Report on the virtual workshop on **CLIMATE RESILIENT TOILET (CRT) TECHNOLOGY**

Organized By

FINISH MONDIAL BANGLADESH

In Collaboration wit

ITN-BUET

DECEMBER 11, 2025

FINISH MONDIAL BANGLADESH

ITN-BUET

Table of Contents

1 Background

Bangladesh has made significant strides in improving access to Water, Sanitation, and Hygiene (WASH) services. However, regions prone to prolonged flooding and waterlogging remain particularly vulnerable, necessitating innovative solutions to ensure safely managed sanitation for all. Recognizing this, FINISH Mondial Bangladesh piloted the Climate Resilient Toilet (CRT), an affordable and sustainable solution designed for such environments. By integrating adaptive technology with local engagement, the CRT aims to improve public health, enhance community resilience, and address the adverse impacts of climate change.

This workshop aimed to showcase the CRT's technical design, share insights from the Gaibandha pilot phase, and discuss scaling strategies for the technology to Jamalpur and beyond. By uniting international and local stakeholders, the session explored how climate-adaptive sanitation solutions like the CRT can drive impactful and sustainable change in vulnerable regions. CRT technology directly addresses challenges by ensuring functionality, durability, and sustainability under adverse conditions.

2 Workshop Overview

On December 11, 2024, ITN-BUET and Finish Mondial Bangladesh co-hosted a virtual workshop on Climate-Resilient Toilet (CRT) Technology. The event united more than 100 participants, including experts, policymakers, practitioners, students, and representatives from government agencies, academia, NGOs, and INGOs. This workshop provided a crucial platform to explore sustainable sanitation solutions specifically tailored for regions prone to flooding and high groundwater levels.

As Bangladesh continues to grapple with the escalating impacts of climate change, the need for innovative and adaptable sanitation solutions has never been greater. Discussions at the workshop centered around overcoming challenges posed by waterlogging, ensuring sanitation access for vulnerable communities, and scaling climate-resilient technologies. Demonstrations of advanced systems like the Climate Resilient Toilet and Flood-Resilient Toilets (FRTs) provided practical insights into addressing these challenges effectively.

2.1 Welcome Address

In his welcome speech, Alauddin Ahmed, Project Manager at ITN-BUET, emphasized the pressing need for climate-resilient sanitation in Bangladesh. He stated:

"Flooding is a common scenario in Bangladesh. Every 10 years, we witness massive floods, inundating 40 to 70% of the landmass. Sanitation needs are crucial during such times, and it is essential to prioritize climate-resilient technologies."

Ahmed's remarks highlighted the urgency of developing and deploying technologies that can withstand extreme environmental conditions and protect both public health and the environment during periods of crisis. His speech set the tone for the workshop by underscoring the necessity of integrating sanitation solutions into broader climate adaptation strategies.

2.2 Opening Remarks

Building on the urgency conveyed in the welcome address, Wahida Anjoom, Country Coordinator of Finish Mondial Bangladesh, emphasized the critical role of policy integration in scaling CRT technology. She stated:

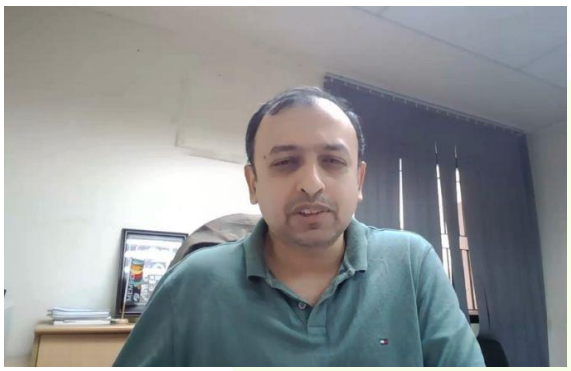
"Integrating climate-resilient sanitation technologies into national policies is essential to address the unique challenges posed by flooding and high groundwater levels. Collaboration with ITN-BUET and DPHE has been pivotal in advancing sustainable sanitation solutions in Bangladesh."

