An Assessment of Health and Safety of Sanitation Workers in Zambia

Implemented by

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LIST OF ABBREVIATIONS AND ACRONYMS

CU:	Commercial Utilities
ERES	Excellence in Research Ethics and Science
FSMA	Fecal Sludge Management Alliance
ILO	International Labor Organization
NWASCO	National Water Supply and Sanitation Council
OHS	Occupational Health and Safety
PPE	Personal Protective Equipment
SDGs	Sustainable Development Goals
SOPs:	Standard Operating Procedures
SuSanA	Sustainable Sanitation Alliance
WASAZA:	Water and Sanitation Association of Zambia
ZEA	Zambia Emptiers Association

OPERATIONAL DEFINITIONS OF TERMS

Emptiers: These are workers who remove waste, both solid and liquid, from toilets that rely on pit latrines or septic tanks.

Formal Emptiers: These are individuals who work for a registered entity, such as a commercial water supply and sanitation utility (CU) or a licensed private sanitation company, to remove waste from pit latrines and septic tanks.

Informal Emptiers: These are individuals who operate independently, without registration with any official authority, to remove waste from pit latrines and septic tanks.

Vacuum Tanker Drivers: These are specialized sanitation workers who use vacuum trucks equipped with tanks to remove liquid waste from septic tanks.

Sanitation Workers: This is a broad term encompassing all those involved in the removal of waste from pit latrines and septic tanks, including informal emptiers, formal emptiers, and vacuum tanker drivers.

Private Sanitation Companies: These are businesses, independent of water supply and sanitation utilities, that provide pit emptying services.

Pit Emptying: This refers to the process of removing both liquid and solid waste accumulated in pit latrines and septic tanks.

Sanitation Workers Supervisor: This is a position within a CU or a private sanitation company that oversees and manages the work of emptiers responsible for removing waste from pit latrines and septic tanks.

ABSTRACT

Sanitation is a cornerstone of healthy communities. Pit emptiers play a critical role in maintaining public health and safety by removing waste from pit latrines and septic tanks. Despite their essential work, these individuals often toil in obscurity and face significant challenges accessing adequate health and safety protections, particularly in developing countries.

This study assessed the health and safety of sanitation workers in Zambia across 10 provinces in 13 districts. The participants included informal (n=112) and formal (n=28) pit emptiers, vacuum tanker drivers (n=56), and personnel from commercial water supply and sanitation utilities (CUs) and private sanitation companies (n=9). Lusaka had the highest number of sanitation workers. Data was collected through questionnaires, interviews, observations, and document reviews from October 2023 to February 2024.

A total of 196 sanitation workers participated in the study, with most being male and aged 25-40. Many (67.75%) had secondary school education with only 6.7% with tertiary education. Workers reported physical hazards as the most common concern, followed by biological, chemical and psychological hazards. One worker also mentioned ergonomic hazards. While over half (61.4%) received safety training and used some personal protective equipment (PPE) 94.5% mostly overalls (work suits) and gumboots, many lacked adequate tools and vaccinations, especially among the informal workers. Illness was the major course of work-related sick days, the majority of which were respiratory. Health insurance and medical checkups were also uncommon. Human-powered waste-carrying methods were frequently used, and most informal workers reported burying waste and formal workers disposing at designated places. The majority of the emptiers reported stigma due to their work.

Zambia has several regulations related to sanitation worker safety, including the Occupational Health and Safety Act, the Factories Act, guidelines and standard operating procedures (SOPs). However, challenges remain, common challenges include lack of PPE, tools, transportation and proper waste disposal sites, uncooperative clients and disposal of solid waste in the pits. Formal manual emptiers had some advantages but still faced limitations in equipment, poorly constructed infrastructure, finances and limited jobs. Vacuum tanker drivers faced difficulties reaching locations, poorly maintained trucks and blockages, poor working conditions and negative perceptions of their work. Sanitation supervisors reported challenges related to transport and equipment, insufficient emptying capacity, and high employee turnover.

Substance abuse, unprofitable business models, and a lack of knowledge among workers were also a concern. Traditional beliefs, poor communication, stigma and limited waste treatment facilities further complicate matters.

Sanitation workers in Zambia face significant health and safety risks. Improvements are needed in providing PPE, proper tools, vaccinations, and health checkups. Enforcement and strengthening the existing regulations are also vital. Additionally, addressing challenges like human-powered waste carrying, poorly maintained vehicles, and limited waste treatment facilities is crucial. Furthermore, improving communication, educating sanitation workers, and potentially reevaluating business models could significantly improve working conditions and safety within the sanitation sector.

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1. INTRODUCTION

Occupational health and safety is an important branch of public health that deals with the protection of workers against adverse health effects that result from their work. (Darabont et al., 2017). Workers especially in developing countries are exposed to different types of hazards in their workplaces including biological, physical, chemical ergonomics and psychological hazards. These are agents in the workplace that cause harm (Leso et al., 2018). These hazards result in different types of diseases and can result in accidents and eventually death (Yanar et al., 2018). According to Botchwey et al., 2022, every year, an estimated 2.3 million people die because of work-related accidents or diseases globally; this equates to about 6,000 deaths every day; there are also an estimated 340 million occupational accidents and 160 million victims of work-related illnesses each year. Workers in different occupations are exposed to different types of risks due to exposure to different hazards while at work. Sanitation workers are among the occupations that are exposed to different types of hazards during their work. Sanitation workers are those that handle wastes both solid and liquid waste. These workers are exposed to different types of hazards (WaterAid, 2019).

Sanitation workers provide a critical service to the general populace. However, their input is usually noticed only when a household or community is confronted with locked, blocked, or filthy toilets; overflowing septic tanks; or beaches contaminated with sewage. These workers are essential to the proper functioning of any sanitation system. In this regard, more technical and skilled sanitary workers are required to achieve the ambitious agenda of Sustainable Development Goal (SDG) 6. (World Bank - Health, Safety and Dignity of Sanitation Workers - An Initial Assessment, 2019).

Sanitation workers often being invisible and subjected to extremely difficult working conditions that expose them to the worst consequences of hygiene and sanitation including debilitating infections, injuries, social stigma, and even death in their daily work. These workers must have rights that need to be recognized; workers need freedom and support to organize as a labor force; and their working conditions need to be a visible concern, requiring improved and progressively formalized to safeguard health and labor rights to ensure decent working conditions, as called for by SDG 8.

Information and data on the health and safety of sanitation workers is an occupational and safety consideration. However, as in many other occupations in Zambia and Africa at large data on the subject is quite limited. Therefore, the extent and negative impact of poor working

conditions for such as sanitary workers is unknown and interventions have no scientific basis and ultimately no policy formulation to adequately address the welfare of these essential workers (Siziya at el., 2013). In general, occupational health hazards in Zambia, Siziya reported that males are more likely than females to be exposed to all types of hazards and consequently suffer the effects. In this regard, it's most likely that sanitary workers who are mostly male dominated, suffer the most effects from risks and exposure.

The challenge and plight of sanitary workers is very evident and addressing the worker's welfare requires a systemic approach from all development dimensions to include policy reforms, legislation and regulation, and developing operational guidelines among others. Such a holistic approach is a broader acknowledgement of sanitary workers' welfare and further professionalizing the workforce. Further, advocating for sanitation workers, and promoting their welfare and occupational rights should be strengthened with sufficient documentation that will build evidence required in the continued addressing of issues of the sanitation works and quantification of various challenges.

Sanitation workers handle human waste, emptying of pits and tanks, transportation of fecal sludge, sewer maintenance and fecal waste management among others. These workers provide a public service important to the community despite a lack of recognition (World Bank et al., 2019; Sustainable Sanitation Alliance (SuSanA), 2021; WaterAid, 2021). These workers are exposed to biological hazards that cause infections such as cholera, typhoid, and hepatitis. Physical, chemical, and ergonomic hazards include heat, toxic gasses, confined spaces, needles, sharp objects and lifting of heavy materials resulting in diseases, injuries, and even death. They are also likely to face social stigma due to the nature of their employment (FSMA and SuSanA, 2020; Watt et al., 1997; Monteiro et al., 2021; WaterAid, 2021; Philippe et al., 2022; Patil, 2017; Tiwari, 2008; Kuffor, 2020).

Health and safety information on employees is scarce in Zambia as in most developing countries (Ahasan, 2001; Kheni et al., 2008). This is more so for sanitation workers who mostly belong to the informal sector. Compounding this is the lack of specific laws to address their health and safety challenges (Peal and Kapulu, 2020). A report on a training conducted for sanitation workers in Zambia revealed limited information regarding their health and safety. The report also highlighted existing gaps for further studies (FSMA and SuSanA, 2020). This study therefore aimed to assess the health and safety of sanitation workers in Zambia.

Research on sanitation workers, who belong to some of the most marginalized sections of society, contributes to the central, transformative promise of the 2030 Agenda for SDGs 1, 3, 6 and 8 (WHO, 2016). The information generated highlights the gaps between recommended operating guidelines for sanitation workers and the prevailing situation in Zambia. This will enable the development of comprehensive policy and legislative frameworks on the health and safety of sanitation workers, thus protecting their health by mitigating occupational risks and promoting ideal working conditions.

1.1 Objectives

1.1.1 General Objective

- To assess the health and safety of sanitation workers in Zambia.

1.1.2 Specific Objectives

1. To quantify and profile the sanitation workforce in Zambia.
2. To identify occupational hazards sanitation workers are exposed to and knowledge of associated hazards and their control in Zambia.
3. To assess access, use and implementation of control measures against identified hazards in sanitation work in Zambia; safety protocols, mechanization and COVID-19 risk controls.
4. To establish commonly reported health conditions among sanitation workers and explore work health and safety challenges that they encounter in Zambia.
5. To identify available legal frameworks, policies, regulations, and standard operating procedures related to sanitation work and their enforcement in Zambia.

2. METHODOLOGY

2.1 Scope

The research focused on sanitation workers involved in the emptying and transportation of waste. This included both formal and informal pit emptiers, responsible for manually or with basic tools emptying pit latrines. Additionally, the study encompassed vacuum tanker drivers, who utilize mechanized trucks for waste collection and transport.

2.2 Study Design

A concurrent mixed methods design was employed. Quantitative data was collected using a cross-sectional study, while qualitative data was gathered through a case study approach.

2.3 Study Site

The study was conducted in Zambia, a country in sub-Saharan Africa. The country has a population of just over 19 million people (Zambia Statistics Agency, 2022). Some communities in Zambia do not have sewer networks, especially peri-urban areas. Peri-urban areas are unplanned settlements with limited access to services such as water, sanitation and hygiene, most of the households in these areas rely on onsite sanitation such as pit latrines for disposal of human waste. These households are responsible for the provision of these onsite sanitation facilities, when the facilities are full, they require pit emptying services offered by sanitation workers (Siwambi, 2017). The study targeted thirteen districts across all ten provinces of Zambia, specifically focusing on Lusaka, Mansa, Ndola, Kabwe, Solwezi, Chipata, Choma, Mongu, Chinsali, Kasama, Kitwe, Livingstone, and Nakonde. These districts were chosen due to the presence of established sanitation service providers and active commercial utilities. The selection reflects the recent shift in Zambian policy, granting commercial utilities the mandate to deliver on-site sanitation services.

2.4 Study Population, Sample Size and Sampling

The study focused specifically on sanitation workers in Zambia. This included both formal and informal manual pit emptiers, and vacuum tanker drivers, all available at the time of data collection in Lusaka and other districts. The quantitative portion of the study included these sanitation workers. For the qualitative aspect, supervisors from commercial utilities and sanitation companies were interviewed to understand the general operations.

To find participants, the study looked at sanitation workers affiliated with commercial utilities across all 10 provinces. To recruit participants from the informal sanitation sector, the study employed snowball sampling. This technique began by approaching sanitation workers employed by commercial utilities. These initial participants were then asked to identify informal sanitation workers within their network. Subsequently, the identified informal workers were invited to participate and, in turn, could recommend others, building a chain of referrals to access this hard-to-reach population. The alternative approach was using the community structures which are the Ward Development Committees. Members of these committees have information on people involved in manual emptying or plumbing in their communities. Finally, purposeful sampling was used to select supervisors from utilities and private sanitation companies. These supervisors were chosen because they could provide detailed information about the companies and the workers themselves.

