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**DELIVERING WATER, SANITATION AND HYGIENE SERVICES  
IN AN UNCERTAIN ENVIRONMENT**

**Sanitation in informal settlements in East Africa (3ksan)**

*K.J. Charles, K. Okurut, A. Tsinda, J. M. Adogo, P. Abbott, L. Okotto, R. Kulabako,  
T. Kaime, J. Chenoweth, R. Malcolm & S. Pedley, UK*

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*Improving access to sanitation in slums in East Africa is a challenge. The 3ksan project has been working to identify the barriers and catalysts to sanitation in Kigali, Kampala and Kisumu. Household surveys in the informal settlements in these three cities have provided insight into the different levels of service provision and demand, access to financial services, and perceptions of enforcement of the regulations. This paper presents key results from the household survey, highlighting the different challenges in the three cities.*

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**Introduction**

Informal urban settlements present a range of challenges to sanitation provision, including a lack of planning and legal enforcement of planning laws; low income and education levels within the population; topographic challenges arising from the settlement on marginal land; and transitory populations.

The 3ksan project aims to improve understanding of how we can catalyse self-sustaining sanitation chains in informal settlements in African cities. The project is being implemented in three cities that face major challenges in providing sustainable access to water and sanitation for their rapidly expanding populations: Kisumu, Kenya; Kigali, Rwanda; and Kampala, Uganda. The similarities and differences between the provision, management, and regulation of sanitation are being analysed using a combination of social and legal research methods. Sanitation chains are defined as the series of services that are required to develop and maintain effective sewage management systems in a community, and the financing and regulation of these services. Solid waste management is not considered here. This definition of sanitation chains includes, but is not limited to, education, construction, maintenance, and management of the waste through pump-out/collection services, transport, treatment and reuse or disposal. For a sanitation chain to be sustainable, not only does the sanitation system have to be “economically viable, socially acceptable, technically and institutionally appropriate, it should also protect the environment and the natural resource” (SUSANA 2008, but services must be in place to stimulate demand, ensure regular maintenance (including removal of waste), and increase the demand for improvements in sanitation, thereby creating sustainable markets to ensure profitable businesses can operate to supply that market. Self-sustaining sanitation chains in the context of informal settlements are defined here as social, financial and technological systems that together provide affordable sanitation and improve public and environmental health without continued external intervention.

In this paper we introduce the three cities and report the results of a household survey undertaken in informal settlements within these cities to characterise the current sanitation chains. We conclude with the lessons learnt so far.

**The study areas: Kigali, Kampala and Kisumu**

The study areas for this project include informal settlements in Kigali (Gatsata, Kimisagara), Kampala (Bwaise III, Kisenyi II and Namuwongo) and Kisumu (Nyalenda B, Manyatta B and Obunga). The three cities, though geographically close, have had different development trajectories that have influenced their current situation (Table 1) such as differences in their colonising countries influencing their legal systems, and in their periods of growth and conflict.

<b>Table 1. Key statistics for the three cities (MoFPED 2000, KCC 2004, UN-Habitat 2005, MINITERE 2006, UN-HABITAT 2006, UN-HABITAT 2007, UN-Habitat 2009, UBOS 2012, World Bank 2012).</b>			
<b>City</b>	<b>Kisumu, Kenya</b>	<b>Kigali, Rwanda</b>	<b>Kampala, Uganda</b>
Population	388,311	1,135,000	1,720,000
Rate of urban growth	2.8 %	4%	4.1 %
Proportion of city's population that live in informal settlements	60 %	62.6 %	Over 60 %
Estimated area of land that the slums cover in the city	19 %	62 %	10%

There has been little improvement in sanitation provision in urban areas in these countries in the past twenty years (WHO/UNICEF 2012), with all countries off track to meet the Millennium Development Goals target 7c for sanitation. In Rwanda, rapid urban growth has led to significant losses in the proportion of people with access to improved sanitation in urban areas. All three countries were below the average for sub-Saharan Africa for the proportion of people with access to improved sanitation in 2010 of 61 % (WHO/UNICEF 2012). A small proportion of the city populations are served by centralised sewerage systems in Kisumu (10 %; Ong'ong'a *et al.* 2010) and Kampala (<7%; NWSC 2007). There is no centralised sewerage system in Kigali. Pit latrines, often unimproved, are the predominant type of sanitation system in the informal settlements (Kulabako *et al.* 2010; Maoulidi 2012; Tumwebaze *et al.* 2012), with sharing of sanitation facilities between households common. In addition, in areas of Kampala, public sanitation systems are used. Open defecation is also common in informal settlements where access to toilets is limited and/or expensive. It is thought to be underreported (Tumwebaze *et al.* 2012) as people either don't admit to it in surveys due to embarrassment and/or it not being their only mode of sanitation but used when they either can't get to a toilet or afford to use one. This may include women (and others) using flying toilets (disposal of faeces in polythene bags) at night rather than going out to a shared latrine.