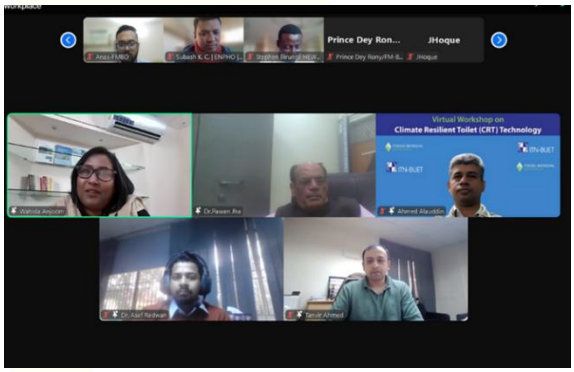
Her remarks highlighted the importance of institutional collaboration in ensuring that innovative technologies reach the communities that need them the most.

Adding a global perspective, Valentin Post, Director of Growth & Innovation at FINISH Mondial, underscored the initiative's broader mission. He remarked:

"We are not only treating human waste but also working towards safe reuse, whether for energy or agriculture."

These opening remarks established the workshop's strategic framework, focusing on innovation, sustainability, and the alignment of sanitation technologies with broader goals of climate resilience and resource management.





2.3 Showcase of Innovations

Dr. Pawan Kumar Jha, Technical Expert in Sanitation, provided an in-depth technical presentation on CRT design, functionality, and impact. A centerpiece of the workshop was the introduction of the "Climate Resilient Toilet," an innovative sanitation system developed to address challenges in flood-prone and high-water-table regions. Key features of the Climate Resilient Toilet include:

- **Three-Chamber Design:** Prevents groundwater pollution and ensures effective wastewater treatment.
- **Advanced Filtration:** Achieves a 99.7% reduction in total suspended solids (TSS) and a 97.8% reduction in total coliform, ensuring environmental safety and public health.
- **Affordability and Usability:** Engineered to be cost-effective and adaptable for rural and urban settings alike.

The system has the potential to transform sanitation practices in vulnerable areas by offering a scalable and environmentally friendly solution.

2.4 Flood-Resilient Toilets in Action

The workshop also featured a demonstration of Flood-Resilient Toilets (FRTs) in Gaibandha Municipality, Bangladesh. Supported by Finish Mondial, two FRT units were constructed in College Para village using locally sourced materials, such as ring channels and cement bags, which serve as bacterial growth media. These toilets demonstrated:

- Significant reductions in TSS, BOD, COD, and coliform levels.
- Cost-effectiveness and adaptability for flood-prone areas.

The demonstration highlighted how the Climate Resilient Toilet design could be adapted to meet the unique challenges posed by waterlogged and flood-prone environments. These toilets not only minimize health risks but also reduce groundwater contamination, making them a vital component of Bangladesh's climate resilience strategy.

2.5 Video Highlight

A significant part of the workshop featured a video presentation focusing on the Flood-Resilient Toilet Project in Gaibandha, Bangladesh. This project, supported by the fund of Directorate-General for International Cooperation (DGIS), Netherlands, was introduced by Dr. Pawan Kumar Jha, Technical Advisor and expert in biogas and septage management.

The video provided an in-depth look at the project's location and components, showcasing innovative toilet designs and waste management solutions aimed at addressing flooding and sanitation challenges in the region. Key aspects of the project included:

- Engineering adjustments to make toilets flood resilient.
- Integration of biogas and wastewater treatment processes to maximize utility and sustainability.

- Strategies for scaling the project to other vulnerable areas in Bangladesh.

This video underscored the workshop's overarching mission of aligning local solutions with global innovations to tackle pressing sanitation and climate challenges.

2.6 Participant Engagement and Key Discussions

Workshop participants actively contributed to discussions, raising practical concerns and providing valuable suggestions for scaling CRT technology. Some of the key points addressed included:

a) Accessibility

Several participants emphasized the importance of ensuring that CRT systems are inclusive, particularly for people with disabilities and the elderly. Experts proposed adjustments such as ramps, wider doorways, and modified superstructures to make the toilets fully compliant with Gender Equality and Social Inclusion (GESI) standards.

b) Affordability

The current cost of 35,000 BDT per unit was noted as a potential barrier for widespread adoption. However, experts reassured participants that ongoing efforts, such as utilizing local innovations and achieving economies of scale, aim to reduce costs and enhance affordability.

c) Flood Resilience

Concerns were raised about potential challenges such as backflow, solid waste treatment efficiency, and water entry during floods. Experts highlighted the system's long-term performance and assured participants of ongoing research to improve pollutant reduction and overall efficiency.

d) Maintenance and Longevity

Questions about the Climate Resilient Toilet's lifespan revealed that it requires minimal maintenance, with cleaning needed only once every 10 years. The sludge produced can be safely repurposed as fertilizer, providing an additional benefit to communities.

