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Review Paper

Socio-economic aspects of improved sanitation in slums: A review

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SUMMARY

This socio-economic review provides an overview of the sanitation crisis in slum areas, and re-emphasizes the importance of sanitation. It highlights a lack of recognition of actual drivers for sanitation improvements, and the complexities in the provision of sanitation services in the context of urban slums with a mix of tenants and landlords. It elaborates how the drivers of demand for sanitation outlined in contemporary research are not universal but are rather context specific. The authors point out specific knowledge gaps for future research; for example, the need to establish a scientific basis for context-specific drivers of demand for sanitation improvements in slums, and a better understanding of associated complexities in order to set boundary conditions for achieving desired improvements.

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Introduction

The growth of slums in the past decade has created major sanitation challenges. Despite the great need for sanitation improvements in slums, there has been limited progress. The factors limiting sanitation progress include low prioritization by stakeholders, inadequate funding, implementation of inappropriate (unsustainable) technologies, and difficulties of shared responsibilities. These recognized limitations are currently being addressed by implementing demand-driven approaches to sanitation improvements, with specific emphasis for private investments in sanitation. Additional factors affecting the

sanitation crisis in slum areas are: (1) a lack of recognition of actual drivers of demand for sanitation improvements; and (2) the unrecognized complexity of providing sanitation services in urban slums. This paper focuses on these latter two detractors from sanitation progress. In doing so, the authors emphasize the importance of non-health benefits of sanitation improvements, and the need to establish a scientific basis for them as potential drivers of demand. In addition, the authors highlight contextual complexities that have not been given sufficient attention, yet which compromise the achievement of desired sanitation improvements. The paper concludes by highlighting knowledge gaps that future researchers may need to address.

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Background

Slum growth

The growth of slums in the last 15 years has been unprecedented. In many of the developing world's cities, slums are emerging as a dominant and distinct type of settlement. In Sub-Saharan Africa, urbanization has become virtually synonymous with slum growth, with the world's highest annual slum and urban growth rates almost identical (4.53% and 4.58%, respectively).¹ In contrast to previous attitudes towards slums, which characterized them as illegal settlements to be eradicated, the 2009 edition of the World Development Report views slum growth as an inevitable 'growing pain' of economic development.² Recently, the United Nations developed a 'slum target' (Goal 7, Target 11) of the Millennium Development Goals (MDGs) to improve the lives of 100 million slum dwellers by 2020, in direct recognition of the fact that slums are a development issue that needs to be faced.

Typically (94% of the time), slums emerge in developing countries as unplanned informal settlements where access to services is minimal to non-existent and where overcrowding is the norm.¹ As well as overcrowding, slum settlements are characterized by extreme poverty, lack of land or property tenure, lack of services and infrastructure, and a predominantly informal economy. Some of the root causes of slum development include long-term failure of governments to implement structural plans to enforce development control and to provide effective municipal services.³ Slum conditions place residents at a higher risk of disease, mortality and misfortune.⁴

Sanitation conditions in slums

Due to the high population density and overcrowding in slums highlighted above, the potential for spread of diseases is usually much greater than in less crowded neighbourhoods. Unlike in rural settings where young children are allowed to defaecate in the yard or on land surrounding the household, in urban slums, the lack of improved sanitation leaves parents with limited options for disposal of children's faeces, which are, in turn, left in common alleyways or drainage ditches.^{5,6}

A number of researchers have documented that inadequate access to sanitation compels slum residents to use unhygienic pit latrines, polythene bags or discharging into nearby open storm drains, creating significant disease-related hazards and environmental pollution.^{7–10} Pollution loads from slum areas are closely associated with settlement density, number of people using each pit, and geological conditions,^{11–13} and have high potential to cause eutrophication of downstream water sources.^{13–15}

