Climate sensitive FSM:

New thinking from vulnerability, resilience and risk-hazard approaches

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AfricaSan5 FSM5

Climate change

An unwanted distraction or critical imperative?

- Not yet part of the urban sanitation and FSM picture
- Uncertainty can lead to inaction
- Beyond “climate proofing” infrastructure to *adaptable, flexible services and governance*
- Aim to bring climate thinking that is applicable to needs of FSM

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Climate change

SDG 13

Target 13.1: Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters

Target 13.2: Integrate climate change measures into national policies, strategies and planning

Target 13.3: Improve education, awareness-raising and human and **institutional capacity** on mitigation, adaptation, impact reduction and early warning

Target 13.a: Implement the UN Framework Convention and operationalise Green Climate Fund

Target 13.b: Promote mechanisms for **raising capacity** for effective climate change-related planning and management including focusing on women, youth and local & marginalized communities

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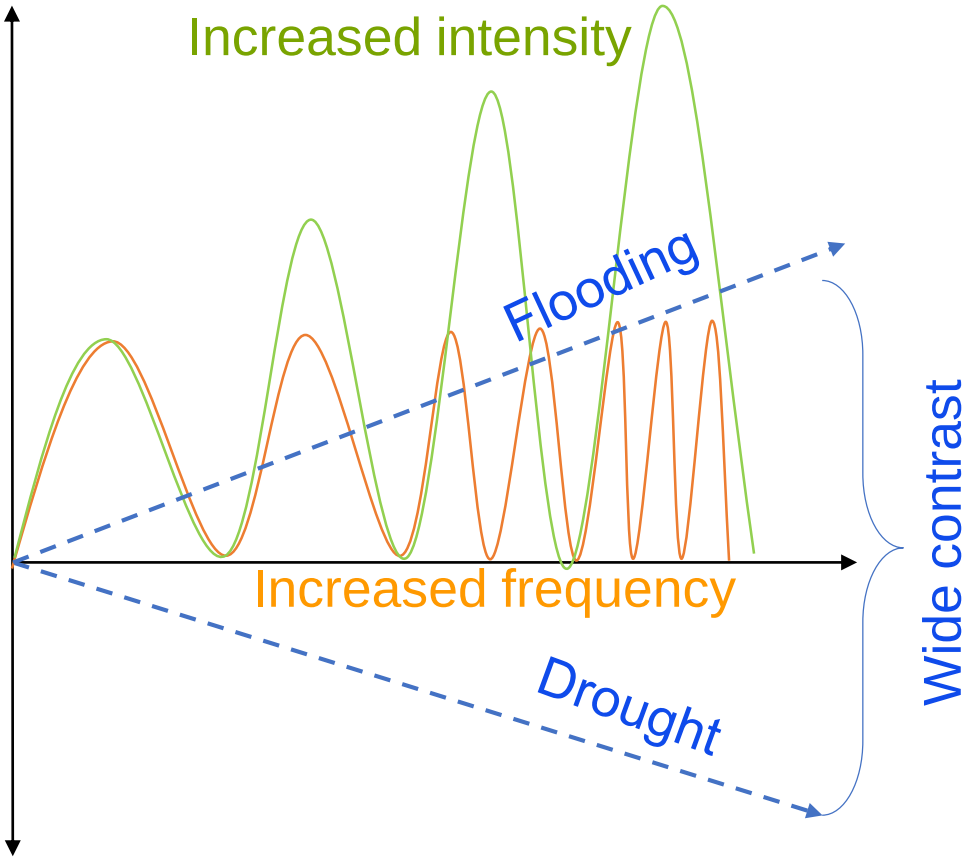
Breath of potential climate change impacts



Climate vulnerability resilience assessments (CVR) in five SNV partner countries highlighted varied nature of expected climate impacts

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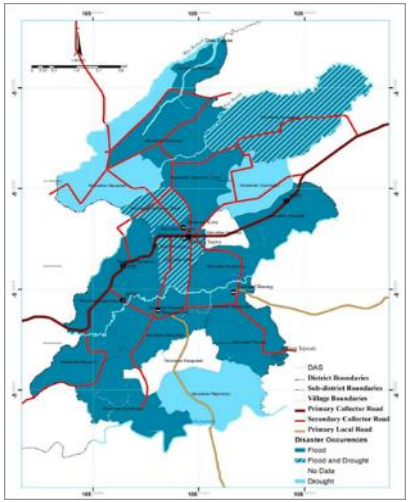
Potential impacts included…

Flood affected areas Zambia (SNV 2018)

