

# Community Challenges and Needs in Sanitation, Related to Flooding Disasters in Peri-Urban Areas: Case of Kanyama - Zambia

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**Abstract:** *This study is motivated to characterize the emergent issues and needs in improvements of mechanisms, in peri-urban area disaster management, with the objective of alleviating epidemic water related disease outbreaks. This paper is a case of Kanyama compound in Zambia, with prevention, preparedness, and response mechanisms the focus of disaster management in this study. Peri-urban areas are hot spots for infectious disease cases and their peripheral with sanitation challenges plays a major role in the increased risk of the outbreak of diseases. A Grounded Theory approach was used in the study by firstly conducting a focused group discussion approach with the community and semi-structured interview for gaining a perspective from relevant authorities. Following this, open and axial coding was performed on qualitative data collected. The findings of this study indicated that key issues were related to service delivery, sanitation facilities, policy and procedures, community participation, community attitudes and behaviour, and informal settlement problems. Furthermore, there is need for a more specific policy to deal with sanitation issues in peri-urban areas, vis-a-vis, preparedness, prevention and response. The study also brought out the need for multi-level community inclusiveness in planning and implementation programs under disaster management.*

**Keywords:** Disaster Management, Flooding Disaster, Peri-Urban, Sanitation, Water Borne Disease

## 1. Introduction

Globally, access to safe water and adequate sanitation is essential in improved resilience in the face of diseases and their outbreaks (Belfroid et al., 2013; Lopez et al., 2019; WHO, 2018). Poor sanitation and access to safe water consequently increase the risk of water and excreta related sickness incidences indicated by outbreaks of cholera and diarrhoeal diseases (Belfroid et al., 2013; Mwaba et al., 2021) and Zambia is no exception to this (Mwaba et al., 2020; Sinyange et al., 2018). Lusaka province has the largest cases among all (Mwaba et al., 2020, 2021). Widespread of Cholera outbreaks in Zambia have occurred since 1977, particularly affecting the capital city, Lusaka. This has largely been attributed to poor access to safe water and sanitation facilities in peri-urban areas of the city (Sinyange et al., 2018). A total of 34,950 cases of Cholera were reported in Zambia between 2008 and 2017 (Sinyange et al., 2018). Out of the total Cholera cases, 89 percent were reported from Lusaka district in both 2009 and 2010 (Sinyange et al., 2018). Even though the number of cases had been decreasing from 2013–2017, Lusaka district still had the highest burden of Cholera as compared to other districts (Sinyange et al., 2018). This is due to Lusaka having several densely populated peri-urban settlement areas with inadequate water and sanitation infrastructure which compromises sanitation and hygiene, fostering waterborne

diseases (Mwaba et al., 2021; Sinyange et al., 2018). In addition, Lusaka has experienced prolonged rainfall that results in flooding which further increases the risk of Cholera outbreak and transmission (Mwaba et al., 2020). The hot spots for these infectious disease cases are predominantly in peri-urban areas and their peripheral with sanitation challenges in such areas playing a role in the increased risk of the outbreak of these diseases (Mwaba et al., 2020). In peri-urban areas, problems associated with poor sanitation, inadequate access to safe water, and poor hygiene are heightened contributing factors to such outbreaks (Moon & Keffe, 2021).

## 2. Literature Survey

A growing number of scholars have recognized that the peri-urban area has its own unique characteristics, requirements, and issues and thus a uniqueness in sanitation related issues (James et al., 2019; Renouf et al., 2018; Wandl&Magoni, 2017). This further, stresses the call for such a study (James et al., 2019; Wolff et al., 2021). Therefore, there is need for such a study that explores the issues and demands of peri-urban communities in terms of disaster planning and response (Kadi et al., 2012; Wandl&Magoni, 2017). This research takes a case study of Zambia's Kanyama Compound. Kanyama is a peri-urban area which is one of the highest disaster-prone areas and experiences frequent natural

disasters including floods which usually leads to lives and properties being lost every year due to its geographical location and underlying geological formation and climatic conditions (Phiri, 2014). The findings of this study aim to characterize the emergent issues and needs in improvements of mechanisms, in peri-urban area disaster management, with the objective of alleviating epidemic water related disease outbreaks.

