

MEDLAND & SCOTT

38th WEDC International Conference, Loughborough University, UK, 2015**WATER, SANITATION AND HYGIENE SERVICES BEYOND 2015:
IMPROVING ACCESS AND SUSTAINABILITY****Vulnerability in the sanitation service chain: lessons from
the SPLASH urban sanitation research programme***L. Medland & R. Scott (UK)***BRIEFING PAPER 2305**

The European Union Water Initiative Research Area Network (EUWI ERA-net, or SPLASH) is a consortium of 16 organizations representing government ministries, funding agencies, national research institutions and technology development authorities from 11 European countries. The main objective of the urban sanitation research programme within SPLASH has been to contribute to the understanding and implementation of at-scale sustainable sanitation service chains in low-income urban areas of Sub-Saharan Africa. The overall findings from the SPLASH sanitation research programme can be viewed through four lenses: the enabling environment, demand creation, vulnerability in the service chain and city wide planning. This paper presents the key findings related to vulnerabilities in the sanitation service chain, which were found to relate to both internal and external vulnerabilities. With greater understanding of these vulnerabilities and how they operate within a particular city context, they can be addressed in a more systematic way as part of city-wide sanitation service improvements.

Vulnerability in the sanitation service chain

Wratten (1995) argues that vulnerability is not synonymous with poverty because, whilst poverty can be reduced through financial borrowing, being in debt can make the poor more vulnerable. Vulnerability can rather be characterised and defined in different ways. For the purpose of this paper, vulnerability encompasses the idea that individuals and households can be negatively affected by events relating to the sanitation service chain, as a result of their specific circumstances.

The SPLASH urban sanitation research programme, running from 2011 to 2014, has identified how different characteristics of vulnerability influence the extent to which sanitation services are effective and why achieving good service provision is so important in addressing vulnerability, particularly for the urban poor. The vulnerabilities, those both influencing and influenced by sanitation services, can be grouped into those that are 'external' and those that are 'internal' to the individual or household. These can be summarised, as in Box 1.

Vulnerabilities have been found, through the research, to be related to a number of characteristics of the urban environment that affect sanitation services, namely: legislation; the physical environment; social dynamics; family, personal and wider public health; access to finance; and levels of knowledge and awareness about risk (Medland et al, 2015). Where many of these characteristics co-exist, people's vulnerability increases and the ability to absorb external shocks decreases, which in turn can lead to a vicious circle of poverty and deprivation.

Vulnerability affects both the *users* and *providers* of sanitation services. Service users are predominantly vulnerable during the containment and collection stages of the sanitation service chain, while service providers are more vulnerable during the emptying, transport and disposal stages (see Box 2). Each stage of the chain needs linking to strategies that can address the specific vulnerabilities and their characteristics in a given context.

Box 1. External and internal vulnerability

Vulnerabilities *external* to the individual or household:

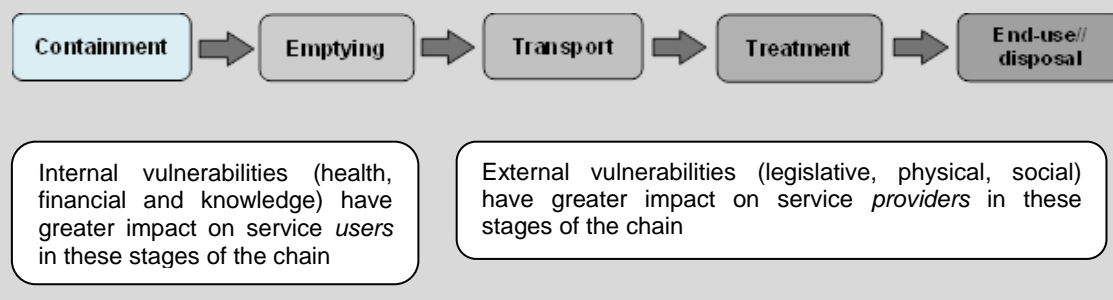
- Legislative: e.g. lack of tenure security, lack of sector coordination
- Physical: e.g. poor infrastructure planning, lack of access for services
- Social: e.g. lack of community cohesion

Vulnerabilities *internal* to the individual household:

- Health / Public Health: e.g. risky behaviours (personal and of others) increasing disease risk
- Financial: e.g. ability to pay for services, security of income
- Knowledge: e.g. limited technical knowledge or awareness of health risks

Internal vulnerabilities in particular can be exacerbated by additional factors such as; disability, chronic illness, single parent- elderly- or child-headed households.

