


## Research Paper

## Stakeholder acceptance of shared toilets to improve sanitation access in low-income urban settings: a case study of Gulu city, Uganda

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### ABSTRACT

With growing worldwide urbanisation, ensuring adequate sanitation for all urban citizens is gaining importance. Access to sufficient and appropriate sanitation presents particular challenges for low-income areas of high population density. In Gulu city, Uganda, 87% of the population relies on shared sanitation facilities. This paper investigates under what circumstances shared toilets can offer access to improved sanitation facilities. It explores stakeholders' perceptions of shared toilets – users, political leaders, and key decision-makers of Gulu. Findings are analysed from an existing dataset of over 10,000 households, alongside qualitative data from household interviews, key informant interviews with health inspectors, health workers, political leaders, and focus group discussions. Results reveal that shared toilets have the potential to improve access to enhanced sanitation technology in areas where people lack the space and financial means to construct individual household toilets. For shared toilets to be acceptable, they would be of a higher sanitation technology, located on private land, with the familiarity of users, and agreed cleaning and maintenance regimes. The paper, therefore, proposes improving both the technology and arrangements for the use of shared facilities, to a level that satisfies users and improves access to safe sanitation in low-income urban areas.

**Key words:** emptyable toilet, faecal sludge management, sanitation technology, urban development, user acceptance

### HIGHLIGHTS

- The technology of shared toilets can influence cleanliness and hence increase user acceptance.
- Users are more willing to share toilets with those they know, such as neighbours or extended family members.
- With the right technology, location, access, and maintenance arrangements, shared toilets can improve access to safer forms of sanitation in high-density urban areas.

### INTRODUCTION

The United Nations has estimated that by 2050 almost 70% of the world's population will be living in urban areas, with almost 90% of urban growth occurring in Asia and Africa (UN 2019). Demand for urban sanitation facilities already exceeds provision. Limited access to space, basic infrastructure, and financial means causes additional barriers in the poorest areas (Ghosh *et al.* 2011). Available space in poor urban settlements is often prioritised for housing, limiting, or preventing available land to construct a sanitation facility (Medland *et al.* 2015). Furthermore, for urban poor households, the priority to invest in a private household toilet is often not as high as for other competing priorities, including medical expenses or school fees (Peletz *et al.* 2021).

#### Filling a sanitation service gap

Shared toilets are often the only realistic affordable sanitation solution for many poor urban households (Mazeau *et al.* 2014; Evans *et al.* 2017; Schelbert *et al.* 2020). They enable those living in high-density low-income settlements to address the gap between open defaecation and unachievable individual toilets and, with due consideration, can be well-accepted among users (Rheinländer *et al.* 2015; Evans *et al.* 2017; Schelbert *et al.* 2020; Tidwell *et al.* 2021). The WHO/UNICEF Joint Monitoring

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Programme for Water Supply, Sanitation and Hygiene (JMP) categorises shared sanitation facilities (shared with two or more households) as a limited sanitation service level. This is on the basis that their poorer hygiene conditions cannot prevent human contact with human excreta. As such, they are precluded from being categorised as either basic or safely managed sanitation services (WHO & UNICEF nd). Despite this, shared sanitation facilities with a greater number of users per facility, are likely to occur in urban settlements (Exley *et al.* 2015), illustrating the importance of understanding the role that urban shared sanitation facilities can play to improve sanitation access.

### Toilet cleanliness and extent of sharing

Concern over cleanliness is a common argument against any kind of shared facility (Biran *et al.* 2011; Simiyu *et al.* 2017). The more users, the more likely a toilet may be considered as being less clean (Tumwebaze *et al.* 2012; Tidwell *et al.* 2019; Schelbert *et al.* 2020). A study of 1,500 toilets (typically ‘covered’ simple pit latrines or VIP latrines) in urban slums of Kampala found that restricting toilet sharing to not more than four households resulted in hygiene standards where the toilet could be considered as ‘acceptable’ or improved (Günther *et al.* 2012). A study of over 340 toilets in urban and rural Tanzania found *Escherichia coli* concentrations at points of hand contact were significantly reduced as the toilet technology improved. Concentrations were related more to the toilet technology<sup>1</sup> (presence or absence of a cover slab) than to the extent of sharing. A median of 5.5 households shared a toilet (Exley *et al.* 2015). The study concluded that in relation to the classification of improved technologies ‘*there is no evidence to support the exclusion of shared sanitation even if the threshold was to be raised to more than five households*’ (Exley *et al.* 2015; 1092). The likelihood that shared toilets will be kept clean has been found to benefit from clearly communicated roles between users and agreed cleaning arrangements (Tumwebaze 2014; Schelbert *et al.* 2020).

