Using local stakeholder knowledge to assess health risks and inform sanitation safety plans

This project brief provides an overview of a methodology being developed by the International Water Association (IWA) and partners of a research project funded by the European Water Initiative ERA-NET (SPLASH) entitled “Sustainable and resilient sanitation service chains in Maputo province – action research and piloting for the benefit of the urban poor”.

The Participatory Rapid Sanitation System Risk Assessment (PRSSRA) methodology uses local stakeholder knowledge as part of a participatory and rapid risk assessment methodology that assesses the risks in sanitation chains in order to prioritise interventions to reduce these risks. The principle benefits of the risk assessment can be summarised as follows:

- Provides a systematic and objective assessment of sanitation related risks.
- Highlights communities who are most vulnerable to sanitation hazards.
- Can be applied as a means to improve existing systems as well as plan for new interventions.

The project partners involved in the research in Maputo are Class-A, established as a platform for multi-stakeholder partnership and a learning alliance, University College London who are leading on the development of the risk assessment methodology and W-Smart who are focussing on wider application of the application of methodology.

Existing context

The purpose of a sanitation system is to contain and manage excreta to avoid exposure by local residents. However, sanitation systems are frequently inadequate in performing this function resulting in hazardous events which may result in exposure of the population to the hazard (faeces). As a result, sanitation related diseases are widely prevalent (endemic) in cities of sub-Saharan Africa particularly in poor communities and in informal settlements where infrastructure provision is poor.

The interrelated physical, environmental and social factors mean that solving sanitation-related health problems remains challenging and sanitation interventions can be too much focussed on one particular dimension of the problem. This can lead to poorly designed pro-grammatic interventions and decisions about investment that may not achieve the maximum health outcomes and overall benefit to society.
Participatory Rapid Sanitation System Risk Assessment

The methodology is based on the premise that an improved understanding of risks associated with sanitation can help to target interventions and develop strategies to reduce risks where sanitation systems are most precarious and local residents are most at risk. The methodology focuses on an assessment of hazardous events at the:

a) Community level – these are hazards that are prevalent in and around people’s homes and are related to inadequate sanitation facilities, a lack of servicing of these facilities and poor local level infrastructure for waste collection.

b) Municipal level – these hazards are related to the waste collection or treatment and disposal/reuse systems and risk is calculated according to the principal hazardous events that occur in each sanitation chain not according to geographical area.

A participatory approach towards situational analysis gives institutional stakeholders the opportunity to identify which communities are most at risk and to identify parts of the sanitation chain to which high risk can be attributed. The other benefit of the participatory approach towards data collection is that provides a direct feedback loop towards a diagnostic of the current situation and derivation of solutions to these problems. This approach can then be used as the basis for discussing risk reduction interventions with the responsible authorities, community organisations and service providers.
The principles of risk assessment methodology are as follows:

- **Participatory** – to engage with stakeholders at different levels
- **Simple** – to ensure that stakeholders understand the process
- **Holistic** – to take into account the full sanitation service delivery chain
- **Resource efficient** – to be independent on expensive equipment or specialist expertise
- **Rapid** – to be applied at city-scale

**Risk assessment framework and risk indicators**

The risk assessment is based on the assumption that in situations where excreta are not safely contained, local residents are at risk of exposure to faecal matter containing pathogens, which may lead to illness and further propagation of disease. Figure 3 illustrates how the disease exposure pathways are affected by the type of sanitation system and how the resultant morbidity is also dependent on the vulnerability of individuals to combat disease. The figure shows that there are three main elements that manifest to result in escalation of sanitation risks:

i) the coverage and quality of the sanitation systems;
ii) the factors that exacerbate exposure through transmission routes for faecal contamination; and
iii) the vulnerability of populations to disease.

![Figure 3 - Disease transmission routes related to sanitation highlighting risk aspects related to i) hazardous events, ii) exacerbating factors and iii) vulnerability](image)

**Figure 3** – Disease transmission routes related to sanitation highlighting risk aspects related to i) hazardous events, ii) exacerbating factors and iii) vulnerability
Components of the risk assessment framework

1) **Sanitation systems**: the primary element of risk is posed by the hazards related to excreta (mainly contained in faeces) that harbour different types of pathogen and resulting in disease in the local population. Although the most important sources of hazards are household facilities/communal latrines and infrastructure for excreta and wastewater management, solid waste is widely considered to be part of sanitation and is part of municipal environmental health services.

2) **Exacerbating factors**: the incidence of and exposure to hazardous events are often exacerbated by additional factors and circumstances that, although not directly related to sanitation systems, impact upon these systems resulting in an increased frequency, intensity, and/or duration of exposure to hazards. The following risk indicators are considered to be of primary importance: i) availability of water for maintaining hygienic conditions ii) flooding which causes dispersion of hazards iii) hygiene behaviours (particularly hand washing) iv) flooring in housing which can increase disease transmission when not lined v) groundwater levels vi) domestic livestock and vii) wastewater reuse.