2.5 Data Collection

Data collection occurred between October 2023 and February 2024 using a mix of methods. The researchers employed the Peal and Kapulu (2020) framework to quantify and profile the workforce. Additionally, observations and interviews with sanitation workers using questionnaires were conducted to identify occupational hazards, safety measures, and common illnesses. Legal frameworks, policies, and regulations related to sanitation work were explored through interviews with sanitation workers' supervisors and document reviews. Finally, open-ended questions in the worker's questionnaire and supervisor interviews were used to understand the occupational health and safety challenges faced by sanitation workers. All data collectors were competent in qualitative and quantitative data collection methods. Existing data collection tools were modified and pretested to ensure they effectively addressed the research objectives.

2.6 Data Analysis

The qualitative component of the study involved the transcription of interviews. To ensure participant anonymity, a de-identification process was implemented. This involved removing any identifiable information, such as names, from the transcribed data. Thematic and content analysis were utilized to analyze the anonymized transcripts and documents. Thematic saturation was achieved, and the results were presented based on participant categories and emergent themes.

In contrast, a quantitative approach was adopted for the quantitative data. This involved data entry and analysis using statistical software, specifically Microsoft Excel. Descriptive statistics, including frequencies and proportions, were generated for the collected data. The results were disaggregated by type of sanitation workers. Disaggregation of the data by sex was deemed unnecessary due to the limited representation of female sanitation workers (n=1). Similarly, the geographically diverse nature of the study, with small sample sizes within each district, precluded meaningful disaggregation by location.

2.7 Ethical Considerations

Ethical approval was sought from Excellence in Research Ethics and Science (ERES) Converge (Ref. No. 2023-Jan-024) The study had minimal risks to the participants. Permission was sought from the Ministry of Local Government and Rural Development, Ministry of Water Supply and Sanitation Development and NWASCO to conduct the study. Permission was also sought from each commercial utility and private sanitation companies. Informed consent was obtained from all the study participants. Participants were given full information about the study and information sheets were shared with them. Participants who consented were given information sheets and asked to sign the consent forms as acceptance to participate. Those who did not consent to the study were not forced to take part. Confidentiality was ensured by not using names of participants but identification numbers. There was no anticipated reputational risk to the companies/organizations that were included in this study. The companies found not to comply with certain standards were advised on what to do by the research team instead of reporting them to the authorities. In the case where there was discussion of sensitive issues, companies and participants were not forced to give information, they were not comfortable with.

2.7.1 Reduce Risk to COVID-19

Before and during fieldwork, COVID-19 prevention guidelines were emphasized to the data collectors and the participants. Data collectors and participants had access to sanitary supplies such as soap, hand sanitiser gel and face masks. Further, data collectors were trained in the data collection protocol that respects participants' health and safety such as maintaining greater than 2 meters.

2.8 Partners Institutions

The research team worked with several stakeholders including local authorities under the Ministry of Local Government and Housing, commercial utilities, Zambia Emptier Association, sanitation workers and Ministry of Labor and Social Security, the Ministry of Water Development, sanitation and Borda Zambia. The institutions helped in identifying the sanitation workers across the formal and informal sectors, provided data for the study, and guided in the implementation of the study, they also provided preliminary information and technical assistance on the sanitation workers and companies as some institutions have been promoting the sanitation workers sector in Zambia through training and other engagements.

2.9 Dissemination of Study Findings

The outcome of this study will be disseminated through different platforms. Study findings and related information will be presented/shared with the funders.

In addition, dissemination meetings with various line ministries will be conducted both to inform and obtain their reactions to the study findings. Examples of these ministries include the Ministry of Labor and Social Security, Ministry of Water Development, Sanitation and Environmental Protection, Ministry of Health, Ministry of Local Government and Rural Development and Water Supply and Sanitation Utilities in the specific study areas and NGOs in Zambia. Dissemination meetings will also be organized with sanitation companies, representatives of sanitation workers from the Zambia Emptier Association and the sanitation workers. Publications of findings in peer-reviewed journals will be among the priorities as well as policy briefs. The findings will also be shared on social media platforms.

2.10 Study Limitation

This study relies on self-reported data from sanitation workers. Due to the sporadic nature of their work, the research team was unable to verify most of the information. However, observations were conducted of some vacuum tanker drivers and informal emptier work activities.

3. RESULTS

3.1 Overview of Sanitation Work in Zambia

3.1.1 Sanitation Work in Zambia

Zambia relies on commercial water and sanitation companies to manage onsite sanitation. These companies are regulated by the National Water Supply and Sanitation Council, following the National Water Supply and Sanitation Act of 1997. These utilities operate across all 10 provinces of Zambia. They may offer emptying services directly to the community, or if they lack the capacity, they can subcontract the work to other enterprises. There are also private sanitation companies that provide emptying services as well.

While most Zambian utilities have vacuum tankers for emptying pits like septic tanks, these tankers can typically only remove liquid waste. If sludge needs to be removed from the pit, manual emptying services are required.

3.1.2 Process of Pit Emptying

The process of emptying a pit, like a septic tank or latrine, can be done manually or mechanically. Before any emptying happens, the area is checked for accessibility, integrity of the infrastructure and whether the structures are even emptiable. This assessment usually happens a few days before the scheduled job. Vacuum truck drivers also need to confirm if their vehicle can reach the pit location. If everything is accessible and all is in place to empty, the customer and the emptier agree on a date, time, and the amount of waste to be removed. Payment terms are also decided based on the company's policy.

For septic tanks specifically, the emptying process starts by opening the tank to vent any gasses. Then, a pipe is inserted to suck out the waste using a vacuum truck. The amount removed depends on the agreement between the customer and the emptier. This wastewater is then hauled to a treatment facility for processing or disposal, with most facilities using conventional or natural methods (waste stabilization ponds).

Manual emptying follows a similar principle. For latrines, a hole is dug on the side to access the waste. Scooping tools with handles or manual pumps i.e. eVac are then used to remove the waste. If the sludge is hardened, water or chemicals might be added to loosen it up. The removed waste is collected in buckets or barrels for proper disposal. Formal emptiers take it to designated

locations for final disposal and or treatment, while informal ones might dig new pits nearby for burial. An alternative method used by informal emptiers is to dig a reasonably sized pit or trench right next to the latrine or septic tank. Thereafter, a hole is made in the wall and the sludge is allowed to drain into the hole/trench up to no more than halfway. The remaining half is then filled up with soil that was initially removed during the digging process. It is important to note that some emptiers entered the pits to remove sludge, a dangerous practice not recommended according to safety guidelines.

3.2 Business Models for Emptying Services in Zambia

Different models exist of how the emptying business is organized in Zambia. The first model is a delegated management model where community-based enterprises are involved in emptying on behalf of the commercial utility. A contract is signed between the utility and the enterprises which stipulates a revenue sharing ratio between the commercial utilities and the emptiers usually 60 and 40 percent respectively at the agreed time usually monthly but some reported sharing the money after every job. The utilities oversee the operation of the private sanitation company by providing transportation, drivers, PPE, and disposal sites for the sludge. Payments are received by the utilities and both parties look for customers. The utilities also provide equipment for desludging and oversee its maintenance.

The second model is like the first one, but the enterprises pay for hiring the emptying equipment 15 percent of the service cost and 200 Zambian Kwacha (ZMW) for the truck from the commercial utility. They also provide fuel, PPE, and pay for waste disposal at the treatment plant. The enterprise also ensures that all workers have the relevant qualifications and are trained in occupational health and safety. The delegated management model is used more in provinces where the SNV was implemented as the project provided the startup requirements for the emptying including vehicle, training, PPE, and business models.

The third model is a scheduled emptying model where the utility takes care of everything. People register with the utility to be on a list for scheduled emptying and pay a membership fee and a regular contribution monthly or quarterly. The amount can also be embedded in the water bill if the customers allow it. Desludging is scheduled per street after informing the customers. This project is currently being piloted in some townships in the central province.

Another model involves commercial utilities collaborating with independent private operators or enterprises. The utility's role is limited to providing waste disposal facilities. These independent waste collectors pay a disposal fee based on the volume of waste, typically K36 per cubic meter.

The informal manual emptiers range from sole operators to groups of about 10 individuals. The more organized groups are also involved in other related businesses which include plumbing works and the building of septic tanks and Soakaways. The organizational structure includes both a tiered arrangement and a horizontal structure. The tiered arrangement has a clear lead who manages the business and identifies job opportunities. The leader also identifies who to include in a particular job with the number being determined by the size of the job. In such scenarios, the remuneration per job is standard, being about K100. In the horizontal structure, there is no clear leader and the members of the group work as peers. The money generated is shared equally among the group members. In other arrangements, the informal workers do not belong to any organization but just get invited to participate on a job based on need by both formal and informal manual emptiers. Some utilities have been involved in informal emptier works and facilitate training for them as they prepare to formalize their businesses.

In the case of vacuum tanker services, most of the vacuum tanker drivers were employed by commercial utilities on contract or permanent basis and were paid monthly salaries. This same applied to some private companies that owned vacuum tankers. A few private companies allow the employees to choose between a fixed monthly salary or a fixed percentage commission. The company oversees providing the required health and safety services and equipment for these drivers.

3.3 Supporting Institutions for Sanitation Workers in Zambia

Several institutions support the works of Sanitation workers in Zambia. These include local and international institutions. Table 1 presents the institutions that have played a role in this field in Zambia and the support that has been provided by these institutions.

Table 1: Supporting Institutions for Sanitation Workers in Zambia.

Institution, Project and Funder(s)	Year and Area of Implementation	Activities
Local Authorities	Different districts	Conduct inspections for enforcing health and safety standards by sanitation companies and workers
Ministry of Health	Central province and other areas	Educating communities and local leaders about the importance of pit emptying and disseminating information about sanitation programs, such as the scheduled desludging program
NWASCO	Areas with commercial utilities	Regulates the sanitation sector and provides training and formalization opportunities for sanitation workers.
The Netherlands Development Organization SNV; WASH Alliance international WAI; Plan International WASH SDG Project-Chambeshi-Lukanga sanitation project in Zambia. Funded by the Netherlands ministry of foreign affairs	2017 to 2024 in Mbala, Mpulungu, Kabwe, Nakonde, Kasama, and Chinsali districts	The project focused on supporting sanitation worker's efforts including: **Formalization:** Identification of sanitation workers and facilitating their formalization process. **Start-up Support:** Provide emptying equipment, a vehicle, PPE, disinfectant Vaccination, and registration assistance for the workers. **Training and Capacity Building:** Regular training throughout the project's lifespan on health and safety protocols, business management skills, and marketing strategies. **Sustainability:** Commercial utilities are given the responsibility to manage the vehicles and other startup materials, or equipment given during the project for ongoing maintenance **A follow-up project** in Nakonde district with funding from USAID involving **Refresher Training** in occupational health and safety and business development and **construction of a Fecal Sludge Treatment Plant** in the area.
World Bank; Lusaka Water Supply and Sanitation Company Lusaka Sanitation Project World Bank Funded by the World Bank	2020 to 2024, Lusaka district peri-urban areas	One component of the project aimed to address improving on-site sanitation waste management. The project involved independent sanitation companies that received vital startup support, including Equipment for manual emptying of pit latrines; PPE; Training in safe emptying and general safety measures; Vaccinations and Marketing strategies. The utility monitors the activities of the companies to ensure adherence to project standards. The project subsided the cost of the emptying services to lessen the burden on the community.

Institution, Project and Funder(s)	Year and Area of Implementation	Activities
		Currently, residents pay K250 per cubic meter, while the actual cost is K400.
Unilever	**Livingstone district**	Contributed to the construction of faecal sludge management plants under the Southern Water and Sanitation Company in Livingstone
Water and Sanitation for the Urban Poor; Lusaka water supply and sanitation company; BORDA Zambia and Water and Sanitation Association of Zambia Funded by Stone Family Foundation	**2011 Kanyama Lusaka districts**	This project aimed to develop an affordable and sustainable pit-emptying service for Kanyama residents.
Habitat for Humanity	**Kabwe district**	Constructed toilets for locals to facilitate proper pit emptying in Kabwe Zambia for the vulnerable, especially in the scheduled desludging.
Radio Stations	**Kabwe and other districts**	Played a vital role in disseminating information about available emptying services and programs across various districts.

Source of information: Interviews with sanitation worker supervisors and literature review.

3.4 Quantification and Profiling of Sanitation Workers in Zambia

This section presents a profile of sanitation workers in Zambia, based on data collected in this study. The profile covers demographics, working conditions, safety practices, income, and legal and social aspects of the profession.

a. Types of Sanitation Workers

The study identified four primary categories of sanitation workers:

- **Formal manual emptiers:** Employed by registered organizations.
- **Informal manual emptiers:** Self-employed or working for unregistered entities.
- **Vacuum tanker drivers:** Operate vehicles for waste removal
- **Vacuum tanker assistants (Lorry Boys):** Support vacuum tanker drivers.

b. Demographics

Distribution

A total of 196 sanitation workers participated in the study, with a breakdown as follows:

- Informal manual emptiers: 112
- Formal manual emptiers: 28
- Vacuum tanker drivers: 56

Gender and Age

The overwhelming majority of sanitation workers were male, with only one female formal manual emptier identified. Age distribution was concentrated between 25 and 40 years, with a smaller proportion under 25 and over 40.