Flooding / Rainfall

- **Increased demand** for emptying (Indonesia)
- **Overflow** of containment into streets (Zambia)
- **Sludge dumped** in drains spread in flood (Nepal)



Flood and drought prone areas in Metro Indonesia (BPS, 2017)

Sea level rise

- **Waterlogging** reduces septic tank function (Bangladesh)
- Buried tanks **risk floatation** if emptied (Bangladesh)

Drying conditions and water scarcity

- **Uncertain supply** for flush sanitation (Nepal)
- Increase groundwater extraction increases risk of drawing **contamination** from unsealed pits (Indonesia)
- Greater **health and smell** impact of untreated discharges in low-flowing waterways (Bangladesh)

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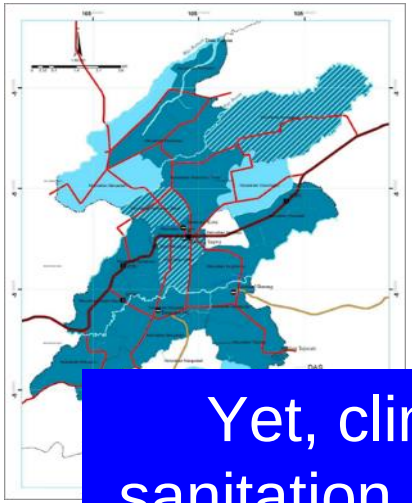

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Yet, climate change was little (or not) mentioned in sanitation policies, regulations, planning and approaches

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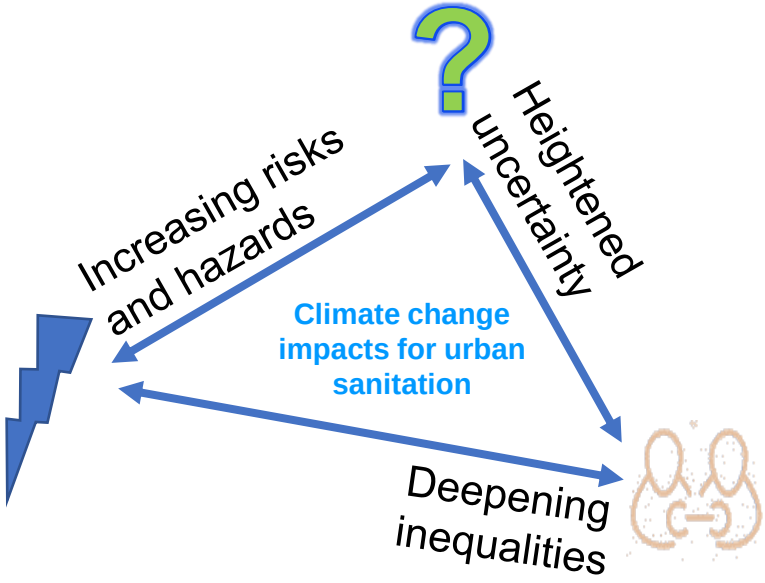
Beyond just an infrastructure challenge

Climate change has far-reaching effects, including on social and environmental systems

- **Narrow view** of existing climate-sanitation literature as an 'infrastructure' challenge
- **Broader perspectives** on climate impacts: **i) risk/hazard**, **ii) resilience** and **iii) vulnerability**
- **Not only the physical** but also social/institutional: users, service providers, governance, planning etc. affected by climate change



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(i) Risk-hazard thinking

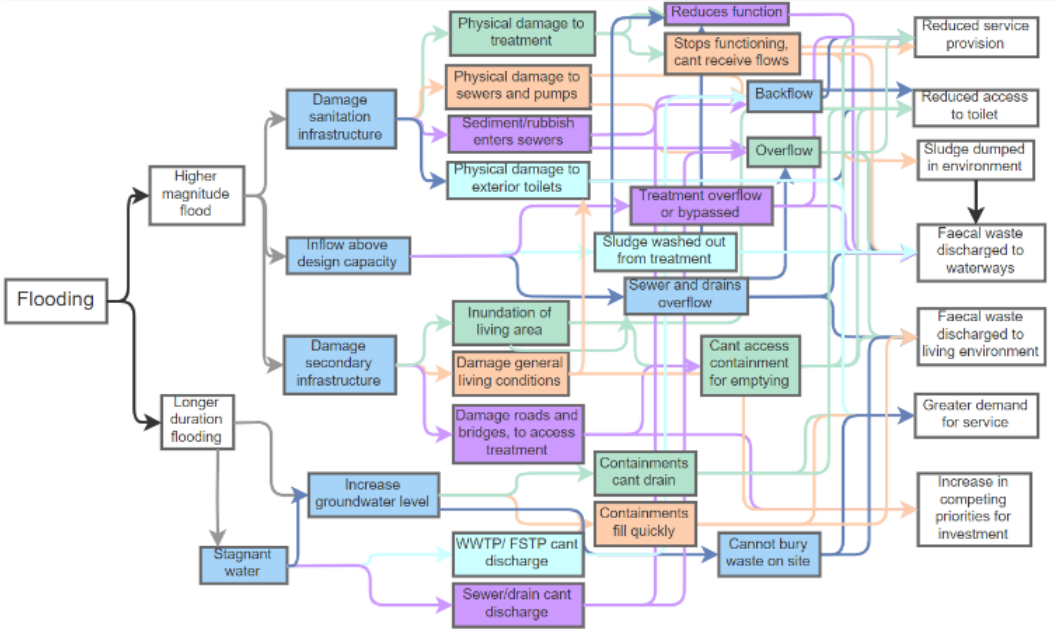
Increasing risks to physical infrastructure posed by climate hazards