The lack of planning controls in 'unplanned' areas and the subsequent increasing housing density highlighted by Kampala City Council³ has two detrimental impacts on the development of sustainable excreta management. First, streets and passages become narrower, making access increasingly difficult for vacuum tankers to empty full pits. Second, the average compound size decreases as plots are continually divided to build more and more houses. As a result, the space available to build an initial or replacement latrine eventually diminishes

to such an extent that building the traditional style of latrine is impossible. Projects aimed at building latrines, particularly those with large standard designs, ignore these constraints and are unlikely to have much long-term impact. Previous research¹⁶ highlights a number of key questions that need to be addressed, such as: How will households empty their pit once it is full? What designs present good value for money and have the attributes desired by the residents? What can people afford or can credit in some form to make purchasing a latrine suit their cash flow constraints? How can tenants be best served or how can pressure be placed on landlords to provide facilities? How can the commercial viability of the provision of services and products be maximized? How can latrine designs be made more environmentally friendly?

These questions move the designer beyond simple product provision and on to sustainable service delivery which, like a sewage service, needs continuous management, institutionalized structures of responsibility and ongoing resources. The solutions lie in the development of product–service packages where the design of emptying services compliments the design of the latrine and vice versa. A clear distinction needs to be made regarding where private households' responsibility stops and public responsibilities start.

It is not uncommon that subsidies in sanitation usually end up benefiting those who are better off.¹⁷ Donation of resources to build public sanitation facilities typically generates pressure from landlords to site these facilities on their properties, in order to increase their property value, as evidenced in a number of African countries. As a result, these landlords assume responsibility for maintenance of the facility, but restrict access to a limited number of paying tenants. What was intended to serve as a public facility ultimately becomes a private enterprise.

The proportion of people using shared facilities is higher in Sub-Saharan Africa compared with the rest of the world. In 2006, the World Health Organization and the United Nations Children's Fund estimated it to be 18%. However, this figure is simply a regional average and does not reflect true slum scenarios. Due to the high level of overcrowding, there is usually not enough space for construction of household sanitation facilities that are not shared. Also, the occupancy rate in slum housing is usually such that a single housing block is partitioned and shared by several households, who also share the available sanitation facility. A good example here is Ghana, where up to 68% of urban households share sanitation facilities.¹⁸ Sharing sanitation facilities is three times more likely in urban areas than rural areas in the developing world. In Eastern Asia, 92% of the users of shared facilities are found in urban areas.¹⁹ As mentioned earlier, shared sanitation facilities, including public facilities (even when improved), are not considered 'improved' according to the definition used for the MDG indicator. In addition, serious concern has been expressed about the actual accessibility of such facilities throughout the day, and about the security of users, especially at night. Further research on the nature and acceptability of shared facilities by slum dwellers is needed.

Relationship between sanitation and health

The relationship between adequate sanitation and health is well documented.^{20–27} Slum dwellers have higher rates of child

malnourishment; prevalence of diarrhoea, malnutrition and hunger; prevalence of human immunodeficiency virus/acquired immunodeficiency syndrome; and, as a result, lower life expectancy.¹ The Global Burden of Disease Study undertaken by the World Bank indicates that 15% of all deaths in children under 5 years of age in low- and middle-income countries are directly attributable to diarrhoeal disease. Close to 90% of the diarrhoeal disease burden is caused by unsafe sanitation, water and hygiene.^{28,29} Buttenheim evaluated how improved sanitation affects a child's nutritional status by limiting exposure to diarrhoeal pathogens and thereby reducing the disease burden. It was found that children's toileting behaviour mattered more than adult's toileting behaviour in creating a safe, hygienic environment and reducing diarrhoeal diseases.³⁰ Acute diarrhoea causes life-threatening dehydration, while chronic diarrhoea can compromise growth and development by preventing absorption of nutrients and increasing susceptibility to future illness.³¹ The risk of diarrhoea is particularly high for children under 5 years of age.^{7,32} In a longitudinal study in north-east Brazil, an overall reduction in childhood diarrhoeal prevalence was registered after city-wide sewerage coverage was improved by 54%.³³

Lack of progress in sanitation improvements

The progress in sanitation has been one of the lowest of all the MDGs. Despite the critical importance of sanitation in achieving MDGs, in 2006, Sub-Saharan Africa still lagged behind the MDG progress target for that year by 19%.¹⁹ Between 1990 and 2006, the proportion of people without improved sanitation decreased by only 8 percentage points. Based on current progress, the MDG sanitation target will not be met by 2015, as shown in Fig. 1. The lack of progress in sanitation is attributed to a variety of causes, including low priority among stakeholders, inadequate funding, implementation of inappropriate (unsustainable) technologies, and difficulties of shared responsibilities.

