

WASH SDG Programme Global Learning and Knowledge Development: WASH and Climate

Community of Practice: Briefing Note

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Learning Clinic Webinar:

Climate change and Sanitation WASH SDG

24 May 2022 and bonus session of 5 July 2022

Sanitation is often the forgotten child.

Following the consultation sessions and as reflected by the interactive poll¹ during the webinar, the theme climate change and sanitation came up as one of the areas with the most desire to learn about. Our first WASH and climate learning clinic on focused on Sanitation and climate and due to logistical issues, a bonus session was organized as well.

This learning theme was shaped to understand both how sanitation is influencing climate change, as well as also how climate change is affecting sanitation services around the world. In many situations, climate change impacts on WASH disproportionately affect sanitation. We are looking at the practical implications of climate change on people's everyday lives in cities, particularly with respect to the interaction between flooding and sanitation.

We have had the opportunity to listen in to [Professor Barbara Evans](#)² presenting the current state of thinking on Climate change and sanitation, and to the efforts the WASH SDG programme in Indonesia has made towards climate change and sanitation and the climate change initiatives being made in Bangladesh.

Agenda – full recording www.youtube.com/watch?v=eFT5w7Saquo and bonus session here www.youtube.com/watch?v=DOTQFe266ks

Theme	Druation	Colleague	Presentation download
Welcome and introduction	5 min	Arjen Naafs	Presentation here
Scene setting	20 min	Professor Barbara Evans	Presentation here
Case study 1: Indonesia	10 min	SNV/ Lena Ganda Saptalena	Presentation here
Case study 2: Bangladesh	10 min	SNV/Marc Casas	
Open discussion	20 min		Recording here
Next steps & closing	5 min	Arjen Naafs	

¹ How would you consider your knowledge on sanitation and climate? 15 % of colleagues are quite confident

² [Professor Barbara Evans](#) presenting the current state of thinking. She holds the chair in Public Health Engineering in the School of Civil Engineering at the University of Leeds and has recently co-authored two flagship publications. She is from the University of Leeds and is part of the future climate for Africa program

Highlights from Professor Barbara Evans Presentation on Climate Change and Sanitation

Setting the Scene

The interface between Climate Change and Sanitation manifests in two ways; The production of Green House Gas emissions, and Failure of sanitation systems and services because of climate change events. A combination of adaptation and mitigation measures are required to reduce vulnerability to the CC effects and reduce emissions respectively.



Professor Barbara Evans, University of Leeds UK



1. Demonstrates the interrelations between climate change and sanitation, and response measures for the impacts
2. Climate change in form of extreme events impacts on sanitation as;
 - a. Sanitation systems and services fail, and
 - b. GHG emissions from sanitation released into the atmosphere
3. Response is in form of; Mitigation to reduce emissions, and Adaptation to reduce the vulnerabilities

Emissions and Mitigation

- Urban sanitation is a major source of GHG emission through: (a) Onsite and offsite systems, (b) Containment, Emptying, Transport & Treatment, and (c) Direct, Operational, Embedded Carbon
- Wet anaerobic systems having the highest emissions
- Direct methane accounts for the highest share of emissions for all systems
- Anaerobic storage and treatment processes have the highest per capita emission rates

To understand mitigation in sanitation, it's important to understand how big the emissions are, and where these were occurring. A study funded by the UK Government points to the following sources of emissions: Off-site and On-site Systems, Containment, emptying, transport and treatment, and Direct operational emissions. Wet anaerobic systems registered highest emissions in the Kampala City study, and direct emissions were mainly from pits and tanks. Methane accounted for the highest share of emissions from all the sanitation systems in the city, with Operational emissions from trucking sludge registering the least emissions. The study findings indicated that 45% of total emissions from the city were from sanitation. In determining the best or recommended 'Sanitation Pathway', Prof Barbara cautioned that no standard or generic sanitation pathway that can be recommended because of the differences in context and the local situation.

