygiene standards.

This finding aligns with literature emphasizing the role of education and awareness in effective sanitation management. According to Cairncross and Valdmanis (2006), laws and regulations are only as effective as the public's knowledge of, and willingness to comply with, them. Behavioural change, household-level hygiene practices, and community engagement are therefore 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.

The study underscores the need to integrate education, awareness campaigns, and community engagement into sanitation programs. Fostering understanding of health risks, proper toilet usage, and maintenance responsibilities can enhance compliance, reduce the burden on enforcement agencies, and promote sustainable sanitation practices across communities.

### **Regulatory Strictness and Prohibitive**

The study revealed that while sanitation laws exist, their current form may not be sufficiently strict or prohibitive to ensure compliance. Key informants emphasized that the laws themselves are not failing, but enforcement could be strengthened through regulatory revisions that make penalties more stringent and deterrent. One key informant noted, "The laws are there; we just need to strengthen them," highlighting the need to reinforce existing legal frameworks rather than create entirely new ones.

This finding aligns with the literature on sanitation governance, which suggests that weak or lenient regulations often fail to incentivize compliance, particularly in densely populated peri-urban areas where oversight is challenging (Mensah et al., 2023). Stronger, well-communicated regulations, coupled with effective monitoring and enforcement mechanisms, can encourage households and service providers to adopt safe sanitation practices. The study underscores the importance of revising and reinforcing regulatory frameworks to make them more prohibitive while ensuring that they are realistic, enforceable, and accompanied by community awareness and engagement. Strengthened laws, when combined with education and support, can help bridge the gap between policy intent and household-level sanitation behaviour, ultimately improving public health outcomes.

### **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.

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. (2020), 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.

### **Adherence to Personal Protective Clothing**

The study revealed that adherence to standard operating procedures, particularly the use of personal protective clothing (PPE), remains a significant challenge in the implementation of on-site sanitation. Participants reported that many employees feel uncomfortable wearing the full protective gear, which leads to inconsistent use and increased exposure to health risks. In addition, some service providers create compliance gaps by disregarding

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the licensing conditions that mandate PPE usage, further compromising occupational safety. This finding is consistent with Chumo (2021), who observed that informal and formal pit emptiers in peri-urban areas frequently operate under unsafe conditions, often neglecting PPE due to discomfort, lack of awareness, or insufficient enforcement. Non-adherence to protective measures not only endangers workers' health but also increases the risk of environmental contamination and disease transmission in the communities they serve.

The study underscores the need for stronger enforcement of PPE compliance through regular inspections and monitoring. In addition, continuous training and sensitization programs could improve workers' understanding of the importance of protective clothing, while interventions that address discomfort—such as providing ergonomically designed PPE—could enhance adherence. Ensuring compliance with protective measures is critical for safeguarding the health of service providers and maintaining the integrity and sustainability of on-site sanitation services.

### **Roll out of Pit emptying Facilities**

The study revealed that there is a critical need to invest in both vaccination programs and the construction of fecal sludge management (FSM) facilities in peri-urban areas. Participants highlighted that while pit emptying services exist, they are often limited in coverage and capacity, leaving many households with inadequate options for safe faecal sludge disposal. Without sufficient FSM infrastructure, communities remain at risk of environmental contamination and waterborne disease outbreaks.

This finding aligns with Chumo (2021) and Mara (2020), who emphasize that expanding access to properly designed fecal sludge treatment facilities is essential for public health, particularly in densely populated peri-urban settlements where pit latrines are the primary sanitation option. Similarly, vaccination coverage among communities and sanitation workers is critical for mitigating the health risks associated with exposure to faecal matter. The study suggests that coordinated investments in FSM infrastructure, coupled with health interventions such as vaccination, are necessary to improve sanitation outcomes. Expanding pit emptying facilities would enhance service accessibility, reduce unsafe disposal practices, and support sustainable management of on-site sanitation systems. Integrating these investments with community awareness and regulatory enforcement can further ensure that sanitation services are both effective and safe.

