

Urban sanitation and climate uncertainty: New ways forward

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INTRODUCTION

Climate change introduces significant uncertainty into decision-making processes for urban sanitation, including both faecal sludge management (FSM) and management of wastewater services. These uncertainties relate to limited precision in predicting new climate extremes and variations at local scales, how society will react to new environmental changes, and “unknown unknowns” – future events that cannot be predicted. Addressing uncertainties concerning climate change impacts on WASH is urgently needed, as they could have far-reaching consequences for public and environmental health and social well-being [1].

Addressing climate uncertainty in the urban sanitation sector requires a combination of existing good practices and new ways of delivering services. To-date, most research on climate change and sanitation in developing country contexts focuses on the management of expected risks of projected climate hazards on physical sanitation infrastructure [2]. While risk management strategies can address uncertainty to an extent, strategies based in resilience and vulnerability thinking offer complementary pathways to more comprehensively respond to uncertainty for urban sanitation.

This poster presents three approaches to addressing uncertainty driven by climate change in the urban sanitation sector in developing countries drawing on the latest thinking in global environmental change: **risk-hazard, resilience, and vulnerability**. Practical ways forward and key takeaways based on reflections from these approaches are described.

BACKGROUND & METHODS

A review of global environmental change literature found that the risk-hazard, vulnerability, and resilience perspectives on climate change each can make valuable contributions to dealing with uncertainty for urban sanitation:

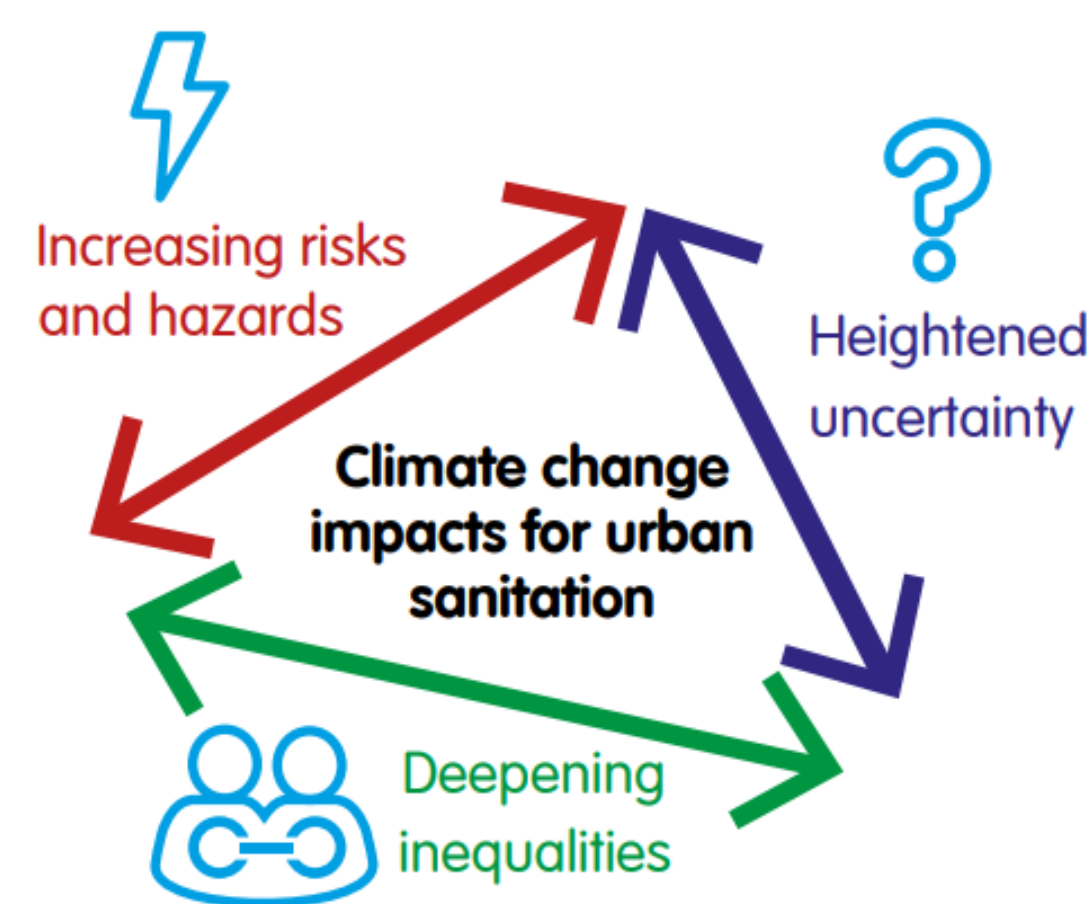
Risk-hazard strategies promote management of a range of possible physical risks to infrastructure and services posed by climate hazards;