The services available to empty sanitation systems and treat waste vary between the cities. In Kisumu, there is a lack of exhaustion trucks to pump-out the waste from pit latrines, with waste primarily removed from latrines by hand, and reburied nearby or may be dumped illegally. Kigali lacks centralised sewerage collection and treatment system, which limits the ability to treat sewage from latrines and septic tanks. In Kampala, waste is collected by members of the emptiers' association or the city council authority who deposit it at the sewage treatment works.

## Methods

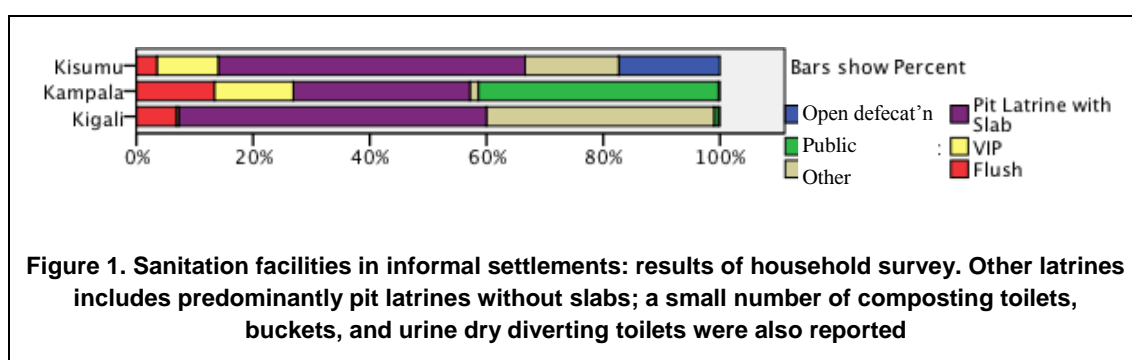
This project focuses on three main areas with regard to sanitation: demand; finance; and the regulatory environment. In this first stage of the project, household questionnaires were administered in the eight different informal settlements across the three cities. The samples for the household surveys were selected through random route sampling techniques in proportion to the population of study area. The survey was designed to assess the sanitation situation in the settlements and identify the main permanent barriers to households' demand for improved sanitation. It was administered between May and September 2012. The survey questionnaire was pilot tested before being administered in the communities, and all the staff involved with the survey trained before use. SPSS (version 20) was used to analyse the household survey data. The survey and the methodology were given a favourable response from the Ethics Committee at the University of Surrey.

Data on the ability of the household to afford basic food, essential clothes and shoes, lighting after dark, fuel for cooking, potable water, medical care and medicines was used to calculate a deprivation index (using Factor Analysis with Varimax Rotation with the scale divided into equal thirds for very deprived, deprived and not deprived).

## Results

The conditions between the cities varied in many key aspects (Table 2). Tenancy rates were generally high (76.5 %). Only 11.3 % had a written tenancy agreement, with the majority of these in Kigali; 21.7 % had no

tenancy agreement, increasing to 43.3 % in Kampala; Kisumu had predominantly verbal tenancy agreements. Kigali had the lowest proportion of deprived and very deprived living in the informal settlements, with the highest proportion of residents who had lived there less than one year (36 %), but also a high proportion (29 %) who had lived there more than 8 years. Kampala was the only city where public latrines were reported to be used, with 42 % of households relying on public toilets, with a further 46 % relying on shared facilities. Pit latrines with slab were common in each city (Figure 1). Pit latrines without slabs were common in Kigali and Kisumu. Open defecation was reported as the main mode of sanitation by 17 % of respondents in Kisumu, but was not widely reported elsewhere, despite being observed in each of the study sites. In the three cities, 60% of households used facilities that would meet the JMP definition of improved by type, but many households used shared system; only 10% of households used improved systems which were only used by their own household.



