Evaluating Shared Toilet Conditions and User Perceptions in Informal Settlement using Post-Occupancy Evaluation: A Case of Rupsha and Greenland Informal Settlement.

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ABSTRACT

Shared sanitation facilities, such as public toilets and communal toilets, are often used as a last resort in informal settlements due to constraints in resources, space, access, and ownership. However, their effectiveness is often hindered by poor design, maintenance, and management, as well as socio-cultural factors that influence user attitudes and behavior. They are not recognized as improved sanitation due to maintenance difficulties as they easily can be avenues for the spread of diseases. Nevertheless, it is unknown whether user experience based on socio-cultural variables affects users' attitudes about hygienic habits and cleanliness; therefore, the issue still exists. This study investigates the challenges and opportunities of shared sanitation in informal settlements in two case study areas, with a focus on user experience and behavior for finding those reasons by assessing the existing condition. Informal settlements in developing nations should adopt and implement the efficient design, construction, and management of community-designed, built and managed sanitation and water resources. With user acceptance, experience, and behavior in mind, this study outlines the existing condition using a post-occupancy evaluation of the shared toilets for the informal settlement residents. It proposes critical policy measures to overcome more basic institutional and regulatory barriers to shared sanitation and their potential alternatives.

Keywords: S*hared sanitation, post occupancy evaluation, community management, informal settlement, hygiene*

1. INTRODUCTION

Growing urbanization and inadequate societal infrastructure, including housing, water, sanitation, and healthcare, are the leading reasons for the emergence of slums in many cities in developing countries (Cohen 2006). While ensuring clean water and sanitation for all is one of the primary SDGs (Sustainable Development Goals), it is a difficult task for those rapidly growing urban informal neighborhoods. By 2030, SDG 6.2 aimed to eliminate open defecation and provide everyone with access to adequate and equitable sanitation and hygiene, focusing on the needs of women, girls, and those in vulnerable circumstances. The SDGs state that 2.6 billion people lack access to proper sanitation; however, this condition changes daily. Because of the fast urban population expansion, the number of individuals living in cities without access to proper sanitation is growing (Organization 2019). To overcome the shortage of sanitation services in these informal settlements, the population turns to practices ranging from open defecation to toilet sharing (Mazeau and Reed 2010).

In Bangladesh, around 52% of people are estimated to be slum dwellers (Population and Housing Census, 2022). They live below the poverty line and lack access to sanitary facilities. Though shared toilets are constructed in slum areas by some non-government organizations to increase sanitation coverage, these solutions do not run successfully due to the lack of maintenance, no universally accessible toilets, long distance from households, privacy, cleanliness, and inequitable physical access for all (Järvelä and Rinne-Koistinen 2005).

The location of those toilet blocks is not maintained properly from the house blocks, so women and children suffer from physical accessibility problems. Most of the time, universal accessibility is ignored, and that reduces the usage of shared toilets for vulnerable groups, senior citizens, and people with disabilities. Most of the time, the sanitation facility from NGOs needs to be better maintained due to a lack of funding management from the community. Therefore, to meet the SDGs and provide a safe sanitation system for everyone, the user pattern and experience of shared toilets must be considered. Additionally, management concerns like lack of funding, electrical facilities, and cleaning profoundly affect the utilization of shared toilets because a significant percentage of slum inhabitants do not regularly use toilets for their needs, contributing to their open defection (Okurut and Charles 2014). For this reason, shared toilet facilities sometimes work as planned and sometimes fail to meet the acceptability of shared toilets. Based on structural quality and management systems, the user experience may differ for women and children.

The primary goal of this research is to evaluate the user experience of existing conditions of shared sanitation facilities and develop some working guidelines for shared toilets that will secure equal access for slum residents.

2. LITERATURE REVIEW

As slums are densely populated, and there aren't enough hygienic toilets in the neighborhood, slum sanitation presents a complex problem for urban areas (Organization 2019). Shared household sanitation services in low-income areas are frequently supplied on-site by landowners, NGOs, and government institutions (Tidwell, Chipungu et al. 2021). The Sustainable Development Goals focus on sanitization facilities, which impact nutrition, education, and child mortality (Hawkins, Blackett et al. 2013).