2.7 Q&A Summary

The workshop featured an interactive Q&A session that allowed participants to address practical concerns and clarify the potential of CRT technologies. Key questions and responses included:

1. Muhammad Tarek Mahmud
   - *Question*: Is there any provision for people with disabilities?
   - *Response*: The toilet can be designed to be accessible for people with disabilities by adding features such as ramps and modified superstructures to make it GESI-friendly.
2. Tawhidur Rahaman

- *Question*: How many samples have been taken to observe pollutant reduction, and is there a long-term monitoring study available?
- *Response*: Long-term monitoring is necessary to draw final conclusions on pollutant reduction. A technical paper on this study is available upon request.

3. Mahmudul Hasan
   - *Question*: Is there a risk of backflow from the second chamber if wastewater does not leach properly, and is this technology suitable for the south and southwest parts of Bangladesh?
   - *Response*: There is potential for backflow if wastewater doesn't leach properly. Technology can be implemented in the south and southwest, provided specific site conditions are met.
4. Md Azizur Rahman
   - *Question*: Has the toilet experienced any issues during monsoons or severe floods?
   - *Response*: Further investigation is needed on how the toilet performs during floods, but adjustments to the design, such as proper leaching and drainage, mitigate flood risks.
5. Mildred Elsie
   - *Question*: Will the leaches in the third chamber draw water into the chambers during floods, affecting functionality?
   - *Response*: The design considers flood risks, and appropriate measures ensure water does not affect functionality during floods.

2.8 Conclusion Remarks

The workshop concluded with remarks from Dr. Tanvir Ahmed, Director of ITN-BUET, who reflected on the broader implications of CRT technology. He stated:

"Regarding adaptation, this technology will score very high as the users can use it even during inundations. Also, the containment remains closed and unaffected during the inundation, which is very important considering the leach pit latrines we currently have are not fully able to do that."

Dr. Ahmed emphasized the dual focus on adaptation and mitigation as essential to ensuring long-term sustainability and resilience.

The session concluded with several recommendations:

- Upgrading Existing Pit Latrines: Explore the potential for retrofitting current pit latrines by adding two additional chambers to incorporate this technology.
- Scaling Up Pilot Projects: Expand the implementation of CRTs in flood-prone areas to assess their effectiveness and adaptability. The findings can then be presented to the government for consideration in national sanitation programs, particularly in rural regions.
- Capacity Building: Train local communities and stakeholders to construct, operate, and maintain CRT systems.

- Further Research: Focus on methane utilization and continued monitoring of pollutant reduction to optimize system efficiency.

Participants left the workshop with a sense of optimism, inspired by the transformative potential of CRT technology to enhance public health, protect the environment, and build resilience in the face of climate challenges.

3 Limitations of the workshop

- **Time Constraints:** The limited duration made it challenging to accommodate contributions from all participants and to thoroughly cover all discussion points.
- **Technical Challenges:** As an online session, occasional technical issues such as connectivity problems and audio disruptions affected the smooth flow of the workshop."
- **Participant Engagement:** The virtual format reduced active participation due to distractions or the passive nature of remote attendance.
- **Limited Networking Opportunities:** Unlike in-person events, the workshop provided fewer chances for informal networking and relationship building.
- **Learning Environment:** Some participants struggled to stay fully engaged or absorb information effectively compared to an in-person setting.
- **Time Zone Differences:** Coordinating attendance across different time zones, limited full participation from a global audience.
- **Technical Proficiency:** Participants with varying levels of familiarity with digital platforms faced difficulties, impacting overall engagement and participation.

4 Recommendations

Based on feedback from workshop participants, the following suggestions are recommended for future sessions:

- **Enhancing Open Discussions:** Improve the structure and facilitation of open discussions to encourage greater engagement from all attendees.
- **Managing Workshop Flow:** Limit the frequency of questions during the session to reduce interruptions and maintain a smoother workshop flow.
- **Incorporating Interactive Tools:** Utilize participatory tools such as quizzes and polls to boost participant engagement.
- **Considering In-Person Workshops:** Explore the possibility of hosting in-person workshops to enhance engagement and provide better networking opportunities.

5 Conclusion

The virtual workshop on Climate-Resilient Toilet (CRT) Technology successfully showcased innovative solutions for flood-prone regions, highlighting practical applications, technical advancements, and the importance of climate