### **Adherence to Minimum Standards**

The study revealed that adherence to minimum sanitation standards remains a challenge in peri-urban areas. Literature indicates that in large multi-household units, the number of toilets provided is often inadequate, with some in-house units having as many as eight users per toilet seat (Peprah et al., 2015). Regulatory frameworks, such as building codes, exist to incentivize improved household provision of sanitation facilities. However, enforcing these standards in low-income settings can be complicated, as landlords may face financial constraints or pass costs onto tenants, potentially undermining housing affordability. Legal and socio-economic instruments, coupled with financial incentives, are thus essential to ensure adequate sanitation provision without creating undue burdens on low-income households.

Similarly, this study corroborates these enforcement challenges within a different context. Findings indicated that statutory instruments to regulate the construction and design of pit latrines in peri-urban areas are still under development. Once finalized, these instruments are expected to provide clear guidance on minimum sanitation standards, including toilet design, spacing, and construction quality, thereby facilitating compliance among households and service providers. This contribution adds contextual knowledge to the literature by demonstrating that even where enforcement mechanisms are planned, gaps remain in implementation, and regulatory frameworks must be supported by practical, context-sensitive strategies to ensure effectiveness.

Overall, ensuring adherence to minimum standards requires a combination of regulatory enforcement, stakeholder education, and incentives that balance public health needs with the economic realities of low-income communities. Strengthened statutory instruments, when integrated with monitoring and compliance mechanisms, can significantly improve sanitation outcomes in peri-urban settings.

## Education and Sensitisation

The study revealed that education and sensitisation are critical for improving compliance with on-site sanitation services in peri-urban areas. Participants emphasized that raising awareness on sanitation laws and practices cannot be achieved by working in isolation; political leaders and local policymakers should be actively involved in advocacy and community sensitisation efforts. Engaging politicians can help amplify messages about the importance of sanitation, encourage community buy-in, and ensure that interventions reach a wider audience.

The study further highlighted that awareness of existing sanitation laws among stakeholders is generally low, which limits the effectiveness of regulatory enforcement. Education, therefore, is a key tool for addressing this gap, not only informing households about their responsibilities but also promoting behavioral change that supports sustainable sanitation practices. This aligns with global findings that sensitisation and community engagement are essential components of successful sanitation programs, as legal frameworks alone are insufficient to drive compliance (Cairncross & Valdmanis, 2006). In conclusion, integrating education and political support into sanitation initiatives strengthens the overall impact of interventions. By combining awareness-raising with legislative enforcement and community engagement, stakeholders can enhance the uptake of on-site sanitation services, reduce health risks, and promote sustainable hygiene practices across peri-urban communities.

## Communication through Education Materials

The study revealed that effective communication and the use of educational materials are essential for improving the uptake and sustainability of on-site sanitation services in peri-urban areas. Participants emphasized the importance of intensifying communication efforts and ensuring continuous feedback from both beneficiaries and service providers. Engaging communities through clear, culturally appropriate educational materials not only informs households about proper sanitation practices but also fosters collaboration and accountability between service providers and residents.

The study further 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. For instance, new infrastructure may necessitate adjustments to existing housing, potentially leading to the demolition of some structures and requiring compensation for affected residents. Coordinating closely with local authorities is therefore crucial to navigate these complex settlement patterns, ensure compliance with planning regulations, and avoid conflicts with households. This finding aligns with global evidence emphasizing the role of communication in sanitation projects. According to WaterAid (2018), 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.

## Flooding and Pollution Control

The study 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.

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.

## Construction of Access Roads

The study revealed that the lack of proper access roads in peri-urban areas significantly hampers the provision of pit emptying services. Participants emphasized the importance of constructing accessible roads and establishing a scheduled pit emptying system to ensure that toilets are serviced before they reach full capacity. Poor access not only delays emptying but also increases the risk of unsanitary conditions, environmental contamination, and health hazards for residents. Key informants also highlighted the need to address broader planning and design issues, including appropriate toilet siting and infrastructure layout, as well as enforcement of sanitation standards. Effective planning ensures that sanitation services can be delivered efficiently, safely, and sustainably, even in densely populated or unplanned settlements.