Informal manual emptiers:

- Under 18: 1
- 18-24: 14
- 25-40: 71
- Over 40: 25

Formal manual emptiers:

- Under 18: 0

- 18-24: 5
- 25-40: 17
- Over 40: 6

Vacuum tanker drivers:

Under 18: 1 (assistant)

- 18-24: 1
- 25-40: 30
- Over 40: 24

Employers

Formal emptiers were primarily employed by organizations such as Northern Emptiers Plumbing and Sanitation Association, SNV Jombolola, and Chambeshi, Northwestern Water Supply and Sanitation Companies. Vacuum tanker drivers were employed by a variety of entities, including water supply and sanitation companies, private companies, and individual operators.

c. Physical Safety

Hazards

Sanitation workers face a range of hazards, including biological, chemical, physical, ergonomic, and psychological.

Personal Protective Equipment (PPE)

While most workers reported having rubber boots and work suits, the use of other PPE like respirators, gloves, safety googles, and helmets was less common.

Safety Training and SOPs

Over 60% of workers reported receiving safety training, primarily from organizations like NWASCO and the Chambeshi and Lukanga projects. However, only a small proportion of workplaces had standard operating procedures (SOPs) in place.

Work-Related Health Issues

Respiratory illnesses were the most common health problems reported by sanitation workers, followed by diarrheal diseases, headaches, and stomach aches. Other factors contributing to absenteeism included family issues, fatigue and fear of accidents or illness.

d. Financial Security

Employment Type and Income

Employment types varied, with 14% of workers having contracts, 37.1% permanent employment, and 49% temporary employment. Income levels were inconsistent, with many informal and formal emptiers paid per job and Vacuum tanker drivers receiving monthly salaries. Only 42.2% of workers received a fixed monthly salary. The charge of service of emptying ranged from small Jobs ZMW 500 to 6000 for complex tasks. In many cases, earnings were shared among multiple workers.

Working Hours

Working hours were often irregular, with informal workers' hours depending on the number of clients. Formal workers employed by registered authorities typically worked 8-hour days.

e. Legal Security

Regulations and Compliance

While some regulations exist, many sanitation workers were unaware of them, and enforcement was inconsistent. Challenges included obtaining licenses, complying with standards, and navigating complex regulatory frameworks. The work of sanitation workers is primarily monitored by local authorities to ensure compliance with health and safety standards. Additionally, NWASCO oversees operations through inspections of commercial utilities.

Worker Associations

Only 12.6% of workers were members of the Zambia Pit Emptiers Association, indicating a limited level of worker organization.

f. Dignity and Stigma

Almost all sanitation workers reported experiencing stigma associated with their work, including ridicule and social rejection. Limited government or NGO support programs were available to address these issues.

g. Government- or NGO-led programs in place to support these workers

Programs supporting sanitation workers include the currently active Lusaka sanitation program, scheduled to conclude in 2024. Additionally, the USAID-funded extension of the Chambeshi Lukanga Sanitation Project in Nakonde district is ongoing.

3.5 Characteristics of Sanitation Workers

The study generated a total of 196 sanitation workers across the country comprising 57.1% (112/196) informal manual emptiers, 14.3% (28/196) formal manual emptiers, and 28.6% (56/196) vacuum tanker drivers. The majority 99.5% (195/196) of respondents were male. This could be due to the perception that this type of work is physically demanding, dangerous and dirty. These are characteristics that have not traditionally been associated with women in the workforce. Most of the sanitation workers fell in the age group 25–40 years and made up 60.5% (118/195) of the participants. The one female that was interviewed was identified as a formal manual emptier. The high count of sanitation workers falling in the age group 25–40 years was also observed when looking into the separate sanitation worker groupings. Furthermore, it was discovered that only 6.7% (13/195) of sanitation workers had acquired a tertiary level of education. Finally, among the formal and informal manual emptiers that were interviewed, only 52.2% (72/138) reported having had a history of training concerning their job. Table 2 provides detailed information regarding some of the characteristics of sanitation workers.

Table 2: Demographic Characteristics of N=196 Sanitation Workers.

Variable/Worker	Category	Frequency	Percentage (%)
Gender			
Formal Emptiers	Male	27	96.4
	Female	1	3.6
Informal Emptiers	Male	112	100
	Female	0	0
Tanker Drivers	Male	56	100
	Female	0	0
All Workers*	Male	195	99.5
	Female	1	0.5
	Total	196	100
Age Group			
Formal Emptiers	<18 years	0	0
	18-24 years	5	17.9
	25-40 years	17	60.7
	>40 years	6	21.4
Informal Emptiers			
	<18 years	1	0.9
	18-24 years	14	12.6
	25-40 years	71	64.0
	>40 years	25	22.5

Variable/Worker	Category	Frequency	Percentage (%)
Tanker Drivers	<18 years	1	1.8
	18-24 years	1	1.8
	25-40 years	30	53.6
	>40 years	24	42.9
All Workers*			
	<18 years	2	1.0
	18-24 years	20	10.3
	25-40 years	118	60.5
	>40 years	55	28.2
	Total	195	100
Education Level			
Formal Emptiers	Primary	3	10.7
	Secondary	20	71.4
	Tertiary	3	10.7
	None	2	7.1
Informal Emptiers	Primary	33	29.7
	Secondary	73	65.8
	Tertiary	3	2.7
	None	2	1.8
Tanker Drivers	Primary	10	17.9
	Secondary	39	69.6
	Tertiary	7	12.5
	None	0	0
All workers*	Primary	46	23.6
	Secondary	132	67.7
	Tertiary	13	6.7
	None	4	2.1
	Total	195	100
Training History			
Formal Emptiers	No	5	17.9
	Yes	23	82.1
Informal Emptiers	No	61	55.5
	Yes	49	44.5
All Workers*	No	66	47.8

Variable/Worker	Category	Frequency	Percentage (%)
	Yes	72	52.2
	Total	138	100

***represents none stratified categories**

Figure 1 depicts the distribution of the number of sanitation workers across the provinces. The number of participants in each province ranged from four in western province to 122 in Lusaka Province. Majority (122/57%) of the informal manual emptiers came from Lusaka province, while Western province had none. Moreover, Western provinces provided no record of either formal or informal manual emptiers, whereas Luapula province only had a record of informal manual emptiers. Across the board, it was observed that the number of formal manual emptiers was significantly low with the highest record being only 10 for Copperbelt province. Figure 2 shows the commercial water supply and sanitation utilities included in the study.

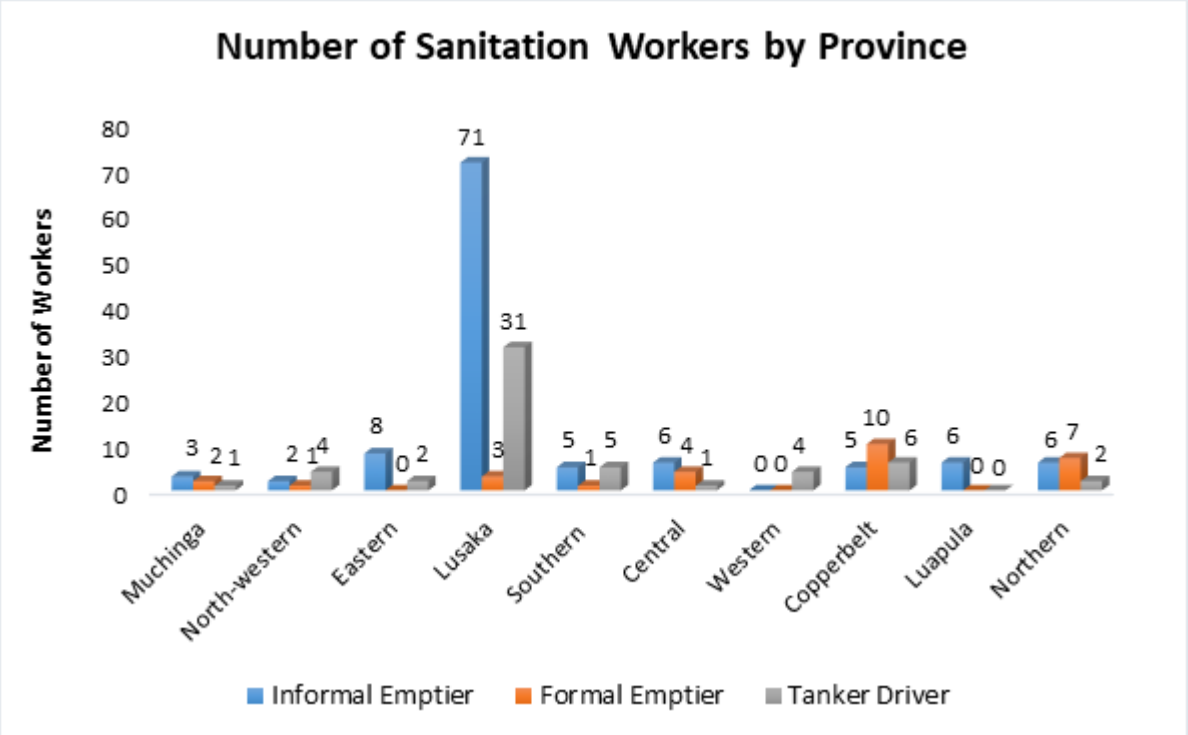

Figure 1: Number of Sanitation Workers by Province


Figure 2: Commercial Water Supply and Sanitation utilities included in the study Western, Chambeshi, Eastern, Northwestern, Nkana, Lukanga, Kafubu, Lusaka, Luapula and Southern

Sources of Pictures: Field Pictures and Internet for Lusaka and Nkana commercial utilities.

3.6 Occupational Hazards Sanitation Workers Are Exposed to in Zambia

Emptiers were asked what hazards they were exposed to in the work environment, the participants revealed physical hazards (needles, nails, broken bottles/glass, confined spaces and weak infrastructure) recorded the highest frequency followed by biological (fecal matter, decomposed animal carcasses, human fetuses and blood) and chemical hazards (disinfectants, noxious gasses). Neither formal nor informal manual emptiers reported potential exposure to ergonomic hazards, but one vacuum tanker driver. Given the nature of their job, recording only

5 sanitation workers reporting possible exposure to psychological hazards (Stress, handling waste considered unclean traditionally (fetuses)) was unexpected. Additional information regarding hazard exposure is provided in Figure 3.