Box 2. The sanitation service chain and where vulnerabilities are most significant



Much of the research addressing issues of sanitation services in high density, informal urban areas focuses on the physical and financial constraints facing both service users and the service providers. More recently, there has been greater attention given to understanding the social and legal constraints affecting levels of service provision for the urban poor, such as weak or non-existent tenancy agreements restricting investment in improved infrastructure or services (Scott, 2011). The SPLASH urban sanitation research programme identified other examples of vulnerability, including those summarised in the following four categories: legislative, social, knowledge and public health.

Legislative vulnerability

Lack of secure tenure is known to be a significant constraint to tenants having access to adequate sanitation services. Relying on landlords to provide facilities leaves tenants vulnerable to poor service levels. Studies in Cameroon, Rwanda and Kenya highlighted an additional level of vulnerability for tenants when a landlord does not own the land title on which their property is built (MAFADY, 2014; Adogo et al, 2012). Security of tenure is needed both for the land titles and the property on it.

A key challenge in realising the Human Right to Sanitation relates to tenure status and informal occupancy of land, from which tenants can have limited, if any, abilities to challenge landlords or city authorities about their right being denied.

Social vulnerability

There is much debate around the presence or absence of social cohesion in urban settings. Social fragmentation is considered to be a more significant reality in urban areas and a reason for increased social vulnerability resulting from a lesser sense of ‘community’ or the feeling of having a ‘network’ of support. This has a bearing on, for example, the use of shared latrines in urban areas. Mazeau (2013) found that in

Ghana, the two main determinants of user preference for shared latrines were price and cleanliness and for those with limited options there is a choice to be made between using more affordable but dirty facilities, or those that are cleaner but more costly. Poor levels of toilet cleanliness in Kampala and Kisumu were found to result from the difficulty of managing a shared resource in areas where there is little community cohesion or sense of shared responsibility.

Current discussions around targets and indicators for the Sustainable Development Goals (SDGs) consider 'basic sanitation' to include a facility that is shared 'among no more than 5 families or 30 persons, whichever is fewer *and if the users know each other*' (WSSCC, 2014). The research in Kampala found cases where shared latrines *can* be well maintained, providing they are shared by no more than four families (Günther and Horst, 2014).

Knowledge vulnerability

Limitations in knowledge may affect a population at large, or specific groups within the population in relation to specific skill sets and knowledge. When access to public services such as sanitation, drainage and solid waste disposal are not available, people find solutions for themselves. This often results in solid and liquid waste being disposed of close to the home. The research in Cameroon found that the majority of households in Yaoundé and Douala dump solid waste and wastewater into their surroundings and are not aware of the dangers this can create (MAFADY, 2014).

A lack of knowledge amongst the building community was identified in all of the studied cities, with the resulting lower quality of latrine construction placing households in a very vulnerable position. Collapsing latrines are not only a risk in and of themselves, but they can also act as a disincentive to construct a replacement facility, forcing people to resort to other unsafe sanitation practices.

Public health vulnerability

Those most directly vulnerable during the emptying and transport phases of the service chain are the faecal sludge collectors and tanker operators. The study in Cameroon specifically considered the challenges facing collectors of faecal sludge from on-site sanitation systems. In Yaoundé and Douala, many emptiers are unregistered, as the mechanism to issue permits for registered operations is not effectively implemented. Even if tanker operators wanted to formally employ staff, there is little incentive to do so while they continue to operate under such informal arrangements.

Emptiers rarely receive training in what the health risks are or how to minimize them, while they continue to work with equipment that is old and prone to breakdowns (MAFADY, 2014). Households who employ the services of emptiers can be vulnerable to the impact of poor quality emptying and transport operations, if this results in faecal waste being disposed of at or close to living areas, water supplies, urban agriculture and public spaces. Communities more generally can also be put at risk from poorly managed operations, especially those living along the transport routes of faecal sludge trucks, or near to sites where faecal waste is discharged into the environment.

Key learning points

In relation to the areas of vulnerability identified above, key learning points identified from the SPLASH sanitation research programme can be identified as follows:

Reducing legal and financial vulnerability influences demand for improved facilities

Poor households are more willing to engage with service improvement initiatives when appropriate support is provided to overcome their own vulnerabilities. This may be through helping household's access finance, establishing improved tenure security, targeting landlords with specific support to encourage investment in facilities, or developing mechanisms to protect tenants from legal risk.