This finding aligns with global evidence indicating that infrastructure access is a critical determinant of effective sanitation service delivery. According to Tilley et al. (2018), logistical challenges such as restricted road access in informal settlements limit the ability of service providers to perform timely sludge removal, undermining public health interventions and increasing operational costs. Hence, improving access roads and integrating planned pit emptying schedules, combined with proper design and regulatory enforcement, is essential to ensure sustainable and efficient on-site sanitation services in peri-urban communities.

## Joint Operations Enforcements

The study 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. According to Mukoronyi and Mwangi (2020), joint operations that involve regulators, local authorities, and community representatives enhance oversight, accountability, and responsiveness in sanitation service provision. Such collaborations help ensure that households comply with laws, service providers adhere to licensing conditions, and public health risks are mitigated. Hence, activating D-WASH structures and promoting joint enforcement operations can strengthen regulatory compliance, improve sanitation behaviors at the household level, and ensure more sustainable management of on-site sanitation facilities in peri-urban communities.

## 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.

In conclusion, enforcement inspections are a vital tool for operationalizing sanitation laws. 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.

## Participation and Political Will

The study revealed that weak political will and limited participation of government and local authorities significantly hinder the effective implementation of sanitation programs in peri-urban areas. Key informants

emphasized that without strong political commitment, enforcement institutions struggle to allocate sufficient human and financial resources, resulting in gaps in planning, monitoring, and service delivery. The study further indicated that planners often lack the technical knowledge and practical experience to implement viable sanitation solutions in high-density, low-income settlements where constraints such as water scarcity, limited energy, inadequate space, and complex land tenure issues are prevalent.

This finding corroborates existing literature. Mensah et al. (2023) identified weak political will, low commitment of enforcement institutions, mild sanctions, inadequate funding, corruption, poor sanitation culture, and limited institutional capacity as major barriers to sanitation law enforcement. Similarly, Lüthi et al. (2009a) highlight that planners' lack of expertise in dense low-income contexts limits the feasibility of sanitation interventions. The present study adds empirical evidence from local insights, confirming that political support and institutional engagement are critical for sustainable sanitation outcomes. Therefore, strengthening political will and institutional commitment is essential for the success of sanitation programs. Without proactive leadership and strategic investment in human and financial resources, even well-designed sanitation policies and regulations may fail to translate into improved public health and environmental outcomes in peri-urban communities.

### **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 (2018), 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.

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.

### **Poor Housing Planning**

The study revealed that inadequate housing planning in peri-urban areas significantly hampers the provision and accessibility of sanitation services. Participants emphasized the need for structured and inclusive community engagement, involving both women and men, to ensure that sanitation interventions are responsive to local needs. Poorly planned settlements create challenges for constructing sanitation facilities, limiting space for toilets and complicating access for service providers.

Additionally, participants highlighted that reliance on boreholes for water, often dependent on electricity, further exacerbates sanitation difficulties. The lack of alternative energy sources for water extraction disrupts the functionality of sanitation facilities, particularly during power outages. This finding aligns with global literature indicating that unplanned housing and infrastructure deficits impede sanitation service delivery and increase public health risks (Tilley et al., 2018).

The study suggests that addressing sanitation challenges in peri-urban areas requires deliberate planning interventions that integrate land use, water supply, energy alternatives, and community participation. Properly planned settlements with accessible roads, adequate space, and reliable water supply will enable the construction and maintenance of sanitation facilities, reduce health risks, and support equitable access for all residents.

## Environmental and Design Challenges

The study revealed that many newly constructed toilets in peri-urban areas have shallow pits, which fill rapidly and place a disproportionate burden on women, who are primarily responsible for household sanitation management. This design flaw not only increases the frequency of pit emptying but also discourages proper use and maintenance, reducing the effectiveness of sanitation interventions. Participants highlighted that poor planning and inadequate design negatively affect community engagement and ownership. A male community beneficiary expressed frustration, noting that the shallow design and lack of thoughtful planning have discouraged some residents from participating in the sanitation project. These findings underscore the need for more careful consideration of environmental and household factors when designing sanitation facilities, including pit depth, durability, accessibility, and space constraints.