Shared sanitation use among individuals in developing countries has considerably expanded in recent years, especially among urban residents (Organization 2019). It is treated as a single category by JMP and is not regarded as improved sanitation (Alam and Mondal 2019). According to the JMP (Organization 2019), "improved" sanitation is a technical term for a sanitation system that is described as "Facilities that ensure hygienic separation of human excreta from human touch. The criteria are (1) Flush/pour flush to (i) piped sewer system, (ii) septic tank and (iii) pit latrine, (2) Ventilated improved pit (VIP) latrine, (3) Pit latrine with slab, (4) Composting toilet and (5) Container-based system. The idea of "improved" is frequently debated concerning sanitation monitoring. The disparity between the

"improved" sanitation data used by JMP and the "adequate" sanitation data used, for instance, by (UN-Habitat 2004), is highlighted by many research (Okurut and Charles 2014). According to the (UN-Habitat 2004) definition of "adequate" sanitation, it should be accessible to all household members, reasonably priced, and free from human excreta and other effluents both inside the home and in the surrounding area. Based on the toilet position of the household, the criteria are set by (1) Toilet within the housing unit with flush or pour-flush, (2) toilet outside the housing unit for exclusive use: (i) with flush or pour-flush, (ii) ventilated improved pit latrine, (iii) pit latrine without ventilation with covering, (iv) holes or dug pits with temporary coverings or without shelter.

The JMP recognizes the value of these toilets compared to having no facilities. Still, it deems the safety and health hazards and the uncleanliness of shared toilets too significant to be considered "acceptable." The threats of overuse, poor management, and inadequate maintenance of shared toilets lead to unhygienic facilities. They pose a health hazard and a risk to the safety of residents, as noted in the JMP reports (Schouten and Mathenge 2010). Shared sanitation includes a variety of technology and management or user models, from toilets shared by a few nearby houses to public toilets occasionally used by thousands of people

However, considerations such as distance, cleanliness, cost, and operation hours impact the utilization of shared bathroom facilities. Furthermore, disadvantaged populations, such as women, older people, and persons with disabilities, face increased challenges due to a lack of access or access to low-quality sanitation facilities (Evans, Hueso et al. 2017)

Table 1: The indicators for assessing shared toilets

Dimension	**Indicators**	**Scholars**
Infrastructure	• Type of toilet (number of household using the toilet)	*(Tumwebaze, Orach et al. 2013),* (Meili, Schelbert et al. 2022), (Alam, Schelbert et al. 2021), (Tidwell, Chipungu et al. 2021), (Schouten and Mathenge 2010)
	• Size	(Schelbert, Meili et al. 2020), (Schouten and Mathenge 2010), (Meili, Schelbert et al. 2022)
	• Ventilation	(Meili, Schelbert et al. 2022), (Schelbert, Meili et al. 2020), (Schouten and Mathenge 2010)
	• Building materials	(Alam, Schelbert et al. 2021), (Schelbert, Meili et al. 2020), (Schouten and Mathenge 2010),
Toilet technology	• Flush to sewer/septic/pit • Flush to elsewhere • Pit latrine (with slab) • Pit latrine (no slab)/ other	(Meili, Schelbert et al. 2022), (Alam, Schelbert et al. 2021), (Schelbert, Meili et al. 2020), (Schouten and Mathenge 2010)
Location	• Inside Compound • Outside Compound • Elsewhere	(Meili, Schelbert et al. 2022), (Alam, Schelbert et al. 2021), (Tidwell, Chipungu et al. 2021), (Schelbert, Meili et al. 2020)
Hygiene	• Hand wash with soap and water • Menstrual hygiene • Waste bin	(Schelbert, Meili et al. 2020), (Schouten and Mathenge 2010), (Alam and Mondal 2019)

Privacy and Security	• Lighting • Lockable door	(Meili, Schelbert et al. 2022), (Schelbert, Meili et al. 2020), (Chaudhuri 2017), (Alam and Mondal 2019)

These facilities can be divided into many categories based on location, size, ownership, management, payment structures, and physical and social access requirements. This study emphasizes shared household sanitation. User experience differs significantly among these numerous types of shared sanitation (Meili, Schelbert et al. 2022).

3. METHODOLOGY

3.1 Selection Of Study Area

To achieve the research goal, two case study areas are selected depending on the availability of shared toilet in slums. Rupsha slum and Greenland Abason are the two selected case study areas to conduct the research. The main objective of selecting these slums is that they have a wide range of shared toilets with variations in age and usable household numbers. While in Rupsha slum, the user number and the age vary. In Greenland Abason, there exists toilet facility variance.