### Toilet technology and acceptance

The technology of shared toilets matters to users and can determine their acceptance (Schelbert *et al.* 2020). Lined emptiable pits are also an important aspect of enhancing toilet longevity (Tidwell *et al.* 2019). Avoiding the need to repeatedly excavate a new pit when an old one is full is particularly attractive to those residing on small plots in urban settings. The design of the toilet slab is also important, particularly as the JMP classification distinguishes between pit latrines. They can be considered improved rather than unimproved with consideration of whether the slabs ‘*completely cover the pit, with a small drop hole, and are constructed from materials that are durable and easy to clean*’ (WHO & UNICEF 2018). The definition also recognises that slabs with a smooth finish of mortar, clay, or mud – that are therefore easier to clean – can also be counted as improved. A toilet of higher construction standards has also been found as more likely to be clean (Exley *et al.* 2015). The future potential of shared toilets becomes increasingly relevant for low-income urban areas, particularly where the desire for individual sanitation facilities is constrained by aspects relating to people’s immediate living environment (financial capacity, land rights, tenure status, or space) and their interface with service delivery options and other elements of an enabling environment (Medland *et al.* 2015; Scott & Cotton 2020).

This paper presents findings from research addressing the challenge and opportunity of shared sanitation in Gulu city, northern Uganda. Granted city status in 2020, Gulu has an annual growth rate of 2% (Ugandan Bureau of Statistics 2014). Uganda is also ranked fifth of the 10 fastest urbanising countries for the period 2018–2050 (UN 2019)<sup>2</sup>. Such figures highlight the significance of addressing the potential for shared toilet facilities in Gulu, to meet the demands of its’ rapidly growing urban population.

## METHODS

The research assessed the feasibility and acceptance of shared toilets in Gulu, from the perspective of users, political leaders, and key decision-makers. Using a mixed-methods approach, it identified the extent of sanitation infrastructure, alongside societal attitudes to shared toilets. An existing dataset from a survey of 10,610 households, (approximately 35% of all households in Gulu at the time (UBOS 2014)) was made available by Gulu City Council (Gulu City Council nd). The household survey, conducted in 2019 by the Public Health Department, took place in 3–4 parishes in each of Gulu’s four municipal

<sup>1</sup> Considered technologies included: flush/pour-flush toilet (highest technology), ventilated improved pit latrine, composting toilet, pit with slab, pit latrine without slab (lowest technology).

<sup>2</sup> In Uganda, 44% of the projected 106 million inhabitants in 2050 are expected to live in urban settlements.

divisions. The original data were collected by Public/Governmental Health Workers using digitalised questionnaires in low- and middle-income areas of higher-density parishes, with all available households interviewed in each parish. Where possible, the head of the household was interviewed. Survey questions addressed categories of the household profile, water access, sanitation, hygiene, and solid waste management. From these, approximately 20 questions relating to sanitation and hygiene were analysed, providing a detailed status of sanitation infrastructure in Gulu in 2019 (see Supplementary Information). Data cleaning ensured that the data used in this study were correct, consistent, and usable. The cleaned dataset was analysed using Excel.

A document review of sanitation legislation and policy documents cross-checked data against details within the legal framework, which contains no evidence that shared toilets are unacceptable or should not be promoted. The Public Health Act emphasises that every citizen is obliged to have access to a toilet at home (Government of Uganda 1935) but does not clearly indicate if it has to be an individual toilet or if a shared toilet is accepted.

Qualitative data were collected through a combination of focus group discussions (FGDs) and semi-structured interviews. Four FGDs were conducted with local leaders, village health workers, and division health inspectors/assistants<sup>3</sup>. FGDs considered shared toilets from the perspective of their contribution to the sanitation offered within the city. Specific issues and views captured during FGDs could be raised during follow-up semi-structured interviews. Interviews were held with users of shared toilets, principal and division health inspectors, local councillors, village health workers,<sup>4</sup> and political leaders including the deputy mayor. Additional observations carried out at eight existing shared toilets (two in each of the city's four divisions) identified the nature of ownership and sharing arrangements. Facilities were randomly selected in each division, based on their being open and accessible to the researcher.