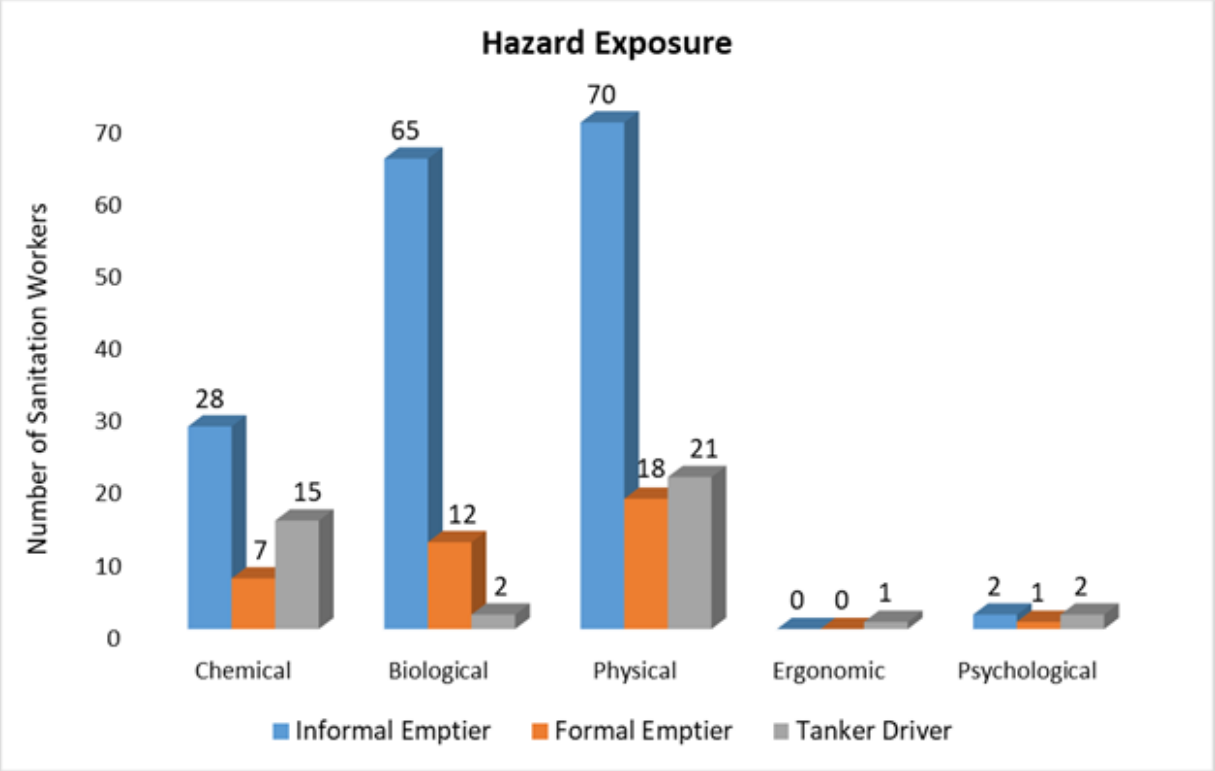

Figure 3: Hazard Exposure among Sanitation Workers in Zambia

3.7 Preventive and Control Measures Against Identified Hazards

Table 3 explains some health and safety procedures among formal and informal manual emptiers and vacuum tanker drivers. It was found that 61.4% (105/171) of sanitation workers reported having received safety training. Among the informal workers, this was mostly peer to peer training. Very few were exposed to formal training. The emptiers who worked with formal organizations in the past were more likely to have undergone formal training. Only 5.8% (10/171) of respondents stated having infection prevention and control guidelines. The health and safety measure that had recorded the highest figure was the use of personal protective equipment (PPE), 68.2% (60/88), 96.4% (27/28), and 94.5% (52/55) of informal emptiers, formal emptiers, and tanker drivers respectively, indicated the use of PPE mostly non-liquid repellent work suits and boots. None of the formal and informal manual emptiers reported having sinker suits among their personal and work environment protective equipment. Only 4%

(4/101) of the manual emptiers indicated that they owned a safety harness; Figure 4 shows a set of PPE used by formal emptiers in one commercial utility. Periodic medical examinations were low among respondents, with only 28.7% reporting having undergone such assessments. A significant proportion of participants indicated the practice of consuming milk after pit emptying as a means of neutralizing inhaled gases. The efficacy of this method requires further investigation.

The recorded number of vaccinations among the respondents was quite low, with 42.2% (68/161) stating that they had never been vaccinated against any of the listed diseases, and most reported being vaccinated for COVID-19 followed by Cholera. This shows that these were not targeted vaccines for sanitation workers but rather related to the response to disease outbreaks. It was also discovered that only 49.5% (94/190) of sanitation workers had health insurance coverage which was mostly the National Health Insurance Management Authority (NHIMA) scheme.

Equipment and Tools

Figures 5 to 7 present the various equipment and tools used by sanitation workers, 92 out of a total of 154 sanitation workers mentioned having adequate tools and equipment. Many tanker drivers, 89.4% (42/47) stated that they had adequate equipment and tools to carry out their job. As expected, more formal manual emptiers, 57.1% (12/21) stated that they had adequate tools and equipment compared to the informal manual emptiers, 44.2% (38/86).

Figure 4: PPE for formal manual emptiers for one of the CU including gumboots, gloves, work suit, helmet and respirators.

Figure 5: Scoopers and a modified shovel used to empty pits.

Figure 6: Barrels and modified garden tools used to empty pits.

Figure 7: **eVac pump used to empty pits.**

Table 3: Health and Safety Procedures– Manual Emptiers and Vacuum Tanker Drivers.

	Informal Emptier		Formal Emptier		Tanker Driver		Total	
Variable	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
Safety Training	**(89)**		**(28)**		**(54)**		**(171)**	
Not trained	45	50.6	2	7.1	19	35.2	66	38.6
Trained	44	49.4	26	92.9	35	64.8	105	61.4
Health and Safety Measures*	**(88)**		**(28)**		**(55)**		**(171)**	
Personal Protective Equipment	60	68.2	27	96.4	52	94.5	139	81.3
Health and Safety Policy	2	2.3	2	7.1	4	7.3	8	4.7
Periodical Medicals	16	18.2	10	35.7	23	41.8	49	28.7
Provision of Milk	50	56.8	17	60.7	39	70.9	106	62.0
Provision of Liquid Antiseptic Soap	24	27.3	13	46.4	37	67.3	74	43.3
Provision of Hand Sanitizers	7	8.0	7	25	27	49.1	41	24.0
Infection Prevention and Control Guidelines	8	9.1	0	0	2	3.6	10	5.8
Vaccinations	17	19.3	10	35.7	17	30.9	44	25.7
Disinfectants[#]	47	53.4	11	39.3	-	-	58	50.0
Protective Equipment*	**(76)**		**(25)**		**(56)**		**(157)**	
Respirators	22	28.9	20	80	37	66.1	79	50.3
Rubber Boots	46	60.5	23	92	51	91.1	120	76.4
Helmets	21	27.6	18	72	32	57.1	71	45.2
Utility Gloves	40	52.6	14	56	33	58.9	87	55.4
Heavy Duty Gloves	29	38.2	13	52	42	75.0	84	53.5
Work Suits or Liquid Repellent Coveralls	42	55.3	22	88	51	91.1	115	73.2
Sinker Suits	0	0	0	0	4	7.1	4	2.5
Reflective Vest	5	6.6	0	0	12	21.4	17	10.8

	Informal Emptier		Formal Emptier		Tanker Driver		Total	
Variable	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
Safety Goggles	3	3.9	11	44	20	35.7	34	21.7
Safety Harness[#]	3	3.9	1	4	-	-	4	4.0
Reflective Barrier Tape	4	5.3	0	0	12	21.4	16	10.2
Disinfectants	19	25	5	20	23	41.1	47	29.9
Vaccines Received*	**(89)**		**(24)**		**(48)**		**(161)**	
Tetanus	3	3.4	7	29.2	8	16.7	18	11.2
Hepatitis A	1	1.1	2	8.3	1	2.1	4	2.5
Hepatitis B	5	5.6	6	25	1	2.1	12	7.5
Cholera	17	19.1	3	12.5	14	29.2	34	21.1
Typhoid	11	12.4	1	4.2	4	8.3	16	9.9
COVID-19	46	51.7	2	8.3	20	41.7	68	42.2
None	41	46.1	12	50	15	31.3	68	42.2
Health Insurance	**(103)**		**(28)**		**(54)**		**(185)**	
Yes	5	4.9	12	42.9	33	61.1	50	27
No	98	95.1	16	57.1	21	38.9	135	73
History of Medical Check-ups	**(107)**		**(28)**		**(55)**		**(190)**	
Yes	42	39.3	19	67.9	33	60	94	49.5
No	65	60.7	9	32.1	22	40	96	50.5

***categories of these variables are not mutually exclusive-hence the percentages, (*) numbers in the brackets represent the total number of responses for each particular variable, %percentage, [#] total percentage does not include tanker drivers, F-Frequency**

The most common cause of work-related sick days among sanitation workers was illness. The highest reported frequency was 21, among informal manual emptiers who stated illness was a common cause of sick days. The least cause of work-related sick days was accidents. Accidents were not associated with work-related sick days among tanker drivers. This information is shown in Figure 8.

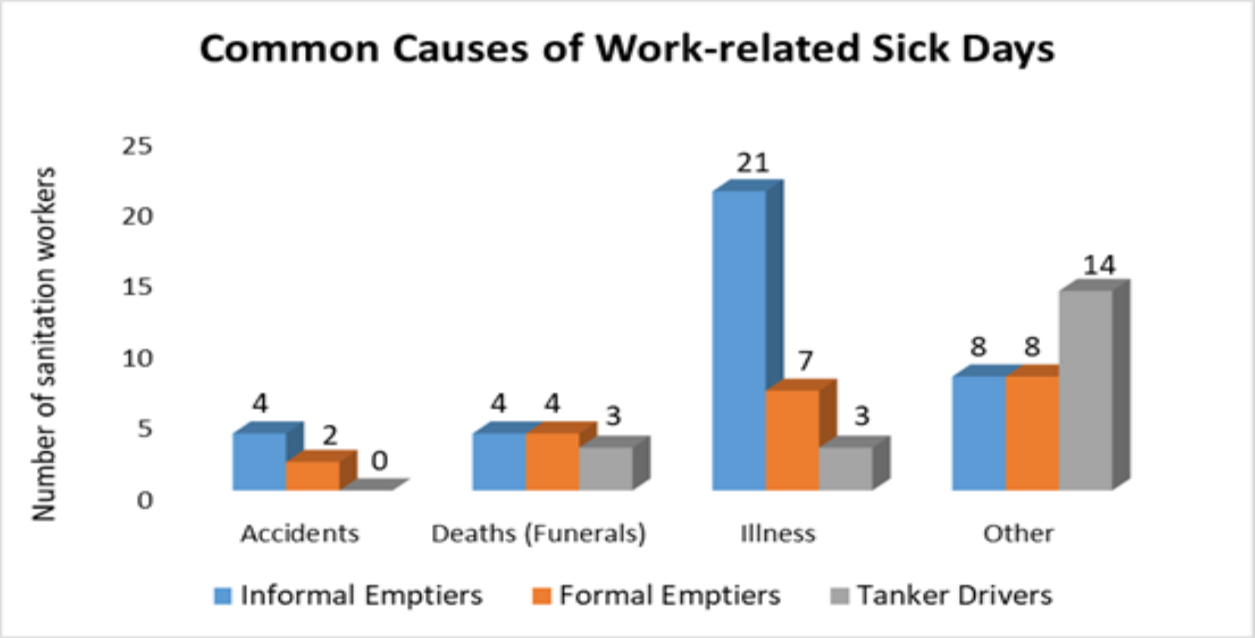

Figure 8: Common Causes of Work-related Sick Days Among Sanitation Workers.

We decided to investigate the diseases and conditions often reported among sanitation workers. It was discovered that most of the conditions were respiratory (Figure 9). This was seen from the 17 and 20 counts recorded by informal emptiers and tanker drivers respectively. Diarrheal diseases had the second highest frequency with the highest record of 7 from tanker drivers. Fever and musculoskeletal disorders had the lowest frequencies. Other causes of missing work included being unhappy with the job, having to take care of sick relatives i.e. children, fatigue, stigma, fear of getting sick due to lack of PPE, flooding of the pits due to heavy rains, and lack of equipment. Fatigue was the most recurring additional cause.