- In Kampala, housing ownership and property rights were found to be the strongest determinants for households having an improved latrine in their home. While 39% of owner occupiers had access to an improved latrine, only 5% of tenants did.
- Granting households better access to finance through formal, semi-formal or informal means has been shown in Kampala, Kigali and Kisumu to be a key enabler in creating demand for improved household facilities (Okurut and Charles, 2014).

Capturing knowledge can help address health vulnerabilities

A sanitation risk assessment tool applied in Maputo adopted an extended F-diagram¹ as a tool for conducting a rapid participatory sanitation system risk assessment. The tool helped participants from the study communities to quantify risks and then map them onto locations in their city. This helped to highlight the ‘hot spots’ of health risk, where specific interventions would be required to reduce those risks. Peer-based consultation providing opportunities for reflection between participants about how ‘other people’s behaviours’ can affect their own health, generated rich information (International Water Association, 2014).

- Identifying indigenous knowledge as part of the assessment and decision-making process when planning to improve sanitation facilities and services can support, or indeed contradict, previously held pre-conceptions and assumptions made by decision-makers about people’s awareness of health risks.

Opportunities to change the status quo

Research into financially viable options for faecal sludge and wastewater end-use options has been linking to the impact on demand and requirements to mobilize earlier stages of the sanitation service chain: containment through to transport. This provides the opportunity to work on creating demand for improved wastewater and faecal sludge treatment options linked to better containment technologies, improved emptying and transport services, driven by the revenue potential at the end of the service chain. Greater demand for treated faecal sludge could act as the catalyst for increased coverage, efficiency and quality of services, that in turn reduces vulnerability for both service providers and service users.

The different types of vulnerability have consequences that extend beyond the realm of sanitation service provision and it is recognised that reducing levels of vulnerability in low-income urban areas is no easy task. Overcoming vulnerability may require trade-offs – such as landlords being prepared to reduce the vulnerability gap relating to tenure security – at least in the short term, in an effort to overcome apparently insurmountable challenges and incrementally improve sanitation services. With increased understanding of the influence of the range of vulnerabilities in relation to sanitation provision, it is possible to identify incremental improvements that could reduce those vulnerabilities for both service users and service providers.

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References

- Adogo, J.M., Malcolm, R., Kaime, T., Okotto, Okurut, K., and Tsinda, A. (2012). *The Right to Sanitation in Legal Frameworks with Reference to Urban Informal Settlements of Kenya, Uganda and Rwanda*. Royal Institution of Chartered Surveyors Legal Research Symposium, Arizona State University, Las Vegas, Nevada.
- Günther, I. and Horst, A. (2014). Access to better toilets. <http://www.dandc.eu/en/article/how-improve-sanitation-situation-slum-settlements> [24/02/2015]
- International Water Association (2014). *Rapid Participatory Sanitation System Risk Assessment to Support City Sanitation Planning: Policy Recommendations*. IWA.
- MAFADY Consortium (2014). *Summary of the Main Results of the MAFADY Project*. MAFADY Consortium.

- Mazeau A (2013). *No toilet at home: Implementation, Usage and Acceptability of Shared Toilets in Urban Ghana*. UK: Loughborough University.
- Medland L, Cotton A.P, Scott R.E (2015). *SPLASH Urban Sanitation Research Programme Briefing Note 3: Understanding and addressing vulnerability in the sanitation service chain*. Loughborough: WEDC.
- Okurut, K. and Charles K.J. (2014). *Household demand for sanitation improvements in low-income informal settlements: A case of East African cities*. **Habitat International**. 44 (2014) pp.332-338
- Scott, P (2011). *Unbundling tenure issues for urban sanitation development*. PhD thesis, UK: Loughborough University. WSSCC (2014). *WASH targets and indicators post-2015: Recommendations from international consultations*. Water Supply and Sanitation Collaborative Council, Geneva.
- Wratten, E. (1995). *Conceptualizing Urban Poverty*. **Environment and Urbanization**.7 (1).pp.11-33.
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Note/s

This paper highlights some of the findings from the SPLASH urban sanitation research programme that has been captured in a series of synthesised outputs. These are free to download from the SPLASH website at <http://splash-era.net/outputs.php>

¹ The F-diagram comes in many forms, illustrating the movement of pathogens from the faeces of one person to where they become ingested by somebody else – through direct or indirect pathways.

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