**Table 2. Summary demographics for the three cities based on the results of the household survey**

Parameter	Units	Kigali, Rwanda	Kampala, Uganda	Kisumu, Kenya
Number of households		1,794	1,666	1,927
Tenants?	%	65	72	94
Years living in house	Mean (SD)	6.6 (9.2)	8.0 (9.6)	4.9 (7.2)
Household populations	Mean (SD)	4.5 (2.3)	3.8 (2.2)	4.7 (1.8)
Proportion defined as very deprived	%	6.8	13.0	29.6
Proportion defined as deprived	%	7.1	53.5	67.6
Distance to sanitation	Mean (SD) in m	9.0 (7.6)	54.2 (96.4)	33.3 (74.4)

Respondents were asked about their level of satisfaction with their current sanitation system. Respondents in Kampala were more likely to be very satisfied, although the proportion who were satisfied or very satisfied was similar between Kampala (52 %) and Kigali (52 %). Satisfaction was lowest in Kisumu with only 44 % satisfied or very satisfied. Satisfaction increased as people moved up the “sanitation ladder”. For respondents using flush and pour-flush systems there was 75.4 % overall satisfaction; with 56.7% for respondents using pit latrines with a slab. Of the few respondents using composting toilets (n=16) and urine dry diverting toilets (n=6), dissatisfaction levels were high (81 % and 67 % respectively were dissatisfied or very dissatisfied). Satisfaction was also higher if the latrine was only used by one household, than if shared. Public latrines had the lowest satisfaction with 30.9% satisfied or very satisfied.

Overall, 6.4 % of respondents reported using open defecation as the main mode of household sanitation, almost all of whom were in Kisumu (333 of 342). The people who reported that they used open defecation were more likely to be male; to have lived there for longer, with 60% having lived there for more than 4 years; to be older; and to have a lower educational attainment. They were also more likely to be walking further (>30m).

Demand for sanitation was highest in Kigali with 37% indicating that they had considered installing (or had installed) a household sanitation facility. By comparison, in Kisumu, only 3.2 % of respondents indicated that they had considered installing (or had installed) a household sanitation facility. Similar proportions of respondents had installed sanitation systems in Kigali and Kampala. Of the few in Kisumu who had installed a toilet, there were very high rates of dissatisfaction. Dissatisfaction was not found to be a motivating factor for demand across the three cities.

The higher level of demand in Kigali is attributed to a combination of active education on hygiene issues, availability of pro-poor finance and the government actively promoting improvements in slums. Almost a third of respondents in Kigali reported having received education about sanitation improvement, compared to only 6 % in Kisumu. In Kigali, tenancy is also less of a barrier to demand, with tenants work collectively to construct a shared latrine. However, in Kigali, 40 % of households that have installed a system are using an unimproved type of facility (pit latrine without a slab), compared to < 1 % in Kampala. This corresponds with high levels of dissatisfaction (60 %) in Kigali for those who had installed a system, but low levels of dissatisfaction (20%) in Kampala. For those using public toilets, demand for a household system was low (5 %).

Lack of planning is a common problem in informal settlements. In the urban case studies in this study, lack of planning has resulted in a lack of space for building new systems, and a lack of access for service providers. The topography is also a barrier in Kigali and Kampala, in part due to the lack of planning. For households who owned their properties, the most important barriers for building improved sanitation were lack of money (56 %), topography (28 %) and lack of space (12 %). For those who reported using open defecation, their reasons for lacking a toilet were: no space (42%), cannot afford (39%), and insecurity of tenure (11%).

In Kigali, communities work together to improve their environment. For sanitation, this means that unskilled labour is readily available, but there is a lack of skilled labour and affordable materials, resulting in unimproved facilities being constructed. In Kampala, there are many small service providers available, with more respondents reporting paying someone else to build a latrine than in the other cities, however, the awareness of these providers was greatest for people who used a private sanitation system, and lowest for those using a public system.

## Conclusions

Approaches to addressing the lack of sanitation in informal settlements have to address the differences in the populations in these settlements between and within cities. Kigali, as the least deprived of the three study sites, had the highest proportion having installed a sanitation system or planning to, however, these systems often don't meet the JMP definition of improved. In Kampala, public toilets provide an important service, despite the low levels of satisfaction. However, there is a need to consider how demand for private facilities can be stimulated. In Kisumu, the most deprived of the study sites, there were very few improved facilities which were private. And despite very high levels of dissatisfaction, and reporting of problems, there was very little motivation to change things. Stimulating demand is important in Kisumu, but so is providing affordable sanitation system. Following on from these household surveys, work is continuing in the three cities with a series of interviews with stakeholders throughout the sanitation supply chain, focus groups within the communities, and deliberative forums to bring the different groups together.

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## Contact details

Katrina Charles  
Centre for Environmental Strategy  
University of Surrey  
Guildford, Surrey, UK GU2 7XH  
Tel: 01483 689931  
Fax:  
Email: [k.charles@surrey.ac.uk](mailto:k.charles@surrey.ac.uk)  
www: [www.3ksan.org](http://www.3ksan.org);  
[http://www.surrey.ac.uk/cce/people/katrina\\_charles/](http://www.surrey.ac.uk/cce/people/katrina_charles/)

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