This aligns with reviewed literature, which emphasizes that substandard pit latrine design in high-density or peri-urban settlements contributes to rapid fill-up, increased maintenance costs, and limited sustainability of sanitation services (Kennedy-Walker et al., 2015). Thoughtful design and adherence to minimum construction standards can improve the longevity of facilities, reduce operational burdens, and enhance community participation in sanitation programs. Thus, addressing environmental and design challenges is crucial for the sustainability and usability of on-site sanitation facilities. Proper planning, community involvement, and adherence to construction standards can mitigate the rapid filling of pits and promote long-term improvements in sanitation practices.

## Sanitation and Education Curriculum

The study revealed that cultural and educational barriers significantly hinder inclusion in sanitation development projects. One-time interventions are insufficient to address entrenched practices and social norms; instead, systemic change through education is necessary. Lack of education particularly affects gender inclusion, as women are often perceived as illiterate and, as a result, excluded from discussions and decision-making forums. This exclusion perpetuates biased outcomes, with sanitation decisions disproportionately favoring men and neglecting the needs of women. The study revealed that early cultural socialisation plays a critical role in shaping sanitation behaviours and compliance among community members. Key informants emphasized that embedding sanitation practices into cultural norms from an early age helps stakeholders understand the importance of hygiene and fosters long-term adherence to sanitation regulations. By normalizing proper sanitation within the community's social fabric, households and service providers are more likely to comply voluntarily, reducing the need for strict enforcement measures.

This finding aligns with global sanitation literature, which highlights that cultural values, habits, and social norms strongly influence hygiene behaviour (Sommer et al., 2015). When sanitation is integrated into everyday practices and reinforced through socialisation, both adults and children are more likely to adopt and sustain safe sanitation habits. Early engagement in schools, community clubs, and family settings can therefore establish lifelong practices that support environmental health, safe faecal sludge management, and overall public well-being. In conclusion, strengthening cultural socialisation around sanitation is a strategic approach to complement regulatory frameworks and education programs. By fostering a culture that values hygiene and sanitation, communities can achieve greater compliance and sustain long-term improvements in on-site sanitation services.

Participants emphasized that shifting poor sanitation practices requires a mindset change that ideally begins with children. Integrating sanitation education into school curricula and community awareness programs can help transform attitudes over time, fostering more equitable participation. Addressing high illiteracy levels among women in peri-urban areas is particularly critical for empowering them to engage meaningfully in sanitation initiatives. This finding aligns with global evidence highlighting that education is central to achieving inclusive sanitation outcomes. According to Cairncross and Valdmanis (2006), community education and awareness initiatives improve participation, promote gender equity, and support sustainable sanitation behaviors. In the context of peri-urban settlements, systematically embedding sanitation education into curricula and community programs can enhance long-term compliance, ownership, and equitable access to sanitation facilities.

## Adopt the Human Right Approach

The study revealed that adopting a human rights approach to sanitation is an effective strategy for promoting awareness, participation, and accountability in peri-urban communities. Key informants emphasized that this

approach equips community members with the knowledge and skills necessary to engage with duty bearers, ensuring that sanitation services meet their needs and comply with established standards. Participants highlighted that a human rights perspective is particularly important for addressing gender disparities in sanitation. By framing access to safe and adequate sanitation as a fundamental right, both men and women are empowered to advocate for equitable facilities, participate in decision-making, and hold service providers accountable. One key informant stated that adopting a human rights approach is essential for addressing gender discrimination in toilet construction, ensuring that facilities meet the specific needs of all users.

This finding aligns with global evidence, which indicates that applying a human rights framework in sanitation programs enhances community empowerment, fosters gender equality, and strengthens accountability mechanisms (UNICEF & WHO, 2019). Integrating human rights principles into sanitation planning and implementation encourages inclusive participation, safeguards marginalized groups and promotes sustainable access to hygiene services. Hence, adopting a human rights approach provides a strategic pathway for improving sanitation outcomes, fostering gender equity, and enabling communities to actively participate in the planning, monitoring, and maintenance of on-site sanitation facilities.

### **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.

### **Broadened Mandate of the Utility Companies**

The study revealed that the Lusaka Water Supply and Sanitation Company (LWSC) has broadened its mandate from focusing solely on water supply to also encompassing sanitation service delivery. Key informants explained that this institutional shift addressed a long-standing service gap in peri-urban areas, where sanitation services were previously limited or fragmented. By integrating sanitation into its core responsibilities, LWSC can now coordinate water and sanitation services more effectively, ensuring that households receive a comprehensive approach to hygiene and public health.