Resilience strategies emphasise heightened unpredictability due to climate change requiring flexibility and adaptiveness.

Vulnerability strategies consider that not all populations are affected equally, and some require strengthened capacity to respond to climate stress in general;

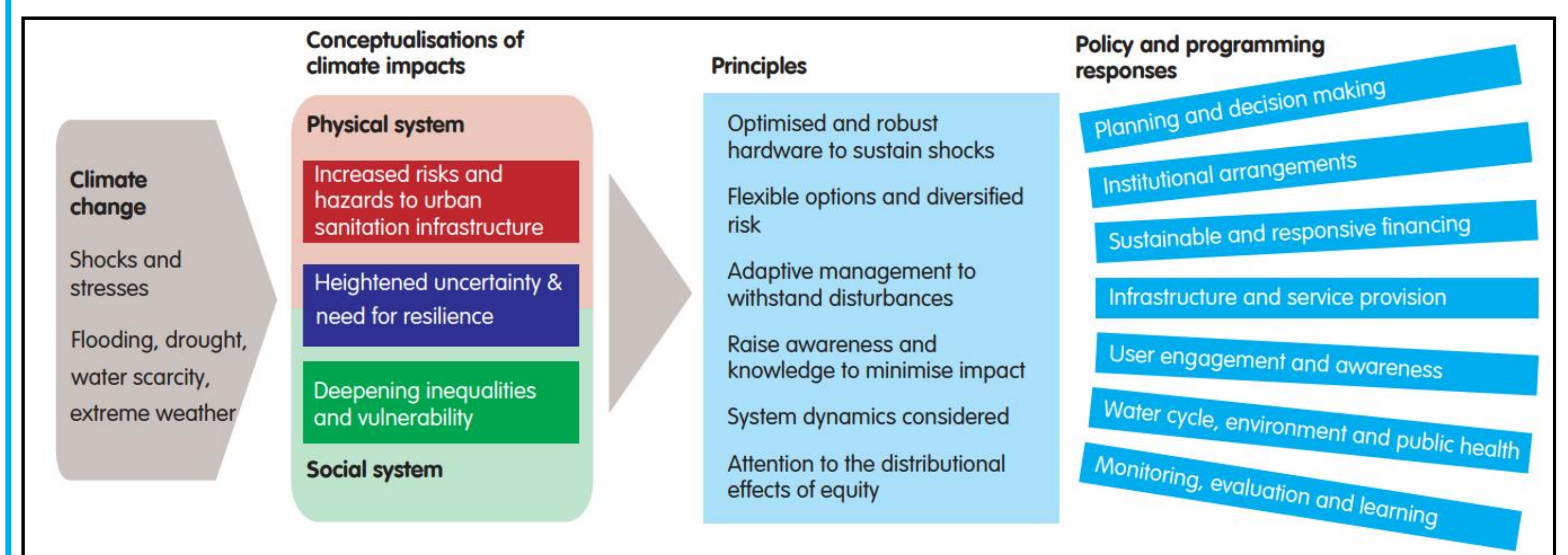
These perspectives were considered in relation to climate impact assessments undertaken in 16 cities in Africa and Asia as part of SNV’s urban sanitation and hygiene programme.

Reflecting on the climate impact assessments, academic and practitioner sanitation and climate change experts from the Institute of Sustainable Futures at University of Technology Sydney and SNV considered how each perspective frames climate change impacts and uncertainty on urban sanitation, and implications for policy and practice.



WAYS FORWARD

Effectively responding to climate change impacts and uncertainty for urban sanitation requires actions that draw on each perspective. Below are some examples of policy and programming responses that can be taken to sustain equitable sanitation services under climate change.