Lack of prioritization for sanitation

In an assessment of the value of water supply and sanitation relative to oral rehydration therapies in developing countries, Okun³⁴ discussed the value of water but hardly addressed the value of sanitation. Sanitation is not normally considered as a priority in development projects. It appears that sanitation

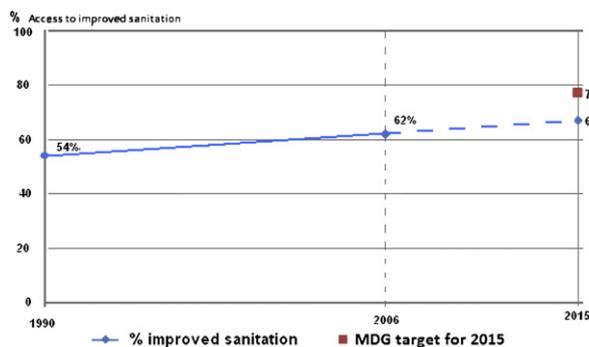


Fig. 1 – Projection of sanitation coverage 1990–2015.¹⁹ MDG, Millennium Development Goal.

should go hand-in-hand with water supply. However, in reality, water supply consumes the lion's share of resources; sanitation is under-resourced and its administration is divided between different ministries which claim to house specific components of it. In Uganda, for example, water supply and sewerage are administrated by a national government agency, whereas sanitation is administrated by line ministries, including the ministries of education (sanitation in schools), health (sanitation in homes), water and environment (sanitation around water sources).

Inadequacy of public funds

Partly as a result of segmented sanitation administration, funds are also segmented, yielding small budgets for improvements. Between 1990 and 2000, approximately 15.7 billion US\$ was invested annually in the global water supply and sanitation sector (see Fig. 2). Only one-fifth of the total investment has been directed to the sanitation subsector.³⁵ In Kenya, for example, investment in sanitation was only 2.6% of the total internal investment for water and sanitation allocated in the internal development budget for water and sanitation in 2003/2004.³⁵ In addition, public fund allocation for the water and sanitation sector has reduced consistently over the past 5 years. One example is the Ugandan case presented in Fig. 3. Similarly, as a strategy to cope with the current economic downturn, many developed countries are lowering their budgetary allocation for development aid to developing countries.³⁶

Lack of appropriate technical solutions

In a review of pro-poor sanitation technologies, Paterson *et al.*³⁷ argued that decentralized simplified small-bore sewerage, connecting small groups of homes and facilities, is, to date, the only technically feasible and economically appropriate sanitation option available for low-income, high-density urban areas. However, there are significant obstacles to adopting this concept in slum areas. In addition to the lack of public funds (described above) to support installation, the lack of in-house water supply yields a lack of flush required to drive these water-based systems. These shared connections invoke additional challenges in slum areas, where the transient nature of

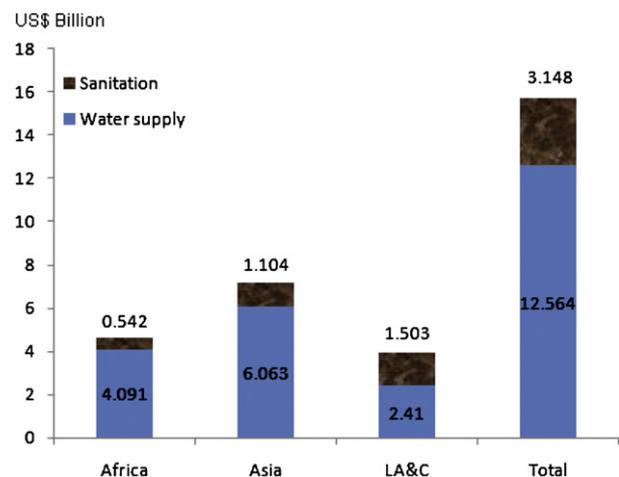


Fig. 2 – Total annual investment in water and sanitation subsector, 1990–2000.³⁵ LA&C, Latin America and Caribbean.