### 3. Methodology

Individual and/or collective behaviours in a community and institution are influenced by socioeconomic and environmental factors. Therefore, this paper adopted a Grounded Theory approach to establish community sanitation issues and needs, related to disease outbreaks and flooding disasters, characteristic to a peri-urban settlement. Taking a Grounded Theory approach, this study relies on open and axial coding to develop key conceptual aspects and emergent issues. An inductive-case study approach relying on focussed group discussions and semi-structured interviews as the methods of inquiry were followed in collecting data used to provide data used in the initial stages of developing these concepts. With regards to this, ethical clearance was obtained to conduct this study from Humanities and Social Sciences Research Ethics Committee. Kanyama compound, a peri-urban area in Lusaka, Zambia was taken as a case study area.

This study area is characterized as a highly vulnerable area to waterborne disease outbreaks. This characterization is based on the premise that this area is one of the hotspots for cholera, malaria and diarrhoeal disease outbreaks in Zambia and is considered as one of the epicentres for such diseases. This research took a focussed group discussion (FGD) approach as the method of inquiry in obtaining responses on questions related to the community challenges and needs in sanitation related to epidemic disaster prevention, preparedness and response in Kanyama. For this study, a homogeneous sampling approach was selected by purposively sampling participants that are all members of the same community, residents of Kanyama. These participants gave an in-depth insight on the issues and demands of this peri-urban community.

To further explore these issues by gaining an institutional perspective, this research engaged public (government) institutions with a community mandate in water and or sanitation preparedness and or response to a disaster. Selected institutions together with their roles in disaster management are presented in Figure 1. These institutions were selected using purposive sampling and interviewed using semi-structured questions. Their responses were also recorded and later transcribed to facilitate textual data analysis.

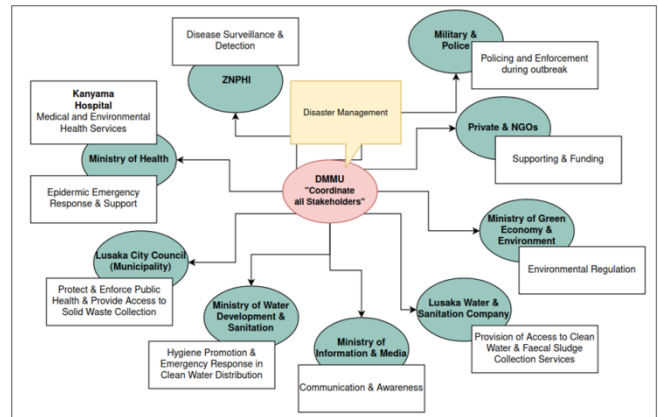


Figure 1: Collaborating institutions with mandate in disaster management governance (Source: Author)

These institutions play a role in disaster management governance, which refers to the way these institutions coordinate at community, national and regional level in order to manage and reduce disaster risks.

Open coding was performed on both data sets from the FGDs and semi-structured interviews, by identifying and categorizing responses found multiple times in the data through repeated reading of sentences and paragraphs of data collected for the study and drawing understanding in the emergent issues. These authorities included those with a mandate to meet the sanitation needs and challenges of peri-urban communities as already alluded. Data collected and analysed comprised concerns and aspects related to community sanitation preparedness, prevention, and response before, during and post a disaster. The data was segmented, and conceptual labels assigned to each segment. Once specified, comparisons between these defined concepts and asked questions were made to methodically specify the states and infer possible relationships with others.

### 4. Results and Discussion

It was established that peri-urban areas are much more vulnerable to the risk of infectious disease outbreaks than they are made out to be in Zambia through engagement of relevant authorities. There are several synergies, illustrated in Figure 2, and combinations of these synergies that can tip the balance from ‘safe’ to ‘epidemic disaster’.

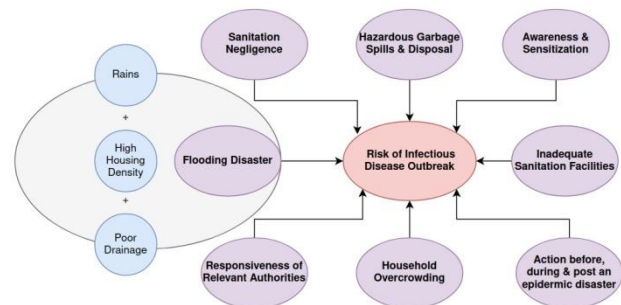


Figure 2: Synergies affecting the risk of infectious disease outbreaks in peri-urban areas (Source: Author)

Taking for instance flooding, areas are prone to flooding disasters because of the high housing density and poor drainage which increase the risk of flooding disasters even

with little rains and thus increasing the likelihood of breeding of water related diseases. This could even be worse off with inadequate type and quality of sanitation facilities especially pit latrines evident from the mixing of storm water and faecal sludge. The role of relevant authorities and community both have a part to play in response actions taken before, during and post an epidemic disaster. However, the study deduced that, hazard risk control and alleviation (before a disaster), are very key in such vulnerable areas because of the heightened challenges in response and recovery during and post a disaster.