3) **Vulnerability**: The third element of the risk framework refers to vulnerability or susceptibility to disease. This takes into account aspects related to exposure (i.e. some social groups within communities are more prone to exposure to others due to their types of activity) and their physical resistance to disease. Taking into account both of these factors, it is clear that children are highly vulnerable. Other factors include nutrition, access to health care and weight for age, which can be attributed to socio-economic status or poverty level. The number of children per household and type of housing are considered to be suitable risk indicators.

Stages in the risk assessment process

*Establishment of city sanitation risk assessment steering committee*

The initial stage of the risk assessment process involves the establishment of city sanitation risk assessment steering committee with representation from the relevant civic authorities, institutional stakeholders and from civil society and non-governmental organisations. This stage involves working with municipal stakeholders to undertake a review of institutional roles and responsibilities and relevant policies that influence the provision of sanitation services.

*Preparing for risk assessment*

The preparation for the risk assessment involves the identification of the different sanitation systems that serve the city with a focus on the larger municipal infrastructure and treatment systems that will be the focus of the municipal system assessment. It also involves the identification of areas which require a more detailed community level assessment of risks. These areas may be identified by looking at existing data about sanitation service coverage across the city, poverty assessments that identify low-income and social disadvantaged communities, combined with institutional stakeholder information about the location of informal settlements and slums. In addition, this stage should involve a presentation of the methodology to the relevant representative from the different institutions on the steering committee so that there is a common understanding and agreement of the process of risk assessment and the roles of the institutions in the process.
**Municipal system assessment**

For each component of the municipal sanitation systems, the different types of hazardous event are identified. Sites of most severe sanitation risk are identified and visited, and indicators of system malfunction and lack of capacity (e.g. sewage overflow, polluted storm drains) are observed along with frequently observed health risks that can arise from these issues.

The assessment involves engagement with technicians such as municipal engineers, service providers who are responsible for operation and maintenance of sanitation infrastructure but also includes other stakeholders such as local farmers. A sanitary survey is applied to assess the condition of the sanitation system responsible for each of these events and to identify the presence of exacerbating factors that could increase the likelihood of a system malfunction.

Risk is estimated using ranked responses of level of exposure, vulnerability and hazard intensity. Summing of the risk factors allows for the comparison of risks arising from different chains and different stages of the waste management process.

**Community level assessment**

The community level assessment focuses on those areas where sanitation conditions are already recognised to be poor i.e. those informal and slum settlements that were previously identified. The area is divided into smaller areas (neighbourhoods) and the risk in each of these areas is assessed separately.

Workshops are conducted with participants from different parts of the area with a mix of genders and age groups. Participants are asked to assess the level of risk in different parts of the area using the risk framework and a defined set of indicators. Each group is given ten counters which they proportion to indicate which types of toilet are predominant in their area.

Each indicator is scored based on a simple traffic light system: Green indicating low level of risk, Orange indicating medium level of risk, and Red indicating high level of risk. Similar to the municipal assessment, the total risk is calculated by aggregating the different factors of risk associated with the quality of service provision, and exacerbating factors relating to the physical and socio-economic situations.
Development of risk mitigation strategies and sanitation safety planning

Figure 4 shows how the sanitation system risk assessment is used to inform risk reduction strategies.

The risks identified and the causes are then discussed, along with drivers in the community such as density of population and level of poverty, which can exacerbate the problems. This serves as a diagnostic to clarify the causes of particular hazardous events and indicates appropriate interventions.

The results from the risk assessment will be used as the basis for discussion about the roles and responsibilities between the community and different institutions for managing risk in different parts of the sanitation service delivery chain.

Who will use this knowledge?

i) Local authorities – policy and planning/prioritization

ii) Environmental health officers – regulatory function

iii) Utilities/service providers – improved service provision

The risk assessment methodology being developed by IWA and research partners in the SPLASH funded project is intended to support the Sanitation Safety Planning methodology which is being developed by the World Health Organization with support from various partner organisations including IWA.

For further information, contact
Jonathan Parkinson, Programme Manager of the Urban Sanitation Initiative based in IWA's London office
(email: jonathan.parkinson@iwahq.org • Telephone: + 44 20 300 48528)
or visit the IWA internet site at http://www.iwahq.org/3x/themes/urban-sanitation-initiative.html

The SPLASH Sanitation Programme aims to address urban sanitation challenges at scale in in sub-Saharan Africa by developing solutions that focus on the entire sanitation service delivery chain. The research programme is funded by the Austrian Development Cooperation (ADC), the Department for International Development (DFID), Ministère des Affaires Étrangères et Européennes (MAEE), Swedish International Development Cooperation Agency (SIDA), Swiss Agency for Development and Cooperation (SDC) and the Bill & Melinda Gates Foundation. For more information and to sign up for the 'Making a SPLASH!' newsletter, visit the SPLASH website: www.splash-era.net/san.res.php