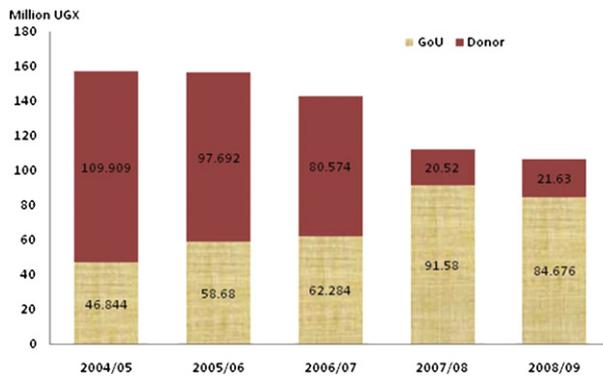


Fig. 3 – Budget allocation trends to the Ministry of Water and Environment.⁷⁴ Donor, non-governmental sources; GoU, funding from the Government of Uganda.

the population contributes to difficulties of shared responsibilities, as discussed below.

Difficulties of shared responsibilities

The majority of slum dwellers are recent migrants from rural areas, many of whom live without the social networks and kinship ties that can provide emotional, physical and financial support in times of crisis.¹ Social cohesion is limited among such groups, as is a sense of shared responsibility. In this environment, shared sanitation facilities become degraded due to lack of responsibility for proper operation and maintenance. Even simplified sewerage, as recommended by Paterson *et al.*³⁷ call for shared responsibility.³⁸ However, shared responsibilities are difficult to achieve among a transient population focused on survival.

Unrecognized likely drivers of demand for sanitation improvements

As suggested in the above overview, improved health has received the greatest emphasis as a motivator of sanitation improvements. While this may be true for public health officials, practitioners and scholars, it is probably not true for individuals surviving in slums. For these individuals, other concerns that contribute to their wellbeing are likely to motivate their choices regarding improvements in sanitation, as discussed below.

Quality of life is not just absence of disease

Wellbeing is not simply a matter of not being ill. Several recently established streams of research such as quality-of-life research and happiness economics, concern themselves with how better health determines the lives of people. Although a substantial body of evidence suggests that illness is strongly negatively associated with subjective wellbeing, and that better health outcomes are associated with higher levels of happiness,^{39–43} the long-standing World Health Organization's definition of 'health' as a state of complete physical, mental and social wellbeing, and not merely the

absence of disease or infirmity,⁴⁴ recognizes that wellbeing is determined by other factors in addition to the absence of illness. A person's sense of wellbeing is also dictated by one's expectations relative to his/her situation. What is perceived to be poverty in one context may not be in another. People who are high up the income ladder can identify themselves as poor, while many of those who are below the objective poverty line do not because of different expectations.⁴⁵ The wellbeing of those who have escaped poverty is often undermined by insecurity and the risk of falling back into poverty.⁴⁰ Studies indicate that non-income factors including child and infant mortality rates, life expectancy and democracy are significant for subjective wellbeing in poor countries.^{39,46–50} According to Graham,⁵¹ a destitute peasant can be very happy if their expectations are met. While this statement contradicts a standard finding in the literature that poor people are less happy than wealthier people globally,^{40,52,53} it is suggestive of the role that low expectations play in sustaining a sense of wellbeing in poverty, and thereby serves as a potential contributor to persistent poverty and compromised living conditions.