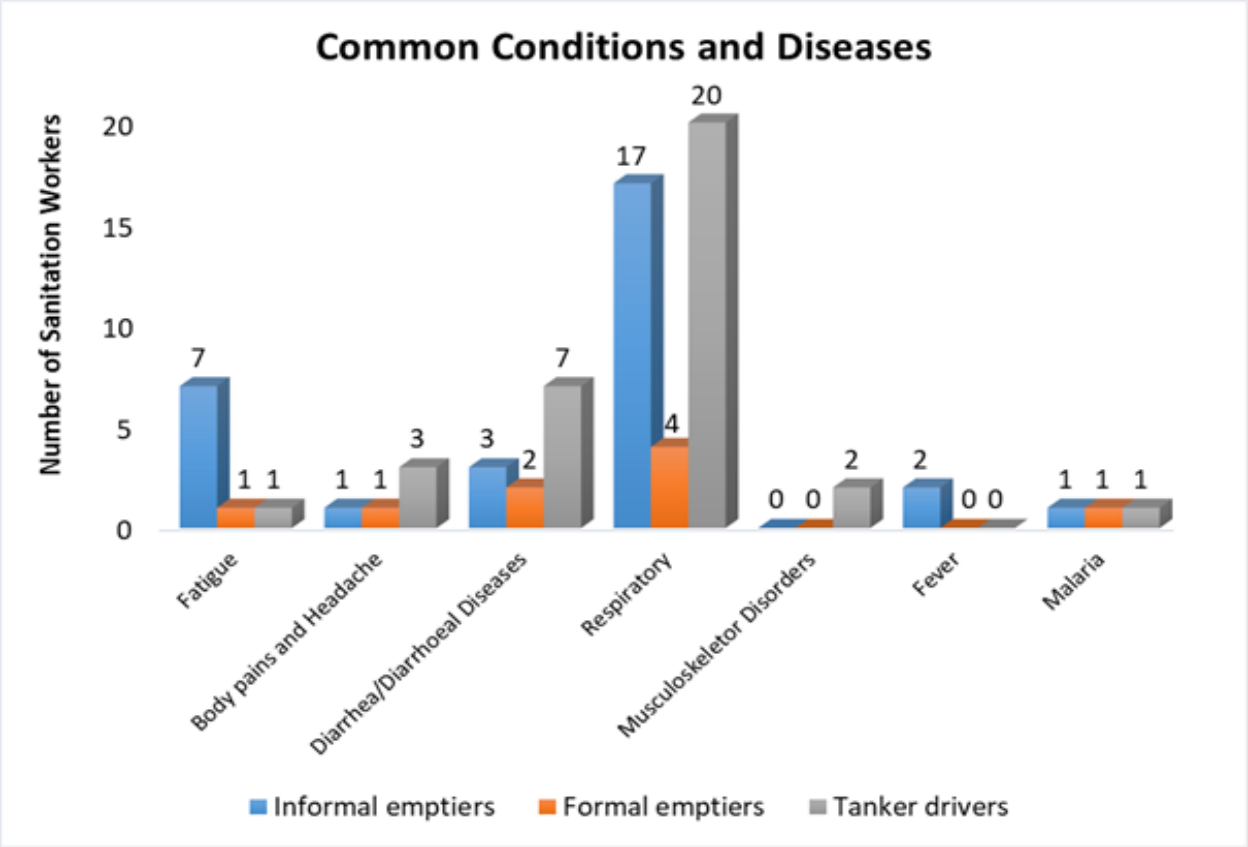

***Figure 9:** Common Conditions and Diseases Among Sanitation Workers.*

Welfare and Working Environment of Sanitation Workers

It was discovered that only 33.3% (51/153) and 37% (37/100) of sanitation workers claimed to have access to welfare facilities (i.e. toilets, washing and bathing facilities and change rooms) and standard operating procedures respectively. Majority (95.7%) of formal manual emptiers reported that they used covered plastic barrels to collect fecal sludge and 54.1% (46/85) of all manual emptiers stated that they use human-powered modes of transportation to move fecal sludge. The main method of fecal sludge disposal (81.1%) used by informal emptiers was burying in the ground. Formal manual emptiers were more compliant with regulations with 85.7% (18/21) stating that they used designated treatment plants. Only 37.1% (53/143) of all the sanitation workers reported that their nature of employment was permanent and 42.2% (68/161) received a monthly salary. Affiliation to the Zambia Pit Emptiers association was very low with only 12.6% (12/95) of manual emptiers stating that they were registered members of the association. More information is indicated in Table 4.

Table 4: Welfare and Working Environment – Manual Emptiers and Tanker Drivers.

	Informal Emptier		Formal Emptier		Tanker Driver		Total	
Variable	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
Welfare facility access	**(81)**		**(20)**		**(52)**		**(153)**	
No	66	81.5	6	30	30	57.7	102	66.7
Yes	15	18.5	14	70	22	42.3	51	33.3
Standard operating procedures	**(79)**		**(21)**		**-**	**-**	**(100)**	
Yes	25	31.6	12	57.1	-	-	37	37
No	54	68.4	9	42.9	-	-	63	63
Fecal sludge collection facility*	**(90)**		**(23)**		**-**	**-**	**(113)**	
Covered plastic barrels	12	13.3	22	95.7	-	-	34	30.1
Open buckets	65	72.2	0	0	-	-	65	57.5
Drums	1	1.1	0	0	-	-	1	0.9
Other	14	15.6	3	13.0	-	-	17	15.0
Faecal sludge transportation mode*	**(63)**		**(22)**		**-**	**-**	**(85)**	
Mechanised	20	31.7	21	95.5	-	-	41	48.2
Human-powered	45	71.4	1	4.5	-	-	46	54.1
Faecal sludge disposal*	**(95)**		**(21)**		**-**	**-**	**(116)**	
Open street	0	0	0	0	-	-	0	0
Buried in the ground	77	81.1	1	4.8	-	-	78	67.2
Manhole	1	1.1	0	0	-	-	1	0.9
Waterbody	1	1.1	0	0	-	-	1	0.9
Designated treatment plant	15	15.8	18	85.7	-	-	33	28.4
Other	1	1.1	3	14.3	-	-	4	3.4
Employment nature	**(68)**		**(19)**		**(56)**		**(143)**	
Contract	5	7.4	7	36.8	8	14.3	20	14.0
Permanent	9	13.2	6	31.6	38	67.9	53	37.1
Temporal	54	79.4	6	31.6	10	17.9	70	49.0

	Informal Emptier		Formal Emptier		Tanker Driver		Total	
Variable	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
ZEA registration	**(78)**		**(17)**		**-**	**-**	**(95)**	
Yes	9	11.5	3	17.6	-	-	12	12.6
No	69	88.5	14	82.4	-	-	83	87.4
Monthly Salary	**(84)**		**(24)**		**(53)**		**(161)**	
Yes	9	10.7	13	54.2	46	86.8	68	42.2
No	75	89.3	11	45.8	7	13.2	93	57.8

***categories of these variables are not mutually exclusive-hence the percentages, (*) numbers in the brackets represent the total number of responses for each particular variable, %percentage, F-Frequency, ZEA – Zambia Emptiers Association**

Figure 10: Light tracks donated by SNV under the Chambeshi-Lukanga WASH projects and vacuum tanks belonging to the various CUs included in the study.

Most sanitation workers reported facing stigmatization in the work environment. 88, 25 and 45 informal emptiers, formal emptiers and tanker drivers respectively reported experiencing stigmatization. More details are provided in Figure 11.

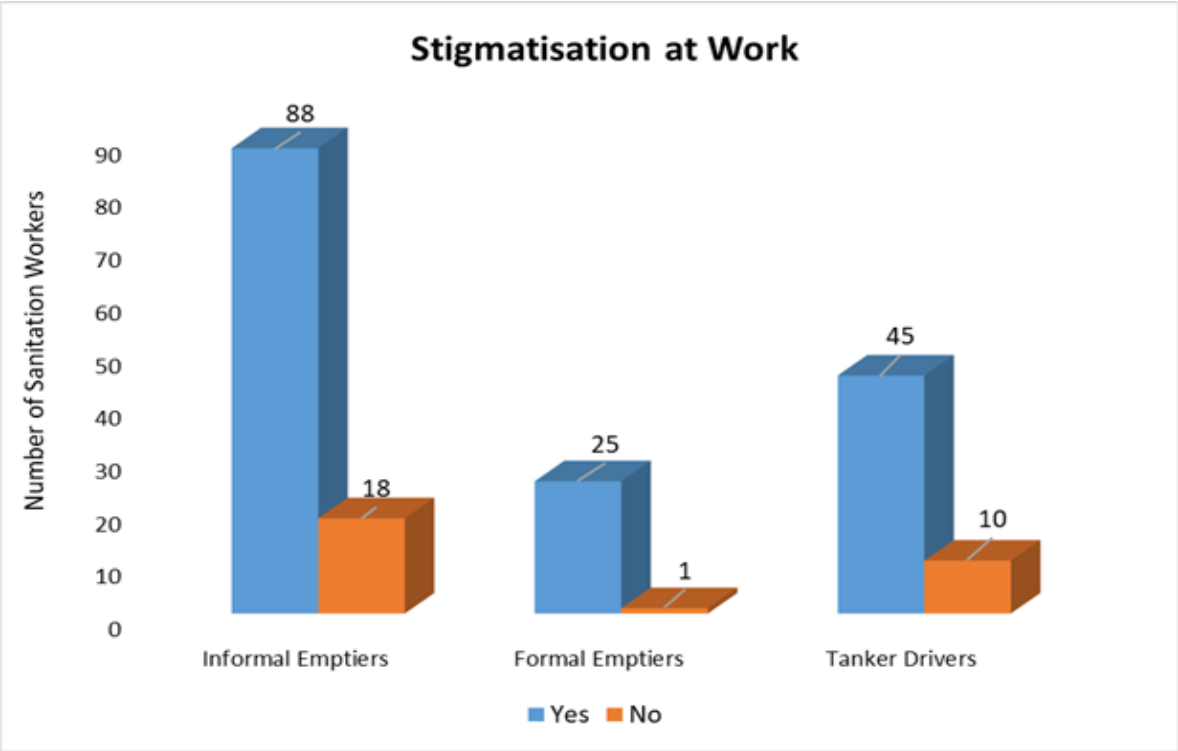

Figure 11: Work-related Stigmatization.

Table 5 details stigmatizing remarks and treatment faced by the sanitation workers. The findings revealed similar negative experiences reported by all the sanitation worker categories. The remarks are mostly similar across the different worker categories.

Table 5: Stigmatizing remarks and treatment experienced by sanitation workers in Zambia.

Informal Emptiers	**Formal Emptiers**	**Vacuum Tankers Drivers**
"People lock doors and windows as we work"	"Rejection from friends and relatives"	"People think we are crazy or say we are poor"
"Badyela mumatuvi" Local language 'They survive through fecal matter'	"Being looked down by customers after completion of work activity"	"People say we are ba namazai" 'Scavengers'
"Children spit on us"	"They laugh at us; they say your work is useless"	"Chimotoka chamatuvi "Local Language "fecal matter vehicle"

Informal Emptiers	Formal Emptiers	Vacuum Tankers Drivers
“People maintain distance” "Inchito yamafi ninchitoyafiko" Local language ‘A job involving faecal matter is a dirty Job’ "nchito ye usebenza ingakufuntise" Local language ‘This job can make you mad’ "People say you look handsome but have a bad job" “Some people can’t eat together with me” “People think we are crazy for doing this job” “This is work for old people; you will get sick” “This job will make you sick you will die”	“People around say this Job is not fit for me” "Teti ndebomba inchito yamafi" Local language ‘I can’t do this faecal matter job” “When buying things people would say impiya yamafi" Local Language “fecal matter money “ “People covering their noses when our vehicle is passing” “Some people lock themselves while we work” “People say a lady working with faecal matter”	“When you are passing, people shout you are smelling.” “You are the ones who bring cholera” “People spitting” "Namwebo mwebenshya ichipompolola amafi" ‘Local language ‘You who drives the fecal pumping truck.’ “My wife talks about my job she doesn’t like it” “Walikwata amano, kuti ulebombela kumafi, camatuvi” Local language ‘Are you normal how can you be working with fecal matter’ hence taking alcohol when I am working. “siningasebenze nchito iyi” Local language ‘I can’t do this job’

Source: Sanitation Workers Interviews

Note: These quotes are in Bemba and Nyanja Zambian languages

3.8 Sanitation Work Regulatory Framework and Enforcement in Zambia

While Zambia lacks specific laws directly governing onsite sanitation work and pit emptying, several general health and safety workplace regulations exist. Additionally, there are guidelines and standard operating procedures (SOPs) specific to sanitation work that provide a framework for safe practices.

The ***Occupational Health and Safety Act Number 36 of 2010*** safeguards the well-being of employees in the workplace. Key provisions include employer duties where employers are responsible for ensuring a safe and healthy work environment. This can be achieved through risk mitigation and the provision of a safe workplace. The act also outlines the duties of

employees in maintaining a safe workplace. The law also stipulates the establishment of a health and safety committee in all workplaces. The ***Factories Act Number 2 of 1966 Chapter 441*** protects the health, safety, and welfare of workers. It mandates employers to provide a clean and well-ventilated work environment with adequate lighting, sanitary facilities, and fire extinguishers. Additionally, the Act prohibits overcrowding and outlines specific requirements for first-aid provisions.

Other laws include the ***Zambia Environmental Management Act Number 12 of 201*****1** which regulates waste disposal in the environment, and the ***Public Health Act Chapter 295 of 1995*** focusing on preventing nuisances which include indiscriminate sewage disposal that leads to diseases and other public health problems.

The laws presented above have limitations as they are designed for broader application and do not specifically address the challenges faced by sanitation workers especially those in the informal sector.

Water Supply and Sanitation Act No. 28 of 1997*:* This law establishes the general framework for sanitation and water provision in Zambia. The act established the National Water Supply and Sanitation Council (NWASCO) and defined its functions. One of the main functions of the council is to regulate operations of the commercial utilities and other water supply and sanitation companies which offer onsite sanitation services in Zambia.