Ethical approval to conduct the research was granted by Loughborough University, UK (ref. JF\_8820) with required procedures including data security, informed participation, and rights to anonymity.

## RESULTS AND DISCUSSION

Analysis of the 2019 City Council dataset identified that, out of households who have a toilet ( $n = 10,191$ ), 87% ( $n = 8,859$ ) report that they share their toilet with other households. The remaining 13% ( $n = 1,332$ ) stated that their toilet is not shared. For households who have a toilet, they are asked if it is shared with other households. If shared, they are then asked the total number of latrine stances the household uses and the number of families sharing. From this, it cannot be categorically known who (individual or family) uses which stance in a shared toilet block. However, in the Gulu context, a household using a unique stance would answer that they are not sharing a toilet, as they have a key to access a unique stance within a toilet block with a common roof. As such, they are not included in the further analysis of shared toilets.

### Shared toilet technologies

From the 8,859 households reporting they share a toilet, the dataset provides technical details of these shared toilets, including the use or not of water, the design of the pit, and the design of the cover slab. Within the Gulu dataset, slabs are defined as being either washable (such as a concrete or tile finish) or non-washable (such as wooden slats). Results are presented in Figure 1. The most common construction for shared toilets is an unlined pit latrine, with or without a washable slab. As unlined pits cannot be easily emptied, over 75% of households sharing a toilet in Gulu are therefore reliant on non-durable sanitation solutions.

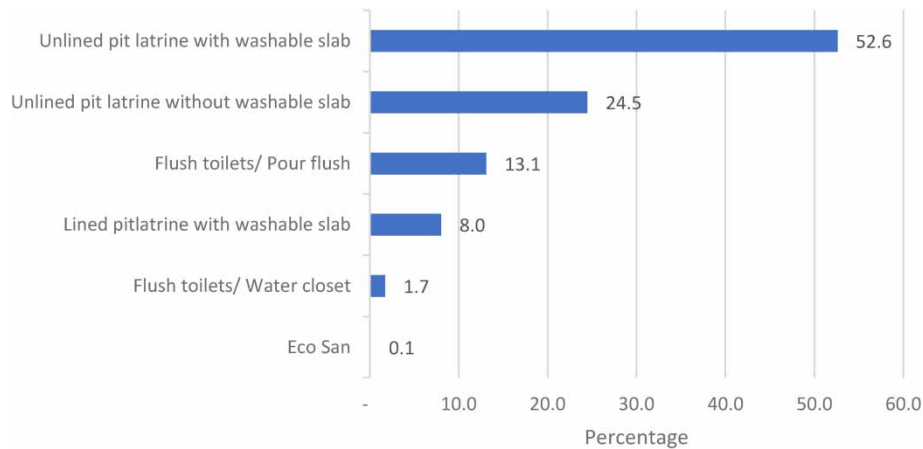
### Cleanliness of shared toilets

Studies have shown that there is a correlation between the status of cleanliness and whether toilets are shared with other households or not (Mara 2016; Simiyu *et al.* 2017). Within the dataset of Gulu, the status of cleanliness was defined according to three categories:

- *Clean* (no strong smell or significant number of flies/mosquitos, no visible faeces on the floor, walls, or seat/pan).
- *Somewhat clean* (some smell and/or some sign of faecal matter in the toilet).
- *Not clean* (strong smell and/or presence of faecal matter in the toilet).

<sup>3</sup> Division Health Inspector: local government workers in the public health department responsible for public health related issues allocated to one specific area in town, supervised by the Principal Health Inspector.

<sup>4</sup> Village Health Workers: volunteers trained by local government to improve and supervise the public health situation in local communities.



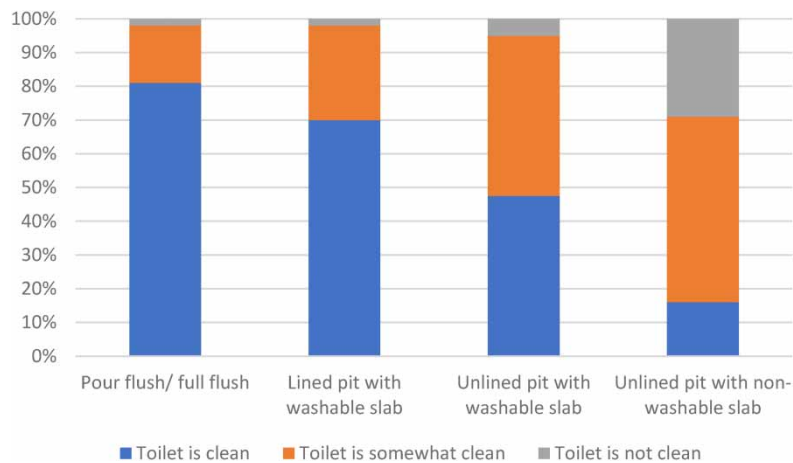
**Figure 1** | Shared sanitation toilet technologies in Gulu ( $n = 8,859$ ).