Non-health externalities from improved sanitation

The most obvious proof that sanitation improvements carry non-health externalities is given by the fact that sanitation is a key component of achieving all of the MDGs, as shown in Fig. 4. A number of non-health outcomes are associated with sanitation improvements. For example, improved sanitation in schools was demonstrated to enhance women's enrolment,^{53,54} which addresses MDGs 2 and 3. MDGs 4 and 5 were linked to sanitation in the previous sections. Linkages between sanitation and other non-health MDGs such as environmental sustainability, partnerships and increased productivity are also described in Fig. 4. Buttenheim³⁰ acknowledged that investments in sanitation improvements offer important positive externalities besides improving health. These attributes of improved sanitation seem perfect motivators in the public domain, and good reasons why government and society in general need to prioritize sanitation. However, since much of household sanitation is a private responsibility across the developing world, demand motivators for sanitation improvements in the private domain (especially among the urban poor) are still not well researched.

Non-health drivers of demand for sanitation improvements

The fact that individuals require more than simply an absence of disease to achieve a state of wellbeing, combined with the substantiation that sanitation improvements carry non-health benefits, suggests that prioritizing health benefits may be insufficient to motivate decisions for sanitation improvements. Okun³⁴ argued that there is much more benefit from access to improved sanitation that has not surfaced in scholarly investigations to date. Subjective non-health benefits of improving sanitation include increases in comfort, privacy, convenience, safety for women and children (especially at night), dignity and social status, modernity, cleanliness, property value and rental incomes; and reductions in odour and flies, embarrassment with visitors or in-laws, accidents and conflict with neighbours.^{16,55,56} Despite the likely relevance of these subjective benefits, increased health continues to be the focus of

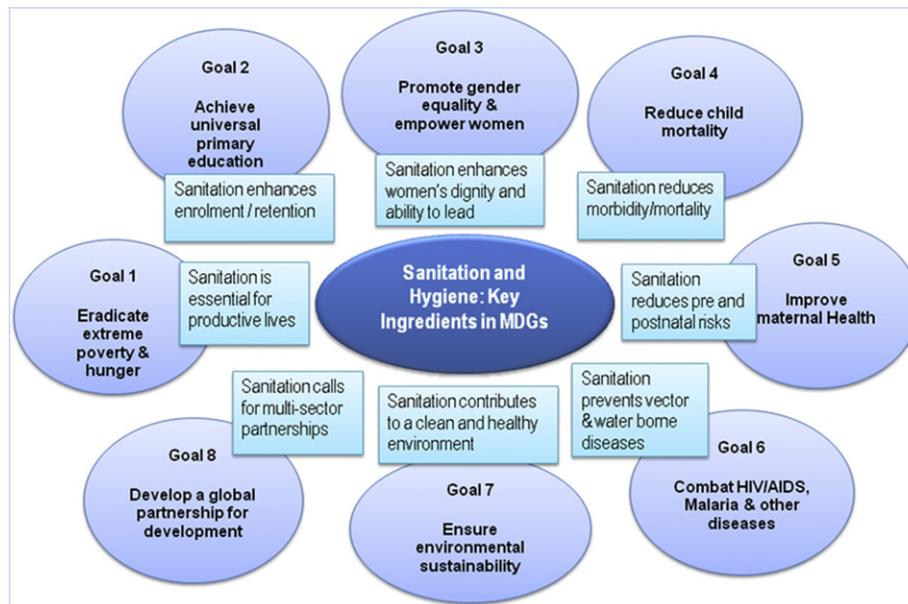


Fig. 4 – Sanitation: a key ingredient in the Millennium Development Goals (MDGs).⁷⁵

sanitation campaigns.^{7,57} However, in contrast, rural people perceive increased health as being the least important of their reasons for constructing a latrine.^{16,56} But, although both Cairncross and Jenkins probed why people want latrines (i.e. transitioning from open defaecation to constructing a latrine), their arguments were based on data from rural settings where households were free to construct facilities of their choice. In urban slums, however, given the interplay between tenants and landlords, variations in preference are bound to occur. In most of Africa's urban slums, there is frequently a distinction between landlords as sanitation providers and tenants as clients.⁵⁸ Often, expectations of landlords and tenants are quite different. For example, a poor tenant may prefer a low cost accommodation that suits his/her limited income, while the landlord may aim to get the best rental income from his/her tenants.⁵⁹