Occupational Health and Safety Guidelines for Water Supply and Sanitation Service Providers in Zambia: These guidelines were developed by NWASCO in 2023 and aim to improve occupational health and safety (OHS) in water supply and sanitation (WSS) services. They encourage compliance with relevant OHS laws and protect employees from health risks, property damage, and public safety hazards. The guidelines apply to commercial utilities, private operators, community-based organizations, NGOs, and local authorities. They recommend that these organizations develop standard operating procedures (SOPs) for OHS. These SOPs should cover employee and employer duties, use of PPE, vaccinations, worker compensation, health insurance, accident prevention, risk management, emergency response, and other general safety measures. The guidelines also call for establishing occupational health and safety committees in workplaces to ensure worker safety. These committees would create general safety rules specific to the workplace and develop safety features like clear signage, labelling, good housekeeping, security, and emergency facilities. Finally, the guidelines require

commercial utilities overseeing other service providers to submit yearly reports on OHS performance and accidents to NWASCO within three days of an incident.

***Standard Operating Procedures (SOPs) Emptying, Transporting, and Safely Disposing of Fecal Sludge, COVID-19 Protocols*:** These SOPs were developed under SNV WASH Sustainable Development Goals Project: Chambeshi-Lukanga Sanitation Project. The SNV project provides standard operating procedures (SOPs) for Emptying, transporting, and safely disposing of fecal sludge and COVID-19 protocols. These SOPs are primarily used to train emptiers and are available in commercial utilities involved in the project.

The SOPs cover:

Licensing: Business licenses from Patents and Companies Registration Agency (PACRA) and Zambia Revenue Authority (ZRA); Fecal Waste Transportation License from Zambia Environmental Management Agency (ZEMA); Permit from the designated commercial utility for disposal at Fecal Sludge Treatment Plants or designated treatment ponds and NWASCO license for collection and transportation services by sanitation workers.

Vaccinations: Recommended vaccinations for sanitation workers include Hepatitis B, Cholera, and Typhoid.

Workplace Preparation: Clearing household items to avoid contamination; Laying plastic sheeting around the work area to minimize sludge exposure; Barricading the area to restrict unauthorized access and Proper placement of equipment to prevent environmental contamination.

Workplace Prohibitions: No entry to pits/tanks; No smoking or eating on the worksite and

Keeping tanks covered.

PPE: The SNV SOPs specify the required PPE for emptying workers including Neoprene gloves; Thick, impermeable overalls; Gumboots; Face shields or safety goggles; Dust masks (minimum standard) or gas masks (preferred); Safety helmets and Raincoats for seasonal work. The guidelines also cover PPE maintenance.

Other Safety Equipment and Requirements: Handling spills and contaminated items: Plastic bin for emptying equipment; Bucket for preparing bleach solution; Plastic sheeting for work area coverage and Sufficient disinfectants (Germguard, Ascepine)

Workplace Hazards: The guidelines identify the following types of hazards faced by sanitation workers: Physical, Chemical, and Biological.

Equipment: The document lists the equipment commonly used for emptying: these include Vehicles for transport of sludge; Modified Garden tools (pick, axe, long-handled fork, bucket scoop); Sealable 55-litre barrels for faecal sludge transfer and transport and Improved exhausting equipment (vacuum tanks, augers, etc.)

Business Operations: The guidelines guide client management including Demand creation, client meetings, site assessments, and agreeing on sludge removal volume and payment terms.

On-site operations: Team supervision, secondary inspection, barricading, creating an access hole, sludge removal using designated tools, transferring solids and liquids into sealed barrels, patching the access hole, and disinfecting spill areas after the job is done.

Transport and disposal: Proper vehicle parking, laying plastic sheeting to prevent contamination, drum transfer and loading, secure transport to the disposal site, slow and careful driving, precautions in case of accidents, emptying at Faecal sludge treatment plants facilities, cleaning drums and vehicles at designated sites, proper contaminated PPE packaging for thorough cleaning, and separation of solid waste for treatment at the disposal site.

***Inspection Checklist for Emptiers Compliance*:** Local authorities have checklists to ensure compliance with occupational health and safety standards by emptiers. The checklist covers medical examinations; mandatory vaccinations; PPE availability and condition; availability of desludging tools and materials; use of disinfectants during desludging; safe emptying, conveyance, and disposal of fecal sludge.

Existing Company Guidelines and SOPs

Several commercial utilities and formal companies have their guidelines and SOPs for both manual emptying and vacuum tankers. These are presented below:

***General Health and Safety Guidelines*:** The general health and safety guidelines covered several issues regarding worker training and the use of PPE. Examples of required PPE include gloves, protective clothing, safety boots, masks, and face shields. Some guidelines recommend the maintenance of incident records, vaccination, and periodic medical examinations. The guidelines also covered vehicle safety for vacuum tanker drivers and

environmental protection. Others had information on the need for health insurance for workers and workers' compensation.

Job Safety Analysis: One utility utilized a job safety analysis form that assesses on-site safety risks. The form outlines required PPE, job steps, potential hazards, and control measures. Supervisors and workers review the form before starting a job.

SOPs for Sludge and Septage Management*:* One utility had SOPs specifically for customer services and safety during scheduled desludging services, a pilot program being implemented under the Chambeshi-Lukanga sanitation and hygiene project.

General Health and Safety Policies: Some companies used general health and safety policies not specific to emptying work. Some companies reported having their SOP and guidelines in draft form.

Most of the reviewed guidelines and or SOPs had information related to what was contained in the SNV SOPs which seems like the main guideline that is available in Zambia. The results presented in this study reveal that not all the requirements stated in the laws, guidelines and SOPs presented in this section are being implemented or followed by the sanitation workers and companies.

3.9 Occupational Health and Safety Challenges Faced by Sanitation Workers in Zambia

The challenges faced by sanitation workers in Zambia, categorized by informal manual emptiers, formal manual emptiers, and vacuum tanker drivers' categories are presented below.

3.9.1 Informal Manual Emptiers

These workers lack essential equipment and resources, leading to health risks and inefficiency. Key challenges include:

Lack of Personal Protective Equipment (PPE)*:* Most workers reported lacking proper boots, gloves, respirators, and masks, resorting to using regular clothes or makeshift alternatives. This was the most recurring challenge among these works and was attributed to the cost of PPE as the service charge for emptying was too low to invest in PPE. The lack of awareness among these workers on the importance of PPE could be another reason for not using and buying the equipment.

***Limited tools and equipment**:* Another frequently mentioned challenge was the limited tools and equipment such as scoopers, shovels, and buckets/barrels; these were often scarce or worn out. Disinfectants were also unavailable, hindering proper hygiene and sanitation. This can also be linked to the cost of these items just like PPE as these people were aware of these items essential for their work.

Transportation Issues: The absence of reliable transport made it difficult to reach disposal sites. Most of the informal workers lacked transport specifically for carrying waste to the disposal sites due to the cost of transportation which made them dispose of the waste in non-designated areas or within the yard.

***Inadequate Disposal Sites*:** Some districts lacked designated waste disposal facilities especially for faecal sludge treatment, forcing workers to improvise, which can be hazardous.

Improper Waste Disposal by Clients: Solid waste like diapers, feti, glass, sticks, bottles, dead animals, and clothes were found in toilets which created blockages and made emptying difficult.

***Unreliable Payment**:* Emptiers indicated that some clients did not pay the agreed-upon amount or refused to pay at all. This was common among friends and relatives of the emptiers.

Physical Strain: the least reported challenge among these emptiers was physical strain. Some emptiers reported manually lifting heavy buckets or scoopers leading to body aches and pains. This is connected to a lack of equipment as most of the informal emptiers did not have tools like pumps to help remove the waste from the pits and the cost of hiring or purchasing the equipment was high.

3.9.2 Formal Manual Emptiers

While formal workers had some advantages, they still faced significant challenges and most of the challenges they faced were like the informal workers. The following were the challenges:

Limited Equipment and Supplies: The most recurring challenge reported by formal workers was the inadequacy and unavailability of tools, disinfectants, and chemicals. The workers indicated that evacuation tools like the pump i.e. Gulper or eVac required additional payment to the commercial utilities for use, limiting their use.

Insufficient PPE: Like informal workers, proper protective gear was often lacking or worn out among these workers. However, formal workers had better access to PPE compared to informal workers. This could be because most of them worked with CUs, and some received PPE from projects such as the SNV WASH programme. Another factor that contributes to

Formal emptiers having better access to PPE is the contracts they have with other organizations such as mining companies. Due to strict adherence to safety guidelines and the use of PPE, the emptiers are compelled to ensure their workers have full PPE when assigned to work in these companies.

***Poorly Constructed Infrastructure*:** emptiers complained that some latrines were not built to standard, making emptying difficult and unsafe due to the risk of collapse. This was most prevalent in peri-urban or informal settlements with poorly constructed structures.

Transportation Constraints: Emptiers who worked under the commercial utilities revealed that the company provided transport was expensive and or unreliable, impacting efficiency. This resulted in some workers relying on public transport for waste disposal. One group of emptiers affiliated with a commercial utility highlighted transport as the biggest constraint. Although the utility had promised to support them with transport, they were only able to access it periodically leading to a backlog of clients who had contacted them and paid for services. They further revealed that even when transport is available, the residential areas that they operate in do does not have road access up to households. In some cases, the vehicle must be parked some distance from the work site implying that the barrels must be lifted manually to the vehicle.

Limited Jobs and Clients: The emptiers reported that finding consistent work was difficult, leading to financial insecurity. Low service costs also hindered profitability. Lack of financial sustainability led to some emptiers leaving to find other income generating ventures. The ones who remain are compelled to supplement with other income generating ventures, including plumbing work and latrine construction.

Solid Waste and Hard Sludge: Similarly reported by the informal emptiers improper waste disposal by residents created blockage of manual pumps and hardened sludge required additional effort or chemicals to remove.

***Financial Constraints*:** Some emptiers reported that limited income made it difficult to afford necessities like PPE replacements, health checkups, and business registration. This was connected to the low cost of the service and limited jobs.

3.9.3 Vacuum Tanker Drivers

Vacuum tanker drivers faced challenges related to accessibility, vehicle maintenance, and public perception:

Accessibility Issues: The most reported challenge faced among drivers was narrow roads and pits located behind houses this made maneuvering tankers difficult. Poor road conditions,

especially during rainy seasons, further hindered accessibility. Poor access road to the treatment site was an issue highlighted by almost all Lusaka based vacuum tanker drivers.

Poor Vehicle Maintenance*:* Like the formal emptiers inadequate maintenance of tankers and pumps was reported by the drivers which led to breakdowns and reduced work opportunities. This problem was mostly reported by vacuum tankers who worked for commercial utilities.

Stigma: Some community members viewed vacuum tanker driving as a dirty job, leading to social stigma for the drivers. This could be because the drivers were exposed to the public and most of the tankers were labeled sewage. Some drivers exhibited self-stigma as they did not disclose their jobs to their families, especially their children.

Customer Issues: Accusations of adding water to tanks and misunderstandings about waste removal capabilities created conflicts between the emptiers and the clients.

Lack of PPE and Supplies: Delays in receiving essential items like soap, disinfectants, and PPE can compromise worker safety and hygiene.

Solid Waste Blockages*:* Like the informal and the formal emptiers similar solid waste was reported in septic tanks clogging pipes and damaged pumps. The tanker design is not suitable for removing solid waste.

Poor Infrastructure: Weakly constructed septic tanks posed safety hazards.

Poor Working Conditions*:* Low salaries, lack of transport benefits, and demanding work schedules (including temporary contracts, long hours, and no breaks) and delayed monthly payments create a challenging work environment. Some drivers mentioned that it was difficult for them to eat after working as they felt disgusted.

Low Service Costs: The drivers revealed that the cost of vacuum tanker services was insufficient to cover operational expenses such as fuel, PPE, chemicals, and decent salaries as the cost of the service was regulated by NWASCO. They also felt that the disposal fee was too high

Limited working hours**:** One company was of the view that working hours should be extended to start an hour earlier and close one hour later. This shows that in some scenarios, the customer base is large enough that access to disposal becomes the bottleneck

Centralized disposal site: The drivers were of the view that creation of more disposal sites in different areas would not only save on time but also reduce on transport costs.

3.9.4 Challenges Identified by Sanitation Workers Supervisor

Supervisors of sanitation workers were also asked to reveal challenges that they faced in working with the sanitation workers. Some of the challenges were like the sanitation workers. The challenges are presented below:

Logistics and Equipment:

- *Unreliable transportation:* Vehicles frequently breaking down disrupted waste collection schedules.
- *Lack of proper tools and PPE:* Commercial utilities lacked essential tools for efficient waste removal and PPE for the workers.
- *Inadequate capacity for manual emptying:* Some companies engaged by the commercial utilities lacked the manpower and equipment for manual emptying.
- *Difficult infrastructure:* Uneven terrain and poor accessibility hampered waste collection efforts.

Workforce:

- *High employee turnover:* Trained sanitation workers leaving the field necessitated constant retraining.
- *Intoxication on the job:* Some supervisors reported that emptiers showed up to work under the influence of drugs or alcohol.