Sanitation service chain component	Potential issues requiring attention
User management of on-site systems	- **Damage** to household toilet or containment during floods. - **Backflow** into containments (or toilets) connected to drains - Unsealed containments **stop functioning** if groundwater too high
Management of emptying services	- **Increased and fluctuating demand** with heavy rains. - **Emergency emptying** increases use of illegal/unsafe practices - **Restricted or greater hazard** to access emptying in flood areas.
Treatment and disposal	- High intensity rainfall **washes out/damages** treatment plant - **Increased contamination** of pathogens from dumped sludge re-spread in environment and waterways - Low flows in receiving water **reduce dilution** of discharges

(i) Risk-hazard thinking

Key considerations:

- Robust systems prepared for shocks
- System dynamics, including:
  - Sanitation infrastructure and **services or infrastructure on which it depends** (drains, roads, water supply etc.)
  - Ripple effect of **disruption** from one part of system to another
  - **Upstream influences** on sanitation, and **downstream impacts** from sanitation across sectors



(ii) Resilience thinking

Heightened uncertainty and unpredictability requiring flexibility and adaptiveness in both physical facilities and related social systems

Sanitation service chain component	Potential issues requiring attention
User management of on-site systems	- **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
Management of emptying services	- **Over-reliance** on single pit emptying providers, truck, access road to treatment that when damaged breaks the entire service chain. - Current maintenance is reactive to issues - **limited preventative maintenance** to prepare for climate events.
Treatment and disposal	- **Lack of warning system**/monitoring limits hazard prediction - **Limited knowledge** of system design reduces ability to adapt to changing conditions.

(ii) Resilience thinking

Key considerations:

- **Flexible** infrastructure, service and management options that help to **diversify risk**
- **Adaptive management** of infrastructure and services – **requires monitoring,** learning and adjusting
- **Increased climate awareness** of service providers and community to increase adaptation and response

(iii) Vulnerability thinking

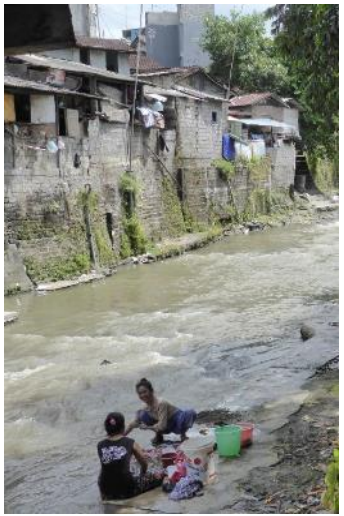
Exacerbation of inequalities – not all populations are affected equally, and some have less capacity to take action

Sanitation service chain component	Potential issues requiring attention
User management of on-site systems	- Vulnerable groups often **face higher risk** of damage to their toilets and exposure to pathogens. - Vulnerable households **less likely to have emergency funding** for repair or rebuilding or emptying containments.
Management of emptying services	- Unregulated services and tariffs are **likely to favour those able to pay more**, or with more power, during times of high demand. - Trucks have **limited access to empty systems** in flood prone areas where vulnerable groups are living
Treatment and disposal	- **Reduction in treatment quality** in extreme events – risk for sludge reuse and **increased exposure to vulnerable groups** using open waterways.