Complexity of providing sanitation services in slums

Historically, the sanitation crisis in slum areas has largely been perceived as either an issue of developing appropriate technologies or, in recent years, as an issue of creating demand for sanitation services. Once a sanitation coverage gap is established, efforts have to focus on raising resources to build appropriate facilities, coupled with sensitization, and the job is done. The authors argue, however, that this portrayal of sanitation services in slum areas is oversimplified and underestimates the inherent complexities of providing sustainable sanitation services. Scarce attention is given to reasons why the situation is the way it is. Issues that, in the authors' view, also impact on the availability of sanitation services, but which are largely ignored, include the prevailing land tenure systems and their impact on the social structure within a particular slum; the demand for sanitation, what drives it, who demands sanitation

services and how is this demand expressed?; the segmented nature of the sanitation sector and the implications of this segmentation on the processes of providing sanitation services; and the lack of clarity in definition of improved sanitation. These complexities affect the development of sustainable sanitation systems, yet they receive scarce scholarly attention. It is also important to appreciate the biophysical diversity of slum settings, and the fact that what is considered a sanitation solution in one context may not actually work in another. For example, whereas in one context slum households may own or, to some extent, have the mandate to put up their own sanitation facilities, in another context (especially where the majority are tenants) many slum households may have no mandate to put up their own sanitation facilities. It is in this latter context that the complexities highlighted above will be discussed.

Demand for sanitation in the urban tenant–landlord context

On-site sanitation financing is, to a large extent, considered 'an every household for itself' strategy, unlike conventional sewerage for which most governments finance the capital and, to some extent, subsidize operational and maintenance costs.⁶⁰ In addition, housing units in informal settlements are often owned by petty landlords whose capital investments are quite low.^{61–64} Jenkins and Sugden¹⁶ argued that demand for sanitation in slums is high but landlords do not meet their responsibilities. The hidden question here is 'Who demands and who provides?'. Given the fact that the majority of slum dwellers are tenants^{59,65–67} who mainly depend on sanitary facilities provided by their landlords, it is important to establish who actually demands and demands what. Although it is possible to view tenants as consumers/clients while landlords play the role of providers, the question is whether such a perspective adequately reflects the reality of sanitation services in slum areas. Firstly, demand seems to be influenced by the ability of

tenants to pay. In instances where the tenants' ability to pay for sanitation improvements is low, virtually no demand would exist for housing with improved sanitation facilities. In situations where tenants are willing and able to pay, sanitation improvements are subject to the agreement of their landlords. This means that the tenants' demand for improvements is expressed through their landlord, which makes it 'secondary demand'. This secondary demand, although widespread in urban slums, especially in East Africa,¹⁶ has not translated into significant sanitation improvements. Tenants have a limited mandate to set priorities of both what is done and how it is done. Secondly, market conditions for renting houses are also likely to influence demands expressed by tenants. In a tight housing market, tenants will be less likely to express their demands if this could reduce their chances of finding suitable housing. Thirdly, the transient nature of many tenants in slum areas may lead tenants not to voice demands for sanitation improvements and to be hesitant to pay for such improvements. Miah and Weber⁶¹ found that tenants have stronger ties with their rural origin where they are likely to eventually return, and thus remit a significant portion of their income, leaving a limited amount for consumption and investment in the city. They make trade-offs of needs such as better housing for the targets they aim to achieve while in the city. If these tenants stay for a limited time, and also view their stay as being of limited duration, the willingness to invest in sanitation improvements may also be limited.