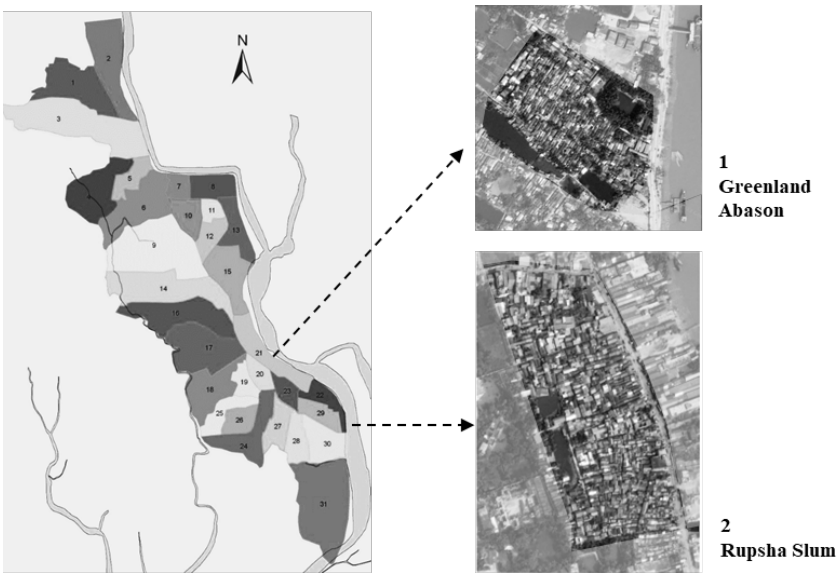

Figure 1. Location map of the case study areas.

3.2 Data Collection And Analysis Process

The study used quantitative and qualitative approaches and multiple case study approaches to provide a thorough exploration. The research used a mixed methods approach, typically starting with a quantitative phase, some preliminary data analysis, and then a qualitative phase in the same research field. The goal of the qualitative phase is to provide more context for the quantitative phase's findings.

20 shared toilets were surveyed with the usage period of long term (past 15 years) and short term (past 5 years) to allow demonstrated facts scientifically and to understand the existing facts by Quantitative methods. The qualitative stage's interviews aimed to comprehend shared sanitation users' management procedures. Qualitative methods are regularly used to assess residents' behavior. Some tools, such as participant observation, often investigate behavior and social relations. To assess the physical

condition of the shared toilets, it is important to evaluate the context and the perspectives of the stakeholders, the selection of the case study area, and the usage duration necessary for this research.

So, both approaches were utilized to relate the conditions of shared toilets in the slums, including the observational method, two focus group discussions, key person interviews, and a field survey with semi-structured questions to households using 20 shared toilets about the condition of provided shared sanitation facility. Since several toilets (cases) were going to be studied, the study met the criteria for a multiple-case study design. The study context was restricted to latrines used by at least eight households.

4. RESULT AND DISCUSSIONS

An average of 18 households used shared facilities, the majority of which were unclean, and the quality of the facilities declined as the number of sharing households increased because it was simpler to set the boundaries of shared facilities when fewer users were working together to improve their shared sanitation facility, other elements that affected how users behaved in maintaining the cleanliness and functionality of shared facilities included well-defined management systems, cooperation, group decision-making, and social norms. Responsibility for these toilets was given solely to the residents after construction. By the observational survey from these slums mainly 3 types of shared toilets are found.