This finding aligns with literature emphasizing the importance of integrated utility services in improving sanitation outcomes. According to Dijk (2012), utility companies that combine water supply and sanitation management can better plan, monitor, and maintain infrastructure, while also leveraging economies of scale to reduce operational costs and improve service accessibility. In peri-urban contexts, where informal settlements complicate service delivery, a broadened mandate allows utilities to respond more effectively to community needs and regulatory requirements. In conclusion, expanding the mandate of utility companies like LWSC not only fills historical service gaps but also strengthens institutional capacity, improves coordination of sanitation and water services, and enhances public health outcomes in peri-urban communities.

### **Construction of the Faecal Sludge Treatment Plants (FSTPs)**

The study revealed that the establishment of Faecal Sludge Treatment Plants (FSTPs) represents a significant measure to support formal pit emptying services in peri-urban areas. Key informants highlighted that this

infrastructure is relatively new, filling a critical gap in the management and safe disposal of faecal sludge. By providing a centralized facility for sludge treatment, FSTPs enhance the efficiency and safety of pit emptying services, reduce environmental contamination, and improve public health outcomes.

This finding aligns with global sanitation literature, which emphasizes that the availability of proper sludge treatment infrastructure is essential for effective on-site sanitation management (Kakar et al., 2023). FSTPs not only facilitate safe sludge processing but also support regulatory compliance, allow for monitoring of waste flows, and provide opportunities for resource recovery, such as biogas or compost production, contributing to environmental sustainability. In conclusion, the construction of FSTPs represents a critical step toward formalizing sanitation services, enhancing operational safety for service providers, and ensuring sustainable management of faecal sludge in peri-urban communities.

### **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 et al., 2000; Thye et al., 2011). 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.

In conclusion, 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.

### **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.

### **Strengthening Regulation and Compliance**

The study revealed that sanitation enforcement is being strengthened through structured regulatory inspections and oversight mechanisms. Key informants highlighted that regular inspections ensure that households, service providers, and public institutions comply with sanitation laws and standards. This structured oversight also helps identify non-compliance early, enabling timely corrective actions and reducing risks to public health and the environment.

This finding aligns with existing literature, which emphasizes that consistent regulatory enforcement is central to effective sanitation governance. Mensah et al. (2023) note that strong regulatory frameworks, coupled with active monitoring, improve adherence to sanitation standards, enhance service delivery, and foster accountability among both service providers and communities. Structured inspections also provide opportunities for awareness-raising, sensitization, and guidance on proper facility maintenance, which supports long-term sustainability of sanitation infrastructure. Thus, strengthening regulation through inspections and structured oversight is critical for ensuring compliance, protecting public health, and promoting sustainable on-site sanitation practices. When combined with education and community engagement, regulatory enforcement can significantly improve sanitation outcomes in peri-urban areas.

### **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 helped reduce 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 aligns 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.

## **CONCLUSION**

The main study objective is to explore the stakeholders' views about sanitation programmes implementation in George Compound of Lusaka, Zambia. The researcher was guided by the specific objective which sought to construct sanitation measures to the perceived challenges identified by the stakeholders in Lusaka to construct sanitation measures to the perceived challenges identified by the stakeholders in Lusaka. In view of this objective, the study revealed several critical insights, and these were: 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.

The researcher applied 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. Each component of the system-regulatory enforcement, infrastructure, household participation, and community engagement-interacts to determine the effectiveness and sustainability of on-site sanitation services. Weakness in any part of the system can compromise the entire sanitation service delivery chain, highlighting the need for a holistic, integrated approach. Hence, addressing sanitation challenges in the peri-urban Lusaka requires a multi-dimensional, systems-oriented approach. Strengthening regulation, improving infrastructure, fostering education and cultural socialization, ensuring gender inclusion, and promoting community participation collectively enhance the effectiveness, sustainability, and equity of on-site sanitation services. These findings provide actionable insights for policymakers, regulators, service providers, and development partners seeking to improve sanitation outcomes in similar contexts.