Based on sanitation improvements in rural areas, it is often assumed that when people improve their sanitation practices from open defaecation to constructing a latrine, 'primary demand' for sanitation has to be created⁶⁸ (in households that have never before allocated money, time or effort to buying, building and maintaining home sanitation systems). Once the household can make the decision to construct a latrine in a rural setting, all other obstacles are, to a large extent, within the household's control. As explained in the previous paragraph, however, in the urban slum context, other issues have to be addressed before sanitation facilities can be improved. Issues such as social relationships within the slum area, the nature of the housing market and demographic characteristics of the slum area are all likely to influence the nature of demand for sanitation improvements. This means there is a need to address sanitation challenges in their particular social and demographic context, and not to rely on pre-ordained solutions.

Implications of multiple actors: the politics of sanitation provision

The provision of on-site sanitation involves both the private and public/societal domains.⁶⁰ Investment in facilities, provision of services, etc. is often viewed as a private responsibility, whilst administrative and regulatory tasks are attributed to the public domain. These tasks in the public domain are highly fragmented with various responsibilities divided over multiple actors, leaving sanitation marginalized and poorly co-ordinated.^{69,70}

In much of the existing literature on sanitation, the different entities are often viewed as depoliticized actors who strive for the common good (improved sanitation). The different actors, however, each have their own specific

interests and objectives which they will try to achieve. The interests of the different actors (landlords, tenants, ministries, non-governmental organizations, donors, international lending agencies, etc.) are likely to conflict and, as such, achieving these interests and objectives is subject to contestation. As different entities pursue their, possibly conflicting, interests, the provision of sanitation services becomes an inherently political process. The dynamics of this political process underlying the provision of sanitation services within a slum setting has largely been ignored by research in the past decade.

Lack of clarity in definition of improved sanitation and its monitoring

Shared facilities provide an uncertain degree of improvement in sanitation. According to UN Habitat, a household is considered to have adequate access to sanitation if an excreta disposal system, either in the form of a private toilet or a public toilet shared with a reasonable number of people, is available to household members.¹ In 2004, the World Health Organization and the United Nations Children's Fund categorized shared private toilets and latrines as 'improved shared' under certain conditions such as the facility being located within the dwelling, yard or compound.⁴ However, only 2 years later, shared facilities were redesignated as 'unimproved sanitation' in recognition of poor operation, maintenance and abuse that in turn discourages their use.¹⁹ These shifts in defining terminologies discount enhancement of shared sanitation facilities, thereby reducing the number of documented improvements. Furthermore, they lead to overall reduction in enhancement of sanitation facilities due to confusion among landowners regarding how to meet local criteria for sanitation improvements.

More generally, confusion exists regarding what criteria should be used to monitor improvements, and this confusion leads to unclear protocols for apportionment of resources. Currently, sanitation is merely monitored through physical targets. Target 11 of the MDGs seeks to 'significantly improve the lives of at least 100 million slum dwellers by 2020', whereas in monitoring this goal, UN Habitat uses the following criteria: (1) improved access to water and sanitation; (2) improved structural quality of housing; (3) reduced overcrowding; and (4) improved security of tenure.¹ Huchzermeyer⁷¹ pointed out the lack of clarity regarding whether one or all of the criteria must be met. In spite of the identification of a specific number of individuals in MDG Target 11, in practice, UN Habitat invokes the normative goal of 'cities without slums' as the objective.⁷² A contradiction is evident between these two interpretations, leading to unclear interpretations of progress, as indicated in a recent review of UN Habitat⁷³ which stated that the 'disconnect between knowledge creation and implementation' in United Nations' programmes should provoke greater international disapproval and elicit steps to improve this connection.

Conclusions

Demand-based approaches seeking to improve sanitation in slums first need to understand the sanitation situation in

question, and then establish situation-specific drivers of demand. The drivers of demand for sanitation improvements outlined by previous researchers are not universal but are context specific. These drivers of demand are not necessarily the health benefits. Future research needs to establish a scientific basis for the non-health benefits of improved sanitation as potential drivers of demand in urban slums. A better understanding of the complexities of slum communities is needed in order to establish boundary conditions for realizing desired improvements.

Ethical approval

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Competing interest

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