The next section explains the key issues specific to disaster management governance concerns related to peri-urban sanitation aspects, from the perspective of public institutions, illustrated in Figure 3.



**Figure 3:** Key Issues: Perspective of Institutions (Source: author)

#### a) Key Issue 1: Land use/peri-urban planning

Mushrooming of households was characteristic to peri-urban areas, such as Kanyama, that started out as informal settlements. This served as a deterrent to sustainable planning for improvements in water supply and sanitation with challenges of encroachment and lack of space for appropriate measures to be undertaken. These encroachments limited effective coverage of household connections to main water supply and sewer lines.

#### b) Key Issue 2: Adequacy of existing sanitation facilities

Pit latrines were the predominantly used sanitation facilities in peri-urban areas in Zambia. In this study, it was indicated that the overcrowding of households imposed a high people/household to pit latrine ratio. This was as high as eight people/household to pit latrine ratio in Kanyama and other peri-urban areas. This high residential population density was postulated to be as a result of migration and high birth rates characteristic to low-income areas. It was indicated that 'retro fit' design pit latrines constructed by households and even by institutions under funded projects,

had inadequate capacity for the number of persons per household in a peri-urban area. In an attempt to cushion this inadequacy, relevant authorities attempted to implement emptying of pit latrines as part of faecal sludge management. However, this study revealed that sludge from peri-urban areas was rich with solid waste serving as a deterrent to the emptying of pit latrines in such areas. This study postulated that this was an effect of possibly societal culture and defunct solid waste management.

#### c) Key Issue 3: Quality of existing sanitation facilities

Pit latrines were poorly constructed which in turn caused a ripple effect in contamination of wells especially during rainy season. This contamination was by excreta mixed with water overflowing from pit latrines and from ground water. Even latrines meant to be modernised and ventilated pit latrines in Kanyama and other peri-urban areas were discovered not to meet globally acceptable standards. This was postulated as a ripple effect from Lusaka City Council leaving it to the community to construct their own pit latrines. Perhaps taking a multi-sectoral approach in enforcing good construction standards and practices and supervision of pit latrines through engagement of relevant authorities could be a necessary attempt to remedy this issue.

#### d) Key Issue 4: Solid Waste Management

There was little effort in advanced improvements in solid waste management in Kanyama and other peri-urban areas. It was indicated that there was a low investment in the solid waste management sub-sector, especially in peri-urban areas. An umbrella approach was taken in the solid waste management garbage collection and disposal, by adopting practices and approaches used in urban areas but seemingly not effective for peri-urban areas. For instance, it was indicated that there was a need to raise standards in solid waste collection with a huge compromise in the garbage collection vehicles e.g., use enclosed trucks for long haulage in place of tippers or non-conventional garbage collection vehicles which in turn contributed to problem of odour and spilling of solid waste. Other concerns indicated were the inadequacy in the number of skip bins and ineffective household garbage collection.

#### e) Key Issue 5: Access to quality water during the event of a disaster

In a state of emergency, the community was provided with clean water that was distributed using trucks by relevant authorities. However, this was never adequate to meet the high community needs for water and some people were forced to drink even contaminated water.

#### f) Key Issue 6: Hygiene compliance

There is intensified sensitization and awareness especially in peri-urban areas. However, there was still little effort by the community to adhere to hygiene compliance.

#### g) Key Issue 7: Community participation

The community was not actively involved by relevant authorities in disaster management. The next section explains the key issues specific to disaster management governance concerns related to peri-urban sanitation aspects, from the perspective of the community, illustrated in Figure 4.





Figure 4: Key Issues: Perspective of the community (Source: Author)

**a) Key Issue 1: Adequacy of existing sanitation facilities**

Constructed pit latrines, whether by community/households or through institutions/organizations, were inadequate to meet the number of persons per household.

**b) Key Issue 2: Quality of existing sanitation facilities**

Household constructed pit latrines were of poor quality with high contamination of wells especially during rainy season represented by the spike in diarrhoeal cases during this season.

**c) Key Issue 3: Water Supply**

There was heavy reliance on borehole water and water drawn from kiosks and neighbours. This was a deterrent to households and the community in constructing ‘pour-flush’ toilets or latrines.

**d) Key Issue 4: Community knowledge and skills in pit latrine construction**

There was little to no knowledge and skills in pit latrine construction related to good construction practices and acceptable standard quality. This inherently affected the quality of community/household constructed pit latrines.