(iii) Vulnerability thinking

Key considerations:

- Understand the **specific risks** expected to be faced by vulnerable communities and **target support**
- Marginalised groups, including women, ethnic minorities, the elderly and people with disabilities, **included in planning and decision making** to build capacity
- Ensure support to vulnerable communities in **recovery from disasters**



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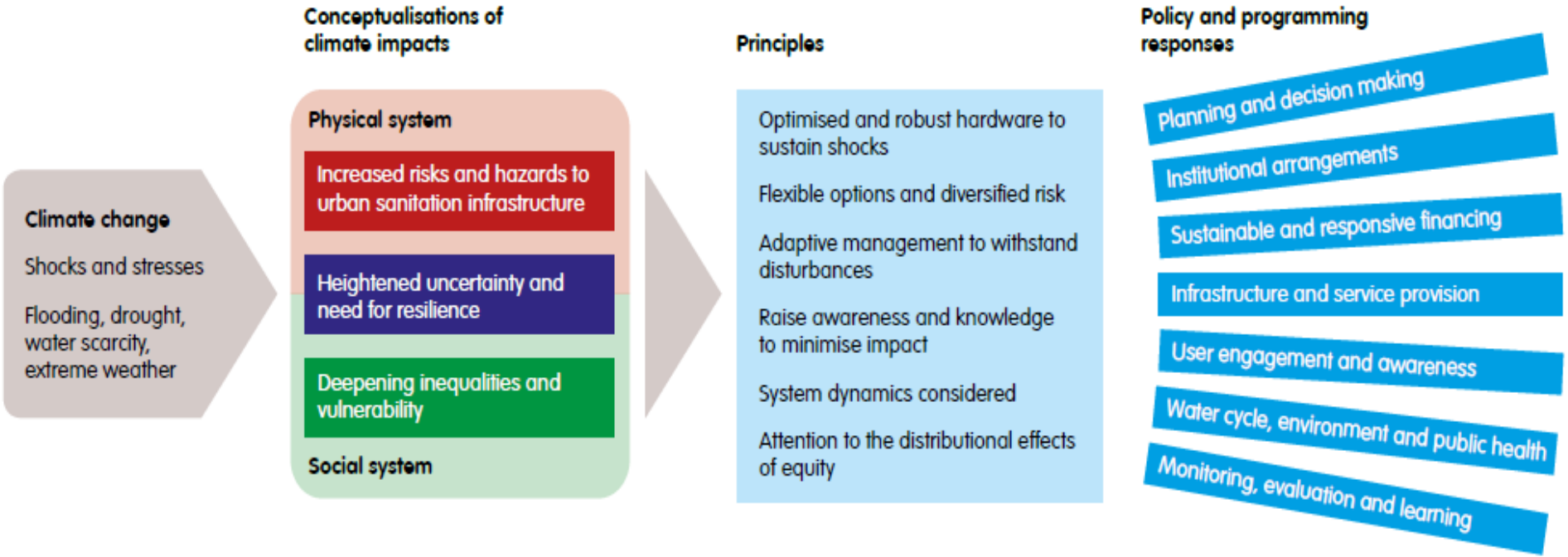
How to apply this climate thinking to urban sanitation?



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Joined-up responses

Sufficient and **accessible financing** for fast response and increased operation and maintenance needs

Diversified approaches to manage infrastructure assets and risks

Include **flexibility and adaptability** in multi-criteria decision making

Governance

Planning

Finance

Assess and plan for particular risks to vulnerable groups *e.g. free preventive emptying*

Improved **institutional capacity to monitor, respond and adapt** to diverse climate scenarios and to ensure equitable service provision

Planning that **considers multiple climate scenarios,** and likely higher finance needs

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Joined-up responses

Does **'robust' sanitation or 'repairable' options** make more sense in given context and climate risks

Involve operators in design and decisions

Infrastructure and services

Consider **GHG contributions in design** *e.g. reduce pumping, reuse biogas, reduce emission from treatment*

User engagement

Monitoring, evaluation & learning

Raise awareness on potential climate hazards to users through familiar and simple language

Environment and public health

Establish **warning systems** and promote awareness of how to minimise risk

Promote win-win climate solutions *e.g. through nutrient re-use effects (greater water-holding capacity) on agriculture affected by climate change*

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Conclusion – take-aways

- **Hazards will increasingly demand attention**: we cannot continue to ignore climate impacts on FSM 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
- **FSM and citywide sanitation services must be designed to be sustainable** under evolving, uncertain conditions

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Taking the next steps

Paper provides a range of climate actions that can be considered in urban sanitation program and policy.

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

http://www.snv.org/public/cms/sites/default/files/explore/download/2019-considering-climatechange-in-urban-san-ushhd-learning-snv_0.pdf

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