Based on the indicators, such as ‘no strong smell or flies’, ‘some smell’, or ‘faecal matter visible’, the survey teams placed the household toilet in these categories. This led to the result that of non-shared toilets, 67% were categorised as ‘clean’, compared to 47% for shared toilets. Of non-shared toilets, 25% were categorised as ‘somewhat clean’ compared to 43% for shared toilets. Within the ‘not clean’ category, however, there is little difference between the types, with 9% of non-shared toilets categorised as ‘not clean’ compared to 10% for shared toilets.

Further analysis of the dataset provides an additional correlation between the reported cleanliness and the technology of the shared toilets, as described in the following section. By focussing on results for shared toilets only ( $n = 8,859$ ), the findings support consideration of the extent to which shared toilets can contribute to the future sanitation offer in Gulu.

**Cleanliness and toilet construction**

For pour-flush or full-flush shared toilets that have a washable slab or pedestal, over 80% were categorised as ‘clean’, while only 2% were categorised as ‘not clean’. Of shared toilets with a lined pit and with a washable slab, 70% were categorised as ‘clean’ while only 2% were categorised as ‘not clean’. For toilets with an unlined pit and a washable slab (the most common type of shared toilet in Gulu), almost half (47%) were categorised as ‘clean’, with only 5% categorised as ‘not clean’. However, of shared toilets with an unlined pit and a non-washable slab, only 16% were categorised as ‘clean’ while almost a third (29%) were categorised as ‘not clean’ (Figure 2).



**Figure 2** | Shared toilet construction and reported state of cleanliness ( $n = 8,859$ ).

### JMP classification of sanitation facilities in Gulu

The data indicate that 66% of *all* sanitation facilities surveyed in the city are classified as ‘limited’ (i.e. improved facilities such as pour-/full-flush, composting toilets, lined pit latrines with a washable slab), on the basis that they are shared. Those categorised ‘safely managed’ (5%) and ‘basic’ (4%) include toilets with improved technologies that are non-shared. Those categorised ‘unimproved’ (25%) comprise the remaining non-shared or shared toilets of low technical quality, such as pit latrines without a slab (Figure 3(a)).

This outcome, however, changes significantly if the classifications do not account for a toilet being shared or non-shared, but rather whether the facility itself is considered as improved or unimproved. In this scenario, 50% of the shared toilets within the dataset could be classified as ‘basic’ (being an improved facility, shared or non-shared, *with a washable slab*) and 25% could potentially be classified as ‘safely managed’ (depending on the subsequent safe transport, treatment and/or disposal of excreta). Note that in this scenario, the category of an unimproved service is not affected, since this category is not dependent on whether a toilet is shared or not. The resulting classifications are shown in Figure 3. These results help illustrate how the city’s sanitation offer *could* look if toilets with a higher construction standard (i.e. lined and with a washable slab), that are currently classified as ‘limited’ due to being shared, are categorised as ‘basic’ on the basis that they are more likely to be clean (see Figure 2).