Conclusion and recommendations

1. Different sanitation pathways have different per capita emission rates; Onsite/ FSM' systems are not inherently better or worse than offsite/ sewer systems; Safely managed' sanitation pathways do not have inherently lower per capita emission rates
2. Emissions are dominated by methane from anaerobic storage, treatment plants and dumping
3. The IPCC is underestimating GHG emissions from urban sanitation and we may be missing opportunities to reduce emissions such as:
 - o Aerobic storage is better
 - o Move sludge through the system quickly (sewers and container-based sanitation, plus smaller tanks)
 - o Treatment should include methane capture – this may have implications for levels of centralisation

Adaptation

- Climate change effects are affecting urban sanitation systems
- Evidence is however scanty and uneven, and skewed towards highly engineered systems in well managed utility contexts

Focus of adaption has been on climatic effects on sanitation infrastructure, and mainly extreme temperatures and flooding, and how this affects sewer systems. There are assertions in literature on climate proofing latrines, however this is not backed by empirical data/evidence.

Conclusions/recommendations

- The sector is making sweeping statements about resilience of pit latrines and septic tanks based on very limited/ absent or incorrect information.
- Interconnections with drainage, solid waste and transport are critical
- Climate has operational implications which may be more important than infrastructure/ design issues.

Discussion/reflections

1. Sanitation emission rates are determined by the technology in use, for example aerobic and anaerobic, and the functions of the treatment plant where methane capture is integrated in the system. The terminology of 'Septic Tanks' is not functional as these are sealed boxes, and nothing related to GHG emissions reduction.
2. 'Why should we care about sanitation emissions?' Studies are pointing towards higher emission rates and thence the need to respond by designing sanitation infrastructure and improve operations to reduce on the emissions. Eliminating emissions is not possible, it's all about reducing emissions.
3. Minimising emissions from standard septic tanks is difficult. Methane capture is only possible at a centralised facility level, and not household level.
4. Re-use of faecal sludge while possible was not the focus for the study presents relative carbon off-set opportunities. Factors of distance between source and treatment facility must be considered. Studies are also being done on efficacy of human derived fertilisers as compared to chemical fertilisers.

The demonstrated interest in mitigation in the Q&A session points to an information and knowledge gap that will continue to be addressed through the learnings.

CASE STUDIES

Bangladesh - Climate Change Initiatives by Marc Casas

Block desludging results in Khulna 2021

Volume of FS (m³) treated by month

Month	2017	2018	2019	2020	2021
January	180	230	225	220	230
February	180	230	225	220	230
March	180	230	225	220	230
April	180	230	225	220	230
May	180	230	225	220	230
June	180	230	225	220	230
July	180	230	225	220	230
August	180	230	225	220	230
September	180	230	225	220	230
October	180	230	225	220	230
November	180	230	225	220	230
December	180	230	225	220	230

- Tripled volume of emptying services
- 50 trips using mobile Transfer Station (mTS) of 7 m³.
- Unknown GHG reduction compared to on-demand service. (Need research)

Decentralized Wastewater Treatment Systems DEWATS

BEFORE: A narrow alleyway with a large, cluttered septic tank structure.

AFTER: A clean, narrow alleyway with a modern, compact septic tank structure.

Diagram of DEWATS components: Buffer tank, Anaerobic Baffled Reactors, Anaerobic Filter Chamber.

Treatment of Faecal Sludge

- FSTP's Operation and Maintenance (O&M) Manuals
- Ability to respond and repair damage to infrastructure.
- Proper maintenance to prevent dysfunctionality after events.
- Financial Resources to respond after events.

The initiatives were a response to flooding as a climatic effect, and related pollution effects.

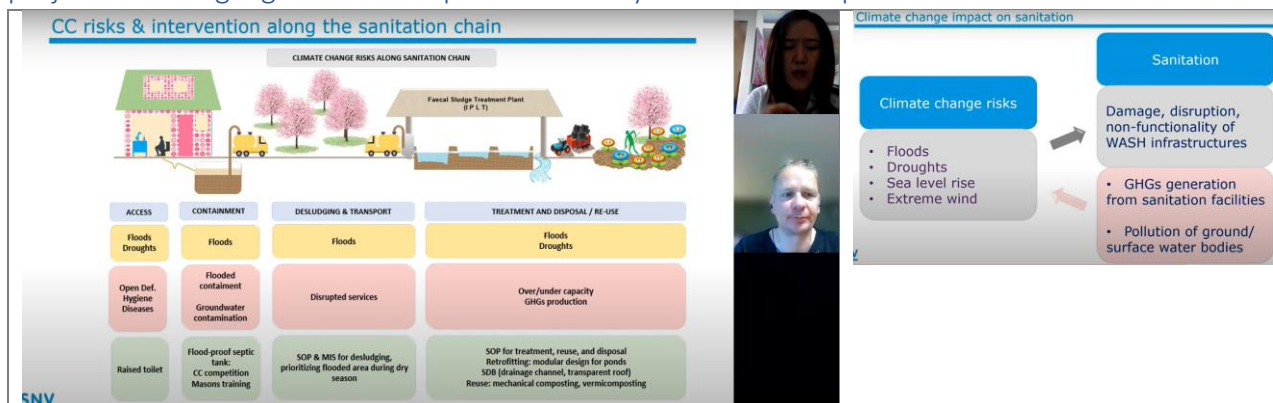
The solutions proposed include prefabricated plastic septic tanks, mobile transfer stations, decentralised treatment systems (DEWATS) and de-carbonised briquette production trials.