**e) Key Issue 5: Municipal authority participation in community/household construction of pit latrines**

Little effort is made by relevant authorities with regards to community/household construction of pit latrines. This was fuelled by the lack of mandate by relevant authorities to ensure quality and adequate community/household constructed pit latrines, in peri-urban areas.

**f) Key Issue 6: Solid waste management**

There was poor garbage collection and disposal services by relevant authorities. This in effect promoted the disposal of solid waste in pit latrines and unmarked areas outside households.

**g) Key Issue 7: Access to quality water during the event of a disaster**

There was heavy reliance on water from neighbours, wells and kiosks. In the event of a disaster, lack of access to quality water was a huge issue for Kanyama and other peri-urban areas. This in turn contributed as a risk factor to the outbreak of cholera and diarrhoeal diseases.

**h) Key Issue 8: Hygiene compliance**

There was a lack of hygiene compliance with others indiscriminately disposed waste in pit latrines and unmarked areas outside households.

**i) Key Issue 9: Community participation**

Relevant authorities made little effort in involving and engaging the community in preventive sanitation responses to meet their sanitation needs and challenges. It was indicated that they are not given an opportunity to actively participate in stakeholder engagement and institutional sanitation improvement related activities apart from sensitization, awareness, and chlorine distribution.

As presented in Figure 5, some of the key issues established in this study, from the perspective of the community, correlate to those identified from the perspective of Institutions. These are:

- Adequacy of existing sanitation facilities
- Quality of existing sanitation facilities
- Community participation
- Solid waste management
- Hygiene compliance
- Access to quality water during the event of a disaster

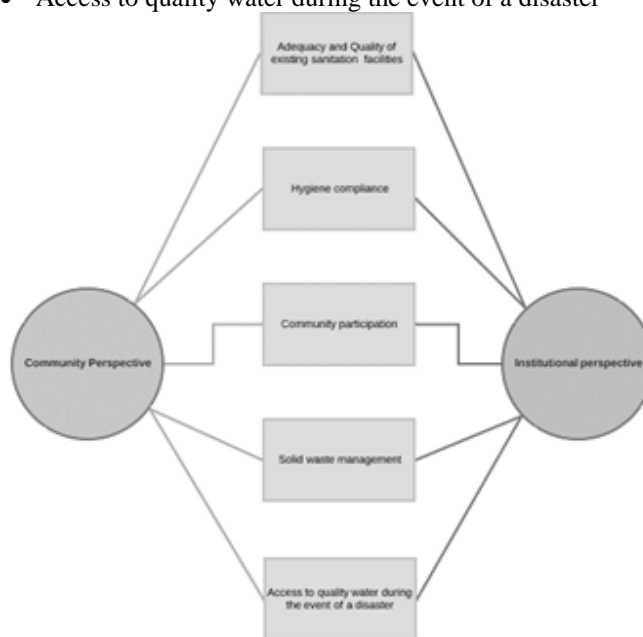


Figure 5: Correlated Key Issues from community and institutional perspectives (Source: author)

From all these key issues presented, these results indicated that six (6) emergent issue aspects can be established which serve as the premise of the implied changes needed in these problem areas. A summary of these emergent categories from axial coding and their subcategories, conceptual aspects and the associated key issues are presented in Figure 6.

### a) Emergent Issue Category 1: Responsiveness of authorities

Relevant authorities need to have specific mandates to peri-urban communities with this paper proposing strategies to include:

- Participation by relevant authorities in the construction of household pit latrines;
- Implementation of inter-modal garbage collection systems' which take advantage of also improving standards in each individual mode (wheelbarrows, carts, trucks etc.);

- Intensifying of regular garbage collection and placement of skip bins; and
- Engaging community and/or its representatives in activities, programs and projects for peri-urban areas targeting sanitation improvement and disaster alleviation.

Another concern related to responsiveness of authorities is policy and procedure. In this study, findings indicate that mechanisms applied to urban areas are almost obsolete in the case of peri-urban areas. From the previous emergent issues, it is clear that there is need for specific policies and procedures to address peri-urban areas.