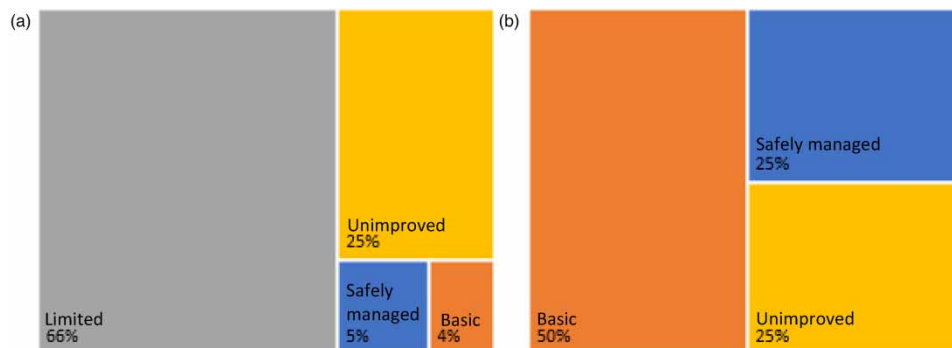
### Acceptance of shared toilets

Based on FGD responses, ‘restriction of users’ emerged as one of the most important aspects to ensure that shared toilets are accepted. One Health Inspector described this as: *‘It must be earmarked for a specific group of people, not for the entire public, so it can be easily followed up if maintenance is needed or other problems will [arise]’*. Interview respondents also clearly stated that people are more willing to share toilets with a restricted number of people, particularly with people they know. This included an emphasis on knowing the other users personally as a condition of accepting shared toilets. As one interviewee stated: *‘if I know the people, I can share’*. Another confirmed: *‘most of the people here I know, some are even extended family members we live peacefully, and we share also other things [boreholes]’*. These reinforce the view that limiting access to a shared sanitation facility to a defined group creates better acceptance. Observation of shared facilities in Gulu revealed that they are often shared with neighbours, extended family, and friends. In cases where the landlord/lady provides the toilet facility for tenants, however, users have no choice about whom they share with.

### Cleanliness and financial status

Interviews and FGDs referred to ‘cleanliness’ as also key to ensuring that shared toilets are accepted by users. In both the FGDs and interviews, respondents proposed that one cubicle should be allocated to one household, to increase a sense of ownership and ensure cleanliness. This means that while the toilet block is shared, the stances are designated for individual household use. A user of a shared toilet said: *‘If I have my own door [toilet stance] then it is as an individual toilet, only me and my family are using it and we would keep it very clean. If it is not clean, we know we are the ones making it dirty’*.

Additionally, respondents indicated that acceptance of shared toilets is dependent on the financial background of users. During interviews and FGDs shared toilets were found to be especially accepted where users have limited financial means to construct their own toilets. A Health Inspector described it as follows: *‘We have so many vulnerable people who*



**Figure 3** | Classification of all sanitation facilities in Gulu, based on (a) JMP classification and (b) technology over shared/non-shared status.

cannot afford to construct a good toilet. I think it [shared toilets] works especially for vulnerable people'. While acceptance of shared toilets was generally lower among the Health Inspectors and political leaders interviewed, they do see shared toilets as a mid-term solution, especially for households who cannot afford an individual toilet. As one Health Inspector put it: 'It must be more like a shared toilet among vulnerable neighbours, people who cannot afford an individual one [...]. We would wish individual ones but having nothing is worse than sharing.'

### Availability of land for shared toilets

Interview respondents identified that emptyable, shared toilets are seen as a particularly viable option in areas where land is not sufficient for individual toilets. A village health worker highlighted that: 'We have very little land[s] and then we have the local toilets [which] have to be moved when they are full, so space will never be enough'. Analysis of the Physical Development Plan of Gulu (Gulu Physical Development Department, nd) confirmed that most of the land in communities is privately owned. Observed shared toilets were located on private land, often belonging to an individual but shared with neighbours, extended family members, and others in an informal agreement with the owner.

FGDs proposed that shared toilets are best constructed over private land belonging to different owners. During FGDs and interviews, participants discussed how shared toilets could be dedicated to a number of households, who each act as a shareholder in the facility. The toilet block would be constructed in such a way that it sits on land owned by each shareholder household, providing each with direct access to their property. In this way, it ensures access for many households, while helping to reduce costs associated with operation and maintenance since it would be based on a cost-sharing module for repairs and emptying. Due to the cost-sharing approach between all benefitting households, participants identified that the toilet could also be constructed to a higher technology and good standard, including ensuring that it is emptyable.

## DISCUSSION

With 87% of Gulu's population relying on shared toilet facilities, their importance in the sanitation offer for the city's residents cannot be overlooked. For poorer households, constructing an improved individual household toilet is improbable. The Physical Development Plan of Gulu (Gulu Physical Development Department, nd) highlights only very limited public space allocation that could be used for the construction of public toilet facilities (such as community toilet blocks or pay-per-use toilets). Bachmayer & Shermbrucker (2014) similarly identified insufficient land in Uganda's cities for the provision of public sanitation facilities, impacting negatively on sanitation investments.