Planning

- Include **flexibility and adaptability** in multi-criteria decision making
- Plan for varied **climate scenarios**
- Consider how sanitation fits in within **broader disaster risk reduction** frameworks

Governance

- Include **climate experts** in sanitation working groups and vice versa
- Improved institutional capacity to **monitor, respond and adapt** to diverse climate scenarios and to ensure equitable service provision

Finance

- Sufficient and **accessible financing** for **fast response** and increased operation and maintenance needs
- Plan for **increased O&M costs** associated with climate change

Infrastructure and services

- Does ‘**robust**’ sanitation or ‘**repairable**’ options make more sense in given context and climate risks
- Prioritise **no-regrets adaptations** that anticipate all climate conditions

User engagement

- Contextualise climate change** within lived experience of users and focus messages on how they can respond in near term
- Provide **timely information** to enable user responsiveness

Environment and public health

- Consider **GHG contributions in design**
- Address how climate change may **shift pathogen exposure** and risks for different populations

Monitoring, evaluation, and learning

- Establish **warning systems** and promote awareness of how to minimise risk
- Develop **rapid review and response** strategies

ADDRESSING UNCERTAINTY

Applying different lenses to climate impacts leads toward different solutions. Each box below shows a different way of approaching uncertainty and examples of how issues created by climate change on urban sanitation service delivery can be framed differently.

Risk-hazard thinking

Approach to uncertainty Uncertainty is addressed through anticipating a range of scenarios based on climate projections, and predicting the impact they will have on services.

- Examples of how issues are framed**
- **Damage** to household toilet or containment during floods.
 - **Backflow** into containments (or toilets) connected to drains.
 - **Restricted or greater hazard** to access emptying in flood areas.
 - High intensity rainfall **washes out/damages** treatment plant.
 - Low flows in receiving water **reduce dilution** of discharges.

Resilience thinking

Approach to uncertainty Uncertainty is addressed through building flexibility and adaptiveness into systems so that the systems can change readily to accommodate changes in environmental conditions.

- Examples of how issues are framed**
- **Difficult to predict user reactions** – rebuild vs revert to OD? Opt for preventative emptying or wash-out contents in floods?
 - **Low willingness to invest** if uncertain of future climate impacts
 - **Over-reliance** on single pit emptying providers, truck, access road to treatment that when damaged breaks the entire service chain.
 - **Limited knowledge** of system design reduces ability to adapt to changing conditions.

Vulnerability thinking

Approach to uncertainty Through the assumption that people and organisations that are empowered are more capable of responding to any impacts they experience in general, uncertainty is addressed by building the agency of the most disadvantaged and reducing inequalities in institutions and norms.

- Examples of how issues are framed**
- Vulnerable households **less likely to have emergency funding** for repair or rebuilding or emptying containments.
 - Vulnerable groups often **face higher risk** of damage to their toilets and exposure to pathogens.
 - Trucks have **limited access to empty systems** in flood prone areas where vulnerable groups are living.
 - **Reduction in treatment quality** in extreme events – risk for sludge reuse and **increased exposure to vulnerable groups** using open waterways.

KEY TAKEAWAYS

Hazards will increasingly demand attention: we cannot continue to ignore climate impacts on FSM, wastewater and effluent discharge, and city-wide sanitation

Uncertainty should not be a reason for inaction: strategies designed for uncertainty (such as adaptive management) are often also win-win.

Resilience and vulnerability in social and institutional systems need attention, not just risk-hazard/technical dimensions

Urban sanitation services must be designed to be sustainable under evolving, uncertain conditions

Read more: ISF-UTS and SNV, 2019. *Considering climate change in urban sanitation: conceptual approaches and practical implications.* The Hague: SNV.

Available at: <http://bit.ly/UrbanSanCC>

[1] Howard, G., Calow, R., Macdonald, A. and Bartram, J., 2016. Climate change and water and sanitation: likely impacts and emerging trends for action. Annual review of environment and resources, 41, pp.253-276.

[2] Kohlitz, J.P., Chong, J., & Willetts, J. 2017 Climate change vulnerability and resilience of water, sanitation, and hygiene services: a theoretical perspective. Journal of Water, Sanitation and Hygiene for Development, 7(2), pp.181-195.