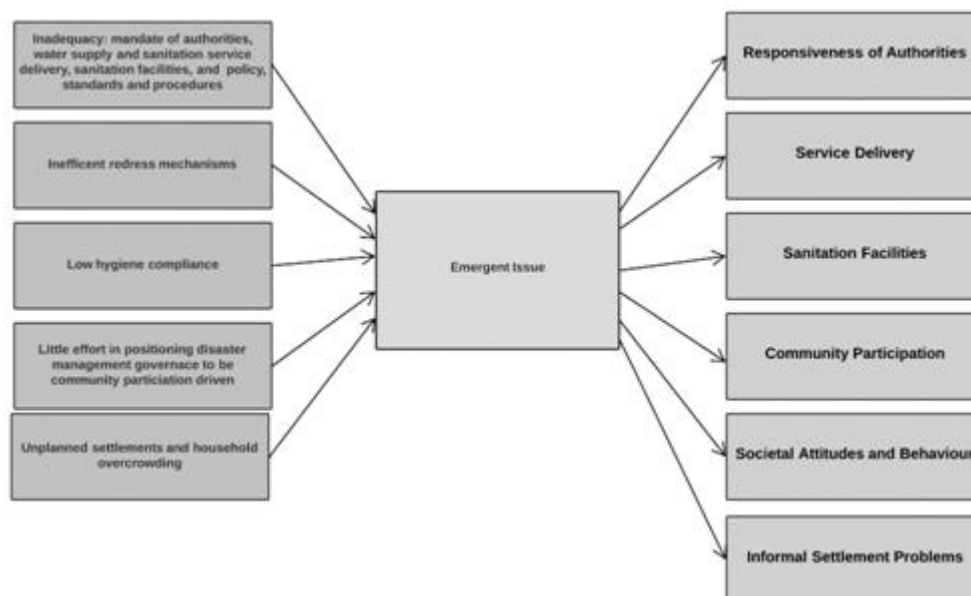


Figure 6: Emergent issue categories (Source: Author)

### b) Emergent Issue Category 2: Service Delivery

The adequacy and quality of water supply and sanitation, and solid waste management services are a huge concern in peri-urban areas. These inadequacies are because of following conventional standards and approaches applied to service delivery generally in urban areas. There is need for specific approaches structured for peri-urban areas.

### c) Emergent Issue Category 3: Sanitation Facilities

The issue with sanitation facilities in peri-urban areas is firstly associated with the predominance reliance on pit latrines. One of the primary concerns with constructed pit latrines is the inadequacy in constructed pit latrines to handle the number of persons per household. The quality of household-built pit latrines is equally a problem in peri-urban areas, with faecal matter overflowing during rainy season and their groundwater contaminated due to poor pit latrine lining. Some of these issues are related to the responsiveness of authorities and service delivery. There is need for strong linkages between communities and relevant authorities. There is also need for a shift from implementation of 'retrofit' pit latrine design and construction standards to strategic approaches specific to peri-urban areas.

### d) Emergent Issue Category 4: Community Participation

The problems associated with community participation stem primarily from issues related to community engagement and involvement by relevant authorities. With the concerns

highlighted in emergent issue category three, such communities do not have the technical knowledge to build quality pit latrines on their own. Also making reference to the first emergent issue, responsiveness of authorities, it has already been alluded that there is need for community participation in institution related activities aimed at sanitation improvement programs or disaster management. There is also need for intensive awareness and sensitization programs, and opportunity for community scheme mechanisms.

### e) Emergent Issue Category 5: Societal Attitudes and Behaviour

In this study, societal attitudes and behaviour are an emergent issue because of the very little hygiene compliance associated to communities in peri-urban areas. The needs of this issue follow the ones already highlighted under the previously discussed emergent issue category.

### f) Emergent Issue Category 6: Informal Settlement Problems

The biggest challenge is in the limitations in what can be done in land use, planning and development in peri-urban areas which are characterized by predominantly informal settlements. Improvement in water and sanitation service delivery is constrained by informal settlement problems, which is primarily because of no initial planning of these settlements. Another issue is overcrowding of households which causes a ripple effect affecting other emergent issues

such as service delivery and sanitation facilities. There is need for a change in policy and procedures, related to disaster management, to be more specific to peri-urban areas.

## 5. Conclusion

This study concludes that there is need to shift disaster management governance and sanitation practices to take dynamic, strategic, and specific: policy, standards and procedures to deal with flooding disasters and their waterborne disease outbreak fall out in peri-urban areas vis-a-vis, preparedness, prevention and response. This study also indicated that it is not only important for sanitation practices to include disaster management, but for disaster management governance of flooding disasters to incorporate specific aspects of emergency sanitation and preparedness for response to sanitation related fallout in waterborne disease outbreaks characteristic to peri-urban area specific needs. Community needs have been highlighted in this study with the most prominent one being the need for strengthened community participation in disaster management governance.

## 6. Future Scope

This study lays the groundwork for the development of mechanisms adapted to remedy inadequacies to the extents of disaster management presented in this study.

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