The results illustrate that a shared toilet, of a higher standard (i.e. waterborne system, or a lined pit with a washable slab), is more likely to be categorised as 'clean' than categorised as 'not clean'. A one-way ANOVA was carried out to compare the effect of toilet construction on cleanliness. This revealed that there was a significant difference in the reported state of cleanliness between at least two groups ( $F(5,7) = 3.48, p = 0.035$ ). Furthermore, the presence and nature of a washable slab or pedestal influences the likelihood of the toilet being clean and hence whether it could be considered an improved or unimproved facility. Shared toilets of a higher technology with an improved slab, pan, or pedestal that is easier to keep clean, in combination with arrangements for acceptable and agreed use, operation, and management of the facility, can offer households access to a toilet that is safer than a low-quality individual household toilet.

Findings from Gulu complement similar studies that show how shared toilets can provide an 'improved' sanitation technology, although under the current JMP definition they are not considered as a 'safely managed' or 'basic' sanitation service level. The JMP service-level classification does not consider a specified number of users allocated to an individual stance, the finish of the toilet slab, pan, or pedestal, the ease and degree of cleanliness, or the arrangements made between users for cleaning, operation, and maintenance. This study reinforces others that find such factors play an important role in increasing access to acceptable and clean sanitation facilities for poorer households (Tumwebaze *et al.* 2012; Hailu *et al.* 2022). This research also supports the view that, for cleaning regimes to be effective, users of shared toilets would ideally know the families they share the facilities with, have open communication among users, and agree on cleaning arrangements (Schelbert *et al.* 2020).

The interviews and FGDs have shown that acceptance of shared toilets is linked to their technology and the standard of construction. Those of a higher technology with good construction standards are associated with long-lasting sanitation solutions. Conversely, in Gulu, most facilities are unlined pit latrines (see Figure 1) which cannot be emptied but are covered with soil once full. Interviews and FDGs highlighted that a shared, emptyable toilet is accepted as a long-lasting sanitation solution. Additionally, shared toilets are more accepted if the number and range of users are restricted.

This study found that current shared sanitation facilities in Gulu of such higher technology (e.g. waterborne or with a washable slab) are more likely to be clean than household toilets of a lower technology (e.g. with non-washable slab). Gulu City Council is keen to improve sanitation services and phase-out unimproved sanitation facilities. This presents opportunities for shared toilets that are constructed to higher technology, to a good standard of construction, and emptyable, with an agreed arrangement for users' access, cleaning, and maintenance, to be increased.

The sustainability of such interventions would need to be evaluated. Applying the sanitation sustainability index (SSI) would, for example, allow the elements of acceptability, health and hygiene, costs, and resource efficiencies (water, energy, and waste recycling) to be assessed for the facility and associated infrastructure (Hashemi 2020). Together with assessments capturing broader management systems (Iribarnegaray *et al.* 2015), applying them to a range of technology and management options for shared toilets would help decision-makers and users identify those best suited to the community context. The results of such interventions and assessments would provide more users with acceptable facilities at the community level, offering the possibility of achieving facilities of a higher standard while phasing-out unimproved shared facilities. As such, findings would contribute evidence of how and under what conditions shared sanitation facilities of sound quality and management arrangements can help countries achieve SDG Target 6.2 in low-income urban settings.

## CONCLUSIONS

The research aimed to determine and identify the potential of shared toilets in Gulu city. Based on the findings, it can be concluded that shared toilet offers the potential to improve access to a higher sanitation technology in areas where people lack space and financial means to build individual toilets of good construction quality. The results have shown that shared toilets must fulfil certain aspects in order to be accepted by users. These include being of higher technology and emptyable, so offering a long-term solution. In addition, restriction and familiarity of users, clear arrangements for the use and cleaning of individual stances and being located on private land. This research goes further to recommend that where a shared toilet has a number of stances shared among neighbouring households, each toilet stance would be best assigned to an individual household.

This study provides new insights into the potential of shared toilets in urban areas for low-income countries. It recommends a greater focus on improving the construction quality, technical standard, management, and operational arrangements of shared facilities in densely populated urban areas, to a level that satisfies and provides safe sanitation. Additionally, while showing how shared toilets can offer a means to increase access to improved sanitation, it also highlights the importance of acceptance of shared facilities for users, as well as the international community. In order to better understand such implications, future studies are recommended that address willingness to invest in shared toilets from the user perspective.

## DATA AVAILABILITY STATEMENT

Data cannot be made publicly available; readers should contact the corresponding author for details.

## CONFLICT OF INTEREST

The authors declare there is no conflict.

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