Business Environment:

- *Unprofitable business models:* Poor customer base and lack of standardized emptying facilities limited profitability.
- *Low knowledge and information assimilation:* Insufficient understanding of key information among some emptiers hindered their work and community interaction.

Community Perception:

- *Traditional beliefs:* One supervisor reported that there was resistance from some communities to having waste removed from their property for proper treatment.

Waste Management Infrastructure:

- *Lack of treatment facilities:* The absence of treatment plants in certain districts made formalizing sludge management difficult. Supervisors called for help from various institutions to help construct treatment facilities.

Communication:

- *Poor communication channels:* Inadequate communication systems hindered effective interaction with customers. The business of pit emptying was not well known by the

community therefore needed for it to be improved like other services that are provided by the commercial and other companies e.g. solid waste collection and provision of water services.

4. RECOMMENDATIONS

- The government and NGOs/funding agencies should construct facilities for proper fecal sludge management to prevent indiscriminate waste disposal.
- The government, through relevant ministries (Water, Sanitation and Labor) and NWASCO, along with donors, should establish programs to equip sanitation workers, especially in areas outside the Chambeshi-Lukanga and Lusaka projects, with essential, tools equipment and transport and basic start-up support for the sanitation workers.
- CUs and private sanitation companies must hire occupational health and safety personnel to oversee the workplace safety and well-being of sanitation workers.
- CUs and private sanitation companies must adhere to safety standards by providing PPE, disinfectants, vaccinations, regular medical checkups and other safety requirements for their workers.
- Improve data collection tools to assess sanitation workers' health and safety concerns, considering diverse work environments.
- Local authorities should conduct regular (quarterly) inspections of sanitation companies to ensure compliance with health and safety regulations.
- Local authorities strengthen oversight on construction of latrines and septic tanks to ensure that communities are meeting minimum standards.
- Implement public awareness campaigns through TV, radio, and other media platforms to educate communities on the importance of pit emptying and to foster respect for sanitation workers. Create awareness among community members on the dangers of burying waste within their yards and encourage them to use formal emptiers

NWASCO:

- Ensure all sanitation companies develop standardized operating procedures for emptying practices and implement mechanisms to monitor compliance.
- Develop comprehensive guidelines or laws addressing sanitation workers’ health and safety, as existing legislation may not cover their specific needs.
- Review and revise sanitation service costs to ensure the business model is financially viable for service providers.
- Implement programs to identify and empower informal sanitation workers and help them formalize their businesses. The current method used by the informal emptiers allows for less contact with fecal sludge and they do not spend on transport

- Facilitate the creation of provincial sanitation worker associations, with support from CUs.

Recommendations for Future studies

To gain a complete understanding of sanitation workers health and safety in Zambia, future studies should encompass all sanitation workers across the entire sanitation chain. This broader approach will provide a more holistic picture of the risks and challenges faced by this vital workforce. While questionnaires can be a valuable tool, future studies should go beyond this method. Collecting biological samples from sanitation workers and environmental samples will allow researchers to directly assess their exposure to harmful substances and potential health consequences associated with their work. This combined approach will yield more robust data to inform interventions.

5. CONCLUSION

In summary, this study investigated the health and safety of sanitation workers in Zambia, the study found that more than 50% of sanitation workers were informal emptiers facing various physical, biological, chemical, and ergonomic hazards. These workers have limited access to protective equipment, tools, transportation, vaccinations, and medical checkups. Illness was the major cause of absenteeism, with respiratory issues being the most common. The study also revealed that some sanitation companies lacked proper guidelines and safety protocols and that existing sanitation laws are inadequate and poorly enforced. Beyond these issues, sanitation workers struggle with stigma, poor working conditions, limited jobs, limited resources, and unprofitable work. These findings highlight the urgent need for local and international efforts to improve the working conditions and ensure the health and safety of these vital sanitation workers.

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APPENDICES

Appendix 1: Assessment tool – Quantification and Profiling of Sanitation Workers

1. Types of sanitation worker

What are the different types of sanitation workers?

Tick all that apply (or if for a focused assessment, select the type of sanitation worker(s)): e.g., Public toilet cleaners School and college toilet cleaners Office toilet cleaners; Manual pit emptiers Mechanical pit emptiers etc.

2. **Demographics for each type of worker selected in section 1:**

a. How many of each type are there? (e.g., Public toilet cleaners _____ Office toilet cleaners_____ Manual pit emptiers _____ … etc.)

b. Who are they employed by? (e.g., how many of the manual pit emptiers are: self-employed _____, employed by private companies _____, employed by private co-operatives _____, or employed by a government department … etc.)

c. What is the gender distribution? (i.e., for each worker type and each employment category, how many are: male, female, or gender not specified?)

d. What is the age distribution? (i.e., for each worker type, employment category and gender, how many are: under 18, 18 – 24, 25 – 40, over 40?) For each type of sanitation worker identified (or for the chosen type of sanitation worker in case of a focused assessment), answer the questions under each of the four dimensions below:

3. Physical safety

a. What potential hazards are they exposed to (biological, chemical and physical)? Please list and describe (e.g., fresh excreta, noxious gasses, sharp objects etc.)

b. Do they have and use personal protective equipment (PPE)? (Y/N) If yes, what does it include?

c. Do they have and use standard operating producers (SOP)? (Y/N) If yes, what does it include?

d. Do they receive safety training? (Y/N) If yes, please describe

e. What are the most common causes of work-related sick days, accidents, and deaths? Please list and describe

4**. Financial security**

a. Do they typically have a formal employment contract? (Y/N) If yes, is it casual; part-time; full time; permanent; flexible? If no, is it casual day labour; part-time; full time; permanent; flexible? For each type of contractual arrangement identified above, answer the following questions:

b. Do they receive a regular salary? (Y/N) If yes, how much do they earn per day (or week or month)? If no, how do they get paid and how much do they earn per day (or week or month)?

c. What are the typical hours (or days) worked per day (or week or month)?

d. Do they typically pay tax on earnings? (Y/N)

e. Do they work for a company or organization? (Y/N) If yes, what is the name of the company(s) or organization(s)?

f. Are they typically members of a workplace association, cooperative, union or CBO? (Y/N) If yes, is this a registered entity? Please describe.

5. Legal security

a. Do government policies, laws and regulations recognize these workers and/or their work? (Y/N) If yes, do they enable or restrict its execution? Please describe.

b. Do they require a licence (or approval of some kind) to carry out the work? (Y/N) If yes, please describe (e.g., cost of license and procedure).

c. Is their work monitored for compliance against local or national standards? (Y/N) If yes, please describe.

6. Dignity

a. Are they subject to abuse or stigmatized by others while carrying out their work, or in social situations? (Y/N) If yes, please describe

b. Are human rights/minority rights measures (policies and laws) in place to counter any abuse or stigmatization? If yes, please describe.

c. Are there any government- or NGO-led programs in place to support these workers? If yes, please describe.

END, THANKS

Appendix 2: Interview Guide Sanitation Supervisors

Date and time:.....

Province/district:.....

Position of the respondent:.....

Name of company or utility:.....

Name of Interviewer:.....

Opening

- Introduction of researchers and the research
- Making the respondent feel free and relaxed
- Create rapport

Questions

1. What is the relationship between the water utility and the sanitation workers?
2. What safety policies or guidelines are available to ensure the health and safety of sanitation workers?
3. What Partners does the institution have with regard to issues of sanitation workers?
4. What activities or programs are available for sanitation workers?
5. What challenges do you face in working with sanitation workers?

Conclusion

Thank the respondents and ask if they have any questions.

END

Appendix 3: Questionnaires Formal Emptiers

Name of Assessor:.....

Province:…….

Name of District: ….....

Name of Institution:…….……

Respondent …….……...

Date of Assessment: ….....

Demographics

1. Gender (Tick where applicable)

- Female
- Male

2. How old are you? (tick where appropriate)

- Under 18 Years
- 18-24 Years
- 25-40 Years
- Above 40 Years

3. What is your level of education? (tick where appropriate)

- Primary.
- Secondary
- Tertiary
- None

4. Have you received training in relation to your job?

- No
- Yes

   If yes, kindly specify:…….....

5. Are you a shift worker? (Tick)
    - Yes
    - No

6. If yes, state the nature of shifts
    - 8 hours shifts.
    - 2 days shifts
    - 3 days shifts
    - Weekly shifts

- Other…….

Occupational Health and Safety

7. Do you receive any safety training?
    - No
    - Yes

(If yes when do you receive the training?)

- Before they start work or a new activity
- At predefined intervals (e.g. once per year)
- When measures/procedures change
- Other

8. What health and safety measures are in place? (Tick appropriate response, can be multiple)
    - Personal Protective Equipment
    - Health and Safety Policy
    - Periodical medicals
    - Provision of milk
    - Provision of liquid antiseptic soap
    - Provision of hand sanitizers
    - Infection Prevention and Control Guidelines
    - Vaccinations
    - Disinfectants
9. Do you have adequate equipment and tools to carry out your job? (Tick where appropriate)
    - Yes
    - No

If yes, kindly specify:…….

10. What Personal and work environment protective equipment do you have? (Can be multiple responses)
    - Respirators
    - Rubber boots
    - Helmets
    - Utility gloves
    - Heavy-duty gloves
    - Work suits or liquid-repellent coveralls
    - Sinker suits
    - Reflective vest
    - Safety goggles
    - Safety Harness
    - Reflective barrier tape
    - Disinfectants

11. What potential hazards are you exposed to?
    - Chemical (Disinfectant, Sulphuric acid, Hydrochloric acid, etc.)
    - Biological (Blood, body fluids, Salmonella, Excreta etc.)
    - Physical (Noise, Pressure, Accidents, etc.)
    - Ergonomics
    - Psychological

12. What are the most common causes of work-related sick days?
    - Accidents
    - Deaths (Funerals)
    - Illness
    - Other:……

13. Do you receive medical check-ups?
    - Yes
    - No

14. If Yes, how often? (Tick where appropriate)
    - Bi-annual
    - Annually

15. Which vaccinations in relation to your work have you received? (Tick where appropriate)
    - Tetanus
    - Hepatitis A
    - Hepatitis B
    - Cholera
    - Typhoid
    - COVID – 19
    - None

16. Do you have any health insurance coverage? (Tick where appropriate)
    - Yes
    - No
    - If yes, kindly state:……

Staff Welfare and Working Environment

17. Do you have access to welfare facilities? (Tick where appropriate)
    - No
    - Yes

18. If, "yes", what do they include (Tick where appropriate, can be multiple responses)
    - Access to changing and washing rooms to use before and after work
    - Access to liquid antiseptic soap

- Access to toilets
- Access to handwashing facilities
- Access to bathing facilities to use before and after work

19. Do you have standard operating procedures for all tasks related to your work?
    - Yes
    - No

20. How many times in a month do you empty pit latrines? (Tick where appropriate)
    - 1-5
    - 5-10
    - 10-15
    - 15-20
    - More than 20

21. How many times in a month do you empty septic tanks? (Tick where appropriate)
    - 1-5
    - 5-10
    - 10-15
    - 15-20
    - More than 20

22. What facilities do you use to collect the faecal sludge?
    - Covered plastic barrels
    - Open buckets
    - Drums
    - Other:……

23. What mode of transport is used to move faecal sludge?
    - Mechanised transport
    - Human-powered

24. Where do you dispose of the faecal sludge?
    - Open street
    - Buried in the ground
    - Manhole
    - Waterbody
    - Designated treatment plant
    - Other:…… ……

25. Do you face any form of stigmatisation?
    - Yes
    - No

- If yes, specify:…….

26. What policies and regulations are in place to support the welfare of manual emptiers?
……
……

27. Are they being implemented?
    - Yes
    - No

If no, Why?

……
……
……
……
……

28. What are the main challenges related to your work?

……
……
……

29. What is the nature of your employment?
    - Contract
    - Permanent
    - Temporal

30. Are you a registered member of the Zambia Pit Emptiers Association?
    - Yes
    - No

31. Are you paid a monthly salary?
    - Yes
    - No

If no, state your salary arrangement
    - Commission based on works
    - Paid per Job
    - Other

32. Are there any ongoing initiatives (or in the recent past) aimed at addressing the situation of manual emptiers?
    - Yes
    - No

If yes, list them

……

If no, why?