## Study Limitations

This study limitations were the length process of obtaining research clearance and consent was delayed due to institutional bureaucracy and slow feedback from certain offices. This had the potential to affect the data collection schedule. However, this challenge was mitigated through persistent follow-ups and timely reminders, which eventually facilitated the approval process. Furthermore, during data collection, some key informants demonstrated divided attention as they simultaneously addressed work responsibilities while participating in the interviews. This occasionally interrupted the flow of the discussion. To manage this, the researcher provided careful recaps of previous points whenever attention shifted, ensuring continuity and accurate representation of participants' perspectives.

The study also employed a qualitative research design focused on exploring participants lived experiences. While this approach enabled in-depth insight and rich contextual understanding, it limits the extent to which the findings can be generalized to all peri-urban communities. Nonetheless, the depth of the findings offers valuable contribution to knowledge and provides grounded evidence relevant to similar settings.

Lastly, the study was constrained by cost and time, which restricted the researcher's ability to include a larger sample or expand the geographical scope of the research. Despite these limitations, methodological rigor was maintained, and the study achieved sufficient depth and saturation to support credible and meaningful conclusions. The findings of this study have several implications for sanitation service delivery, enforcement, and community participation in peri-urban Lusaka.

## Study Implication

In line with the study findings, the researcher highlights the following study implication to methodology, theory, practice, policy and knowledge:

**Methodological Implication:** This study adopted interpretive phenomenology, which enabled the generation of rich, contextualized insights into the lived experiences of beneficiaries and stakeholders involved in on-site sanitation. The approach revealed nuanced challenges, perceptions, and behavioural dynamics, thereby extending the methodological application of interpretive phenomenology for future research in sanitation and other community-based service delivery contexts.

**Theoretical Implication:** The study demonstrates that on-site sanitation in informal settlements cannot be understood solely as a technical or infrastructure provision issue; rather, it is embedded within a wider social, environmental, institutional, and behavioural system. Applying Systems Theory, sanitation service delivery in George compound is shaped by the interaction of multiple subsystems including Lusaka Water Supply and Sanitation Company, Lusaka City Council, Zambia Environmental Management Agency, Community-Based Enterprises, Water and Sanitation Committees, local artisans, schools, and households. When one component of this system does not function well-such as shallow pit construction, waste misuse, solid waste dumping, or weak by-law enforcement-the entire sanitation chain becomes compromised. The study therefore highlights that sustainable sanitation outcomes require coordinated action across all levels of the system, rather than focusing narrowly on infrastructure provision alone.

**Practice Implication:** A key implication relates to the potential fragility of the newly introduced scheduled desludging model proposed by the utility company. The study revealed recurrent structural vandalism and unauthorized design modifications to the toilets constructed under the Lusaka Sanitation Programme. This practice risks undermining the functionality required for safe scheduled desludging. If households continue to widen pit openings, remove linings, or use pits as solid waste disposal sites, the scheduled desludging system may fail to operate effectively. This introduces an implementation risk that has not been adequately addressed in earlier sanitation planning models, representing an important departure from existing assumptions in the literature that improved toilet provision automatically leads to sustained hygienic usage.

From a practice perspective, the study shows that toilet usage experiences are gendered, with women and girls disproportionately affected when pits fill quickly, particularly due to solid waste disposal and the shallow pit

designs necessitated by rocky and waterlogged soil. Additionally, lack of reliable lighting resulting from electricity load-shedding compromises night-time safety and dignity, especially for women. For effective practice, sanitation interventions must therefore align toilet construction with complementary services such as solid waste management, water security, and alternative lighting. Toilet provision in isolation, without these supporting systems, does not yield the intended public health outcomes.

**Policy Implication:** The study indicates the need to move beyond traditional top-down regulation, where compliance is enforced only through municipal inspection and punitive measures. The findings show that Water and Sanitation Committees, Neighbourhood Health Committees, Community-Based Enterprises, and local leadership structures already play informal but influential roles in shaping sanitation behaviour and community norms. The study argues for the institutionalization of a bottom-up enforcement framework in which these community structures are formally recognized and equipped to monitor sanitation standards, report violations, support awareness-building, and mediate compliance at household level. Bottom-up enforcement not only improves monitoring reach but also enhances legitimacy, local ownership, and sustainability of sanitation behaviours. This shift would allow formal regulators and service providers to act in partnership with community governance structures rather than in isolation from them.