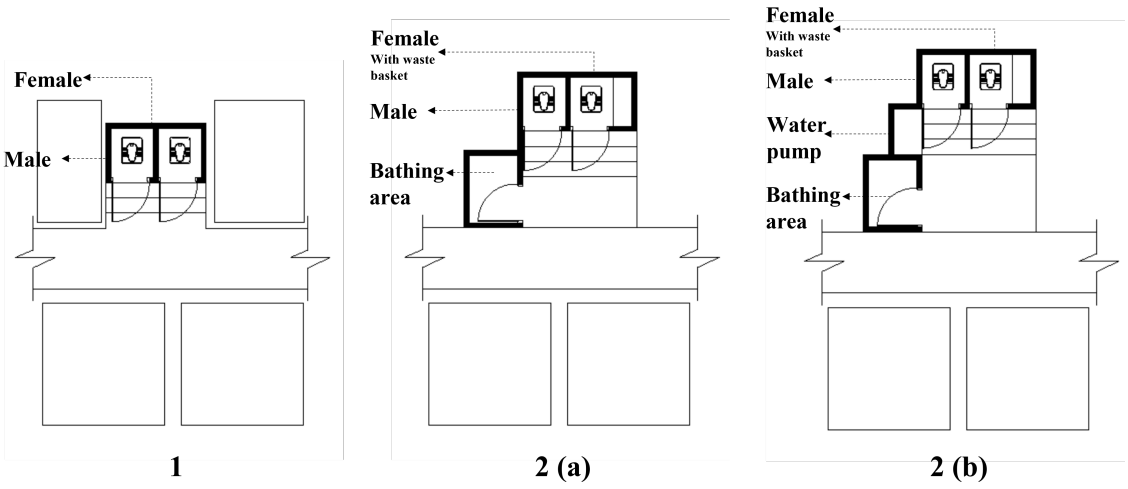

Figure 2. Overall Type of shared toilets.

The basic setting of the toilet includes 2 units of toilets separating male (3'6''x 4') and female (3'6''x 4'). Sometimes extra units adds where the female toilet with waste basket zone (4'6''x 4') and a bathing space (4'x 5') with or with out pump zone if the toilet serves too many households.

4.1 Two unit Type toilets

The two unit-type toilets installed in the slum areas are in bad shape as these were in use for a long period of time, approximately 15-20 years. Most of this type of toilet is found in the Rupsha slum, and these poor facilities make them vulnerable. In the rainy season these are unable to be used because the area becomes waterlogged even with the slightest amount of rainfall. Lack of fresh water availability, poor ventilation, and broken features are some of its drawbacks. There is no initiative from the community or, the NGO, or local government authorities to fix the issues.

Figure 3: Two unit toilet, Rupsha slum

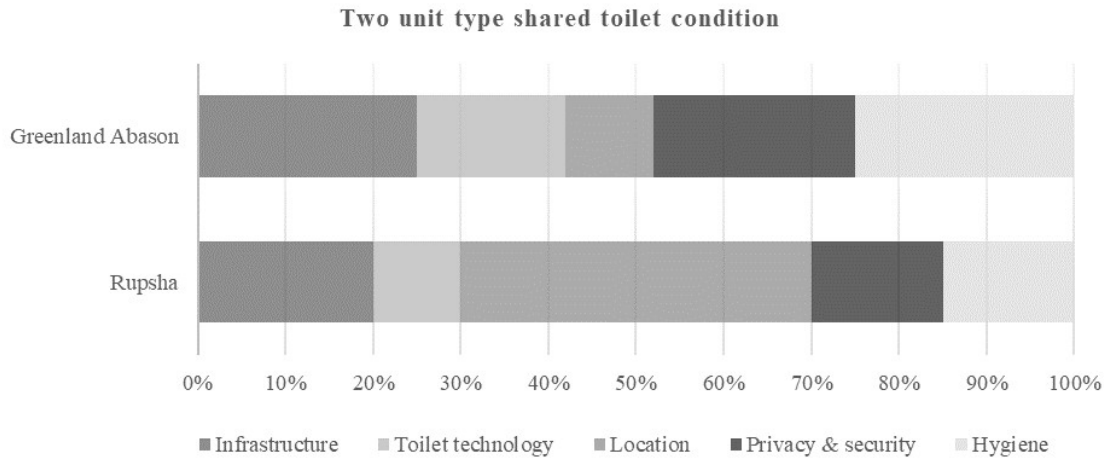

Figure 4: Comparison of existing condition of two unit type toilet.

From figure 3, it is quite clear that for a two-unit type shared toilet, the residents of the Greenland slum feel the necessity of infrastructural and toilet technology features as they have been used for a long time without any repair of the toilet features. Additionally, toilet distance is also a striking aspect regarding their sanitation facilities. Whereas for Rupsha slum dwellers, private security and hygiene are the most prominent aspects, followed by infrastructure and toilet technology.

4.2 Two unit Type toilets with bathing facility

The two unit type with bathing facilities toilets installed in the slum areas are better in condition than the ones in Rupsha. These were installed approximately around 3-10 years with additional facilities considering women's hygiene and privacy. The facilities add extra feature like making the female unit areas bigger than the male ones for menstrual hygiene. Fresh water availability is exists but some features like lights and handles are somewhere broken for lack of maintenance.