……

33. What are the opportunities to address the issue? (Tick where applicable, there can be multiple responses)

- Political will
- Social change
- Sanitation developments
- Financing
- Community support
- Availability of skills
- Demand for services

34. What are the barriers to addressing the issue? (Tick where applicable, there can be multiple responses)

- Lack of Political momentum
- Taboos
- Cultural problems
- Loose soils and most toilets collapsing
- Poorly constructed sanitary facilities
- Lack of durable materials for the construction of toilets
- Poor remunerations for emptying services

35. Are there any quick wins or opportunities? Include research, networking, and influencing perspectives. Yes/ No

If yes, List them

……

……

END, THANK

Appendix 4: Questionnaire Informal Emptiers

Name of Assessor:.....

Province:.....

Name of District:.....

Name of Institution: ……

Respondent:.....

Date of Assessment: ……..

Demographics

1. Gender (Tick where applicable)

    - Female
    - Male

2. How old are you? (tick where appropriate)
    - Under 18 Years
    - 18-24 Years
    - 25-40 Years
    - Above 40 Years

3. What is your level of education? (tick where appropriate)
    - Primary.
    - Secondary
    - Tertiary
    - None

4. Have you received training in relation to your job?
    - No
    - Yes
    - If yes, kindly specify:…….....

5. How did you join manual emptying?
    - worked in a formal emptying organization…….
    - introduced by friends …….
    - other ……..

Occupational Health and Safety

6. Have you ever received any safety training?
    - No……..
    - Yes……..

(If yes when do you receive the training?)

- Previous Job……
- Peer to peer……
- Other……

7. What health and safety measures are in place? (Tick appropriate response, can be multiple)

- Personal Protective Equipment
- Health and Safety Policy
- Periodical medicals
- Provision of milk
- Provision of liquid antiseptic soap
- Provision of hand sanitizers
- Infection Prevention and Control Guidelines
- Vaccinations
- Disinfectants

8. Do you have adequate equipment and tools to carry out your job? (Tick where appropriate)

- Yes
- No

If yes, kindly specify:……

9. What Personal and work environment protective equipment do you have? (Can be multiple responses)

- Respirators
- Rubber boots
- Helmets
- Utility gloves
- Heavy-duty gloves
- Work suits or liquid-repellent coveralls
- Sinker suits
- Reflective vest
- Safety goggles
- Safety Harness
- Reflective barrier tape
- Disinfectants

10. What potential hazards are you exposed to?

- Chemical (Disinfectant, Sulphuric acid, Hydrochloric acid, etc.)
- Biological (Blood, body fluids, Salmonella, Excreta etc.)
- Physical (Noise, Pressure, Accidents, etc.)
- Ergonomic
- Psychological

11. What are the most common diseases or health conditions that you suffer?
    - Diarrhea
    - Respiratory
    - Musculoskeletal disorders
    - Other:……

12. Do you receive medical check-ups?
    - Yes
    - No

13. If Yes, how often? (Tick where appropriate)
    - Bi-annual
    - Annually

14. Which vaccinations in relation to your work have you received? (Tick where appropriate)
    - Tetanus
    - Hepatitis A
    - Hepatitis B
    - Cholera
    - Typhoid
    - COVID – 19
    - None

15. Do you have any health insurance coverage? (Tick where appropriate)
    - Yes
    - No
    - If yes, kindly state:……

Staff Welfare and Working Environment

16. Do you have access to welfare facilities? (Tick where appropriate)
    - No
    - Yes

17. If, "yes", what do they include (Tick where appropriate, can be multiple responses)
    - Access to changing and washing rooms to use before and after work
    - Access to liquid antiseptic soap
    - Access to toilets
    - Access to handwashing facilities
    - Access to bathing facilities to use before and after work

18. Do you have standard operating procedures for all tasks related to your work?
    - Yes
    - No

19. How many times in a month do you empty pit latrines/septic tanks? (Tick where appropriate)

- 1-5
- 5-10
- 10-15
- 15-20
- More than 20

20. How much are you paid for each Job?

…….

21. What facilities do you use to collect the faecal sludge?

- Covered plastic barrels
- Open buckets
- Drums
- Other:……

22. What mode of transport is used to move faecal sludge?

- Mechanised transport
- Human-powered

23. Where do you dispose of the faecal sludge?

- Open street
- Buried in the ground
- Manhole
- Water body
- Designated treatment plant
- Other:……

24. Do you face any form of stigmatisation?

- Yes
- No
- If yes, specify:…….

25. What policies and regulations are in place to support the welfare of manual emptiers?

……
……

26. Are they being implemented?

- Yes
- No

If no, Why?

……
……
……

27. what is the nature of your employment?

- Contract
- Permanent
- Temporal

28. Have you heard of the Zambia Pit Emptiers Association?

- Yes
- No

29. Are you a registered member of the Zambia Pit Emptiers Association?

- Yes
- No

30 Are you paid a monthly salary?

- Yes
- No

If no, state your salary arrangement

- Commission based on works
- Paid per Job
- Other

31. Are there any ongoing initiatives (or in the recent past) aimed at addressing the situation of manual emptiers?

- Yes
- No

If yes, list them

……
……

32. What are the Major problems that you face in your work? (Tick where applicable, there can be multiple responses)

- Lack of Political momentum
- Taboos
- Cultural problems
- Loose soils and most toilets collapsing
- Poorly constructed sanitary facilities
- Lack of durable materials for the construction of toilets

- Poor remunerations for emptying services

33. How do you think your work can be improved? (Tick where applicable, there can be multiple responses)

- Political will
- Social change
- Sanitation development
- Financing
- Community support
- Availability of skills
- Demand for services

END, THANKS

Appendix 5: Questionnaire Vacuum Tanker Drivers

Name of Assessor(s):.....

Province:……..

Name of District: ….....

Name of Institution:…….

Respondent……..

Date of Assessment: ….....

Demographics

1. Gender (Tick where applicable)

- Female…….
- Male……..

2. How old are you? (Tick where applicable)
    - Under 18 Years……
    - 18-24 Years……
    - 25-40 Years……
    - Above 40 Years…….

3. What is your level of education? (Tick where applicable)
    - Primary……
    - Secondary……
    - Tertiary…….
    - None…….

4. How many times in a month do you undertake emptying services? (Kindly state)
   ……..

Health and Safety

5. Do you receive any safety training?

   No…….

   Yes (If yes when do you receive the training?)
    - Before they start work or a new activity…….
    - At predefined intervals (e.g. once per year).....
    - When measures/procedures change…….
    - Other…….

6. What health and safety measures are in place? (Tick appropriate response, can be multiple)

- Personal Protective Equipment…….
- Health and Safety Policy…….
- Periodical medicals……
- Provision of milk……
- Provision of liquid antiseptic soap…….
- Provision of hand sanitisers……..
- Infection Prevention and Control Guidelines…….
- Vaccinations……..

7. What is the state of repair of your Vacuum tanker?

- Excellent……
- Good…….
- Fair……
- Poor……..

8. Do you have reagents/ disinfectants to manage spillages during the transportation of faecal sludge/ wastewater?

- Yes……
- No……

If yes, kindly specify:……..

9. Do you have adequate equipment and tools to carry out your job? (Tick where appropriate)

- Yes…….
- No……

If yes, kindly specify:……

10. What Personal and work environment Protective Equipment do you have? (Can be multiple responses)

- Respirators
- Rubber boots
- Helmets
- Utility gloves
- Heavy-duty gloves
- Work suits or liquid-repellent coveralls
- Sinker suits
- Reflective vest
- Safety goggles
- Reflective barrier tape
- Disinfectants

11. What potential hazards are you exposed to?

- Chemical (Disinfectant, Sulphuric acid, Hydrochloric acid, etc.).....

- Biological (Blood, body fluids, Salmonella, Excreta etc.).....
- Physical (Noise, Pressure, Accidents, etc.).....
- Ergonomic……..
- Psychological ……..

12. What are the most common causes of work-related sick days?
    - Accidents
    - Deaths (Funerals)
    - Illness
    - Other:…….

13. Do you receive medical check-ups?
    - Yes
    - No

14. If Yes, how often? (Tick where appropriate)
    - Bi-annual
    - Annually

15. Which vaccinations in relation to your work have you received? (Tick where appropriate, there can be multiple responses)
    - Tetanus……..
    - Hepatitis A……..
    - Hepatitis B…….
    - Cholera…….
    - Typhoid……
    - COVID – 19……..
    - None…….

16. Do you have any health insurance coverage? (Tick where appropriate)
    - Yes……..
    - No……..
    - If yes, kindly state:……...…….

Staff Welfare

17. Do you have access to welfare facilities at your workplace? (Tick where appropriate)
    - No……..
    - Yes……..

18. If, "yes", what do they include (Tick where appropriate)
    - Access to changing and washing rooms to use before and after work……
    - Access to liquid antiseptic soap……
    - Access to toilets……
    - Access to handwashing facilities……
    - Access to bathing facilities to use before and after work……

19. Do you face any form of stigmatization?
    - Yes……
    - No…….
    - If yes, specify:……..

20. Are women active in operating vacuum tankers?
    - Yes……..
    - No……..

21. What policies and regulations are in place?

……...

……..

……

22. Are they being implemented?
    - Yes
    - No

If No, Why?

……

……

……

23. What are the main challenges?

……

……

……

24. What is your nature of employment?
    - Contract…….
    - Permanent……..
    - Temporal……..

25. Are you paid a monthly salary?
    - Yes…….
    - No……

If No, State your salary arrangement

- Commission based on works…….
- Paid per Job…….

26. Are there any ongoing initiatives (or in the recent past) aimed at addressing the situation of Vacuum tank operators?

- Yes
- No

If Yes, List them

……

……

……

If no, why?

……
……..

……

27. What are the opportunities to address the issue? Tick where applicable can be multiple responses

- Political will
- Adequate financing
- Community support
- Regulatory enhancement
- Demand available for emptying services

28. What are the barriers to addressing the issue? Tick where applicable

- Lack of political momentum
- Taboos
- Financial challenges
- Cultural problems
- Loose soils and most toilets collapsing
- Lack of durable materials for the construction of toilets
- Accessibility

29. Are there any quick wins or opportunities? Include research, networking, and influencing perspectives. Yes/ No

If yes, List them

……

……

……

END, THANK YOU!!!

Appendix 6: Ethical Clearance

ERES CONVERGE

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I.R.B. No. 00005748
F.W.A. No. 00011697

13th February, 2023.

Ref. No. 2023-Jan-024

The Principal Investigator
Dr. James Madaliso Tembo
University of Zambia
School of Public Health
LUSAKA.

Dear Dr. Tembo

RE: AN ASSESSMENT OF HEALTH AND SAFETY OF SANITATION WORKERS IN ZAMBIA.

Reference is made to your protocol submission. The IRB resolved to approve this study and your participation as Principal Investigator for a period of one year.

Review Type	**Fast-Track**	Approval No. **2023-Jan-024**
Approval and Expiry Date	Approval Date: 13th February, 2023	Expiry Date: 12th February, 2024
Protocol Version and Date	Version - Nil.	12th February, 2024
Information Sheet, Consent Forms and Dates	• English.	12th February, 2024
Consent form ID and Date	Version - Nil	12th February, 2024
Recruitment Materials	Nil	12th February, 2024
Other Study Documents	Data Collection Sheet, Focus Group Discussion.	12th February, 2024
Number of participants approved for study	384	12th February, 2024

Where Research Ethics and Science Converge

Specific conditions will apply to this approval. As Principal Investigator it is your responsibility to ensure that the contents of this letter are adhered to. If these are not adhered to, the approval may be suspended. Should the study be suspended, study sponsors and other regulatory authorities will be informed.

Conditions of Approval

- No participant may be involved in any study procedure prior to the study approval or after the expiration date.
- All unanticipated or Serious Adverse Events (SAEs) must be reported to the IRB within 5 days.
- All protocol modifications must be IRB approved prior to implementation unless they are intended to reduce risk (but must still be reported for approval). Modifications will include any change of investigator/s or site address.
- All protocol deviations must be reported to the IRB within 5 working days.
- All recruitment materials must be approved by the IRB prior to being used.
- Principal investigators are responsible for initiating Continuing Review proceedings. Documents must be received by the IRB at least 30 days before the expiry date. This is for the purpose of facilitating the review process. Any documents received less than 30 days before expiry will be labelled "late submissions" and will incur a penalty.
- Every 6 (six) months a progress report form supplied by ERES IRB must be filled in and submitted to us.
- A reprint of this letter shall be done at a fee.

Should you have any questions regarding anything indicated in this letter, please do not hesitate to get in touch with us at the above indicated address.

On behalf of ERES Converge IRB, we would like to wish you all the success as you carry out your study.

Yours faithfully,
ERES CONVERGE IRB

Dr. Jason Mwanza
Dip. Clin. Med. Sc., BA., M.Sc., PhD
CHAIRPERSON