**Knowledge Implication:** Finally, the study contributes new empirical knowledge by documenting the lived experiences, socio-cultural negotiations, and infrastructural challenges inherent in implementing improved on-site sanitation in densely populated peri-urban settlements. This goes beyond existing literature that has primarily emphasized off-site sewered systems or has focused on regulatory frameworks in abstraction from on-the-ground realities. The study provides evidence that sanitation interventions must be tailored to environmental limitations such as rocky terrain and high-water tables, as well as behavioural patterns such as the tendency to dispose of solid waste in pits. By revealing how these contextual factors interact with institutional mandates and technological design, the study advances understanding of sanitation implementation in informal urban contexts.

## Study Recommendations

### The Government:

- i. The Government should strengthen fiscal partnerships with international financial institutions like the African Development Bank, UNICEF, GIZ and the World Bank to increase investment in Faecal Sludge Treatment facilities in Lusaka. This responds to the current shortage of functioning treatment capacity identified in the study.
- ii. The Government, through the Ministry of Education, should mainstream sanitation laws and hygiene behaviour change education into school civic and life skills curricula, to build early awareness and strengthen long-term compliance culture.
- iii. Regulatory agencies Lusaka Water Supply and Sanitation Company, Zambia Environmental Management Agency and National Water Supply company should institutionalize community participation platforms (such as Ward Health Committees) in monitoring and reporting sanitation law violations to enhance enforcement legitimacy and reach.
- iv. Local authorities should undertake incremental settlement re-planning, prioritizing the creation of access corridors for sludge emptying trucks to reduce illegal dumping and collapsed pits. This corresponds with the pit emptying challenge observed by this study.

### The Water and Sanitation Utility Companies

- i. Utility companies should integrate toilet construction with complementary services, including reliable water supply and lighting, recognizing that inadequate lighting affects night-time safety and usage.
- ii. To mitigate the impact of load-shedding, toilet facilities should be fitted with solar-powered lighting and pumping systems, ensuring uninterrupted sanitation service.
- iii. Utilities should adopt a co-design approach that involves residents and artisans at each stage of toilet design and siting to prevent pit depth problems and shallow lining failures.
- iv. Utilities should intensify community sensitization programs on preventing vandalism, misuse, and unauthorized design changes, which were highlighted as major implementation setbacks in the study.

## Community Stakeholders

- i. Community members should preserve the integrity of improved toilet designs and avoid structural alterations to ensure health protection and successful scheduled desludging being proposed by the company new policy direction.
- ii. Community leaders and residents should be formally integrated into sanitation law enforcement structures, such as Neighbourhood Health Committees and Community-Based Monitoring Groups, to enhance surveillance, ownership, D-WASH, Water and Sanitation committees and compliance.

## Suggestions for Future Studies

The researcher suggests the following further future studies based on the findings and limitations and recommends as follows:

1. **Longitudinal Evaluation of Sanitation Programs:** There is a need to conduct a longitudinal study to assess the long-term effectiveness, sustainability, and impact of sanitation program implementation in peri-urban areas. Such research would provide insights into program outcomes over time and identify factors that support or hinder sustained improvements in on-site sanitation.
2. **Implementation of Statutory Instruments:** Future studies should explore the implementation and effectiveness of the statutory instrument on on-site sanitation, which is currently under development. Research in this area would help evaluate the practical application of the instrument, its enforcement challenges, and its influence on household compliance, service delivery, and overall sanitation outcomes.

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## NOTES ON CONTRIBUTION

James Mwale is currently pursuing a Doctor of Philosophy Degree in Development Studies at the University of Zambia. He holds a Bachelor of Social Work, Master of Social Work and Master of Arts in Development Studies. He is also Pursuing Master of Science Degree in Public Health from the same institution. His research interests focus on the Household Sanitation Programmes Implementation in George Compound a Peri-Urban area in Lusaka, Zambia. Moreover, previously studies that were undertaken focused on: Programme, Youth Empowerment for the vulnerable youths: A case study of SOS Children's Villages, and Gender inclusion in the household sanitation programme in George compound.

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