Figure 5: Two unit toilets with bathing, Greenland Abashon slum

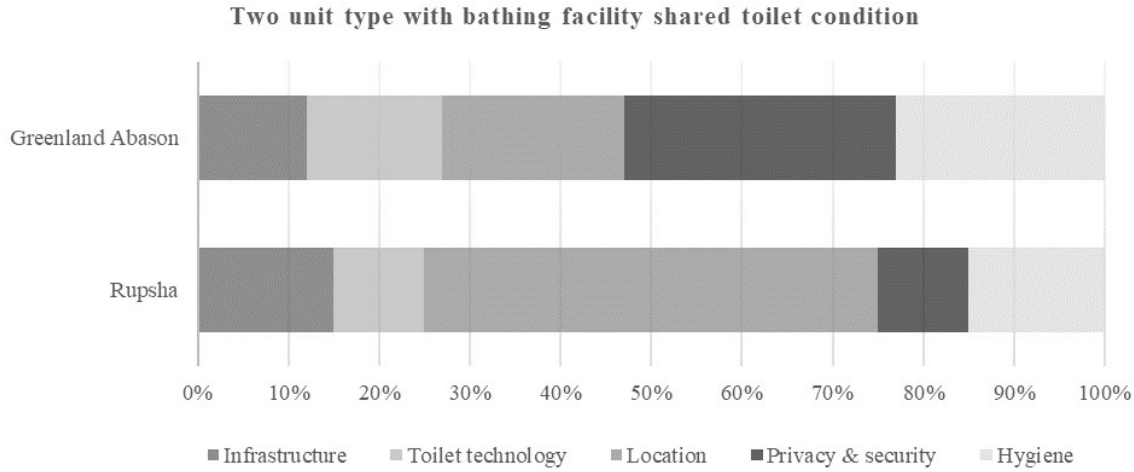

Figure 6: Comparison of existing condition of two unit type toilet with the bathing facility.

As can be seen from Figure 5, the toilet facility scenario of the Greenland Abason is distinctive from the Rupsha slum. The shared toilet condition is much more equipped with toilet features, and they are often repaired, which the community leaders keep track of. But, this is only applicable to some areas since some zones remain excluded from this approaches. People living in this slum consider the location distance of the shared sanitation facilities as essential. On the other hand, for this type of shared sanitation, the scenario of toilet facility condition is similar to two-unit type toilets.

The maintenance of shared toilets is mainly managed by the community members who use the toilets. Generally, a single shared toilet serves 15-20 households in the same neighborhood. The cleaning responsibility is done by every household by each day with different household members. A community leader is assigned to keep track of the condition of the existing facilities. The leader manages a community fund to fix the installations when in need of fixation. When the community leader lacks responsibility, the maintenance of the toilets becomes difficult. Sometimes, the residents are unwilling to give their share of the money in case of repair or the fixtures get stolen frequently. Despite issues related to maintenance, the overall livability of women improved after toilet construction. Indicators for menstrual hygiene management, privacy, security, comfort, cleanliness, and practical reasons were included. Odors continued to be an issue due to the lack of residents willing to clean or the overuse of toilets.