Integrated Municipal Information System (IMIS) was introduced to inform planning and decision making and has been a valuable tool for integrating climate change through use of spatial tools to determine impacts from cyclones on sanitation infrastructure.

Key messages from case study

- The climate change initiatives are a mix of mitigation and adaptation measures.
- Building on what already exists such as the DEWAT system for communities of households.
- Working closely with the local authorities

A case study from Indonesia - Mainstreaming climate change in sanitation: Case studies from SNV project cities. Highlights from the presentation by Lena Ganda Saptalena:



- Climate change and sanitation affect each other. It works both ways and this is also observed in the project cities. The 3 cities – Bandar Lampung, Tasikmalaya and Metro City, with the population about 1,700,000 and 150,000 each. The extreme weather events such as floods and droughts, which are temporarily or permanently damage or disrupt the functionality of the was infrastructure.
- The cities employ onsite sanitation technologies, the type of technology employed in this treatment plans are all producing the quicker slide, the dry, quicker slide. The design capacity of this treatment plant is uh, 1938 and 45 cubic meter per day. And the operating capacity is I also 90 and then 12 and 2524 cubic per.
- This production of the dry slide is around 45 kg/day in Bandar Lampung, 6 kg/day in Tasikmalaya and 12 kg/day in Metro City. This is estimated to be corresponding to the greenhouse gas emission.

Resources

- [\[Video\]](#) FCFA AMCOW Africa Water Week 2018 presentation: Climate change and sustainable sanitation in Africa
- [Nature](#): Whole-system analysis reveals high greenhouse-gas emissions from citywide sanitation in Kampala, Uganda and supporting [Global Water Forum](#) blog
- [Environmental Science and Technology](#): Climate Change Impacts on Urban Sanitation: A Systematic Review and Failure Mode Analysis
- Climate Change Response for Inclusive WASH: [A guidance note for Plan International Indonesia](#)

Discussion points addressed (from chat box/raised by colleagues)

Alok Kumar Majumder, Simavi: Question was that whether to have any kind of experience how really this climate change affecting in a shit flow diagram in the city? The reason I'm asking if we can have a concrete result that really help us to convince the policymaker with the evidence to act on upon on this issue.

Geert, Simavi: What is more important for us to focus on? Is it mitigation or is it adaptation

Mitigation is avoiding greenhouse gases, and methane is one of the components which is emitted from sanitation, and methane is a more powerful greenhouse gas and is only in the circulation for a couple of years, so it is less. In wet situations like septic tanks are turning out to be major methane producers. Whereas for instance, dry latrines and are producing less. So it's not a clear cut case of how to do methane reduction.

On adaptation: This second component is about making sure that we are able to live with and adapt to the challenges of climate change is doing, and Barbara's presentation raised a couple of aspects to that.

And for many of the areas where we're working, the focus should be an adaptation because that is a direct effect on the health and particularly on the sustainability of the services.

Forthcoming learning clinics

Feel free to provide feedback and suggestions [here](#) and see the feedback received till date [here](#)

The next learning clinic is scheduled for **Tuesday 27th of September about WASH and Climate finance from 9:30-11:00 Netherlands time**. The session will be with scene setting by Catarina Fonseca and examples from Nepal and Uganda. If you have anything you would like to share from your sub-programme, please contact [Vera van Der Grift](#). Should you have questions in advance, please submit them [here](#).