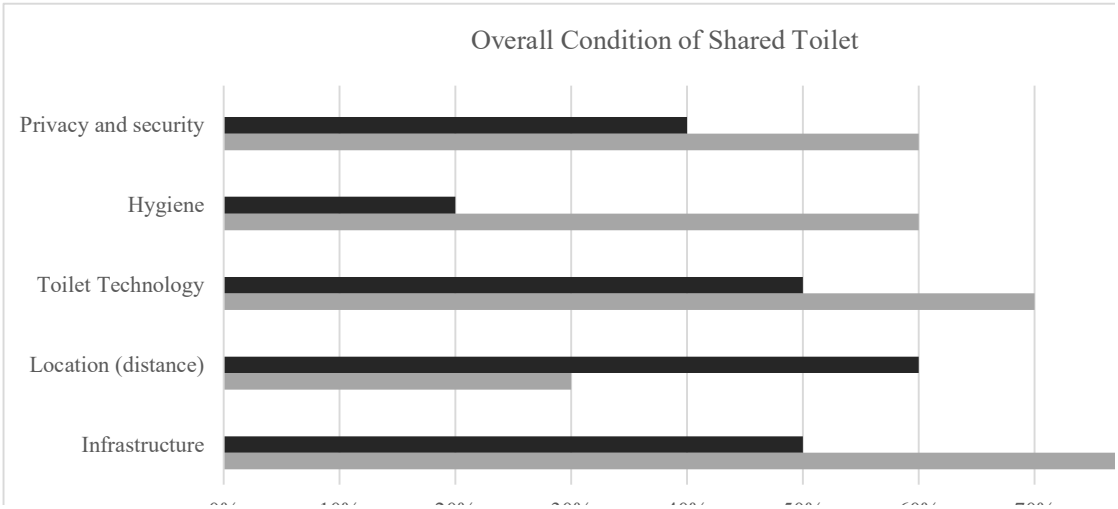

Figure 6: Comparison of the existing condition of two unit type toilet with bathing facility

Appropriate sanitation in informal settlements is a necessity as shown by feedback from the residents of slum and the literature. A more sustainable toilet project, however, would have needed a sufficient budget, high-quality materials, accountability, support from all residents, and positive relationships between the leaders and all stakeholders in the settlement. Furthermore, in order to guarantee appropriate maintenance and follow-up, accommodations for less independent and fragile residents should have been established.

5. CONCLUSIONS

Access to safe water and sanitary facilities is crucial to reduce health disparities. Effective interventions include formative research, identifying natural leaders, creating sanitation committees, developing outcome indicators and baseline questionnaires, appropriate messages and toilet design and placement, long-term follow-up, and political support. Monitoring and evaluation should take potential attrition and reporting bias into account.

Understanding the dynamics of shared sanitation facilities in informal settlements requires a critical lens formed by community principles. Group interactions should be considered in development and policy initiatives when evaluating the effectiveness of shared sanitary facilities.

This study has shown that behavioral factors, as well as physical factors, have an impact on the quality of shared toilets. Physical aspects consist of construction materials, while Behavioral components also consider user behavior and habits. Shared sanitary facilities should be situated such that unauthorized users cannot access them, and authorized users should have a management system that they agree upon collectively.

The most suitable location for a shared toilet is one that can readily house a large number of people and is connected to the drainage system. Maintaining a minimum distance of 25 meters between the household and the shared toilets is imperative while constructing them in an informal settlement. Given that use is significantly impacted by distance. Moreover, The shortage of toilet blocks in households is the cause of unhygienic conditions and decreased frequency of use. The most number of toilet blocks should be used to guarantee maximum utilization. Getting feedback from the community before determining how many toilet cubicles to include while building a toilet facility block can be helpful. The provider must attempt to maintain a ratio between 5 and 8 households per cubicle, even when the slum area is degraded. The ratio must be fixed depending on demand. Then, It is essential to ensure a sense of security by having lighting inside and outside of shared sanitation because most of

them lack adequate lighting. There are security concerns if the restroom buildings are next to a road, at the end of the slum, or close to a damp yard. Installing shared toilets close to the slum's center or in an area encircled by households assures the users a sense of security, especially for female users. The use of shared toilets also depends on Equitable access. At this point, to ensure that female users have regular access to shared toilets, separate male and female toilet blocks are necessary. Women need to replace their sanitary pads regularly and get rid of them during their menstrual cycle, but this might be challenging for them to do in the present scenario. Sanitary napkin disposal facilities must thus be designed into toilet stalls for women, and there must be enough room for them. Children's scale and a block should also be taken into account.

As a result, policy implications and suggestions for more research policymakers and other interested parties, including public health authorities, should ensure that efforts are focused on improving access and ensuring that shared facilities are in a usable, hygienic state. Participants in these activities should include local authorities, landlords, and renters. This study demonstrates that communal sanitation facilities may be kept hygienically clean if users work together. Therefore, while developing policies, consideration should be given to the behavior and practices of the users as well as the total number of users using a service. This means that household-shared sanitation in the Rupsha and Greenland informal settlements could be considered improved sanitation if it is administered appropriately. Along with providing sanitation, development initiatives should focus on the safe and sanitary use of communal toilets and the correct disposal of human waste. The authorities should also consider the reconstruction of damaged toilet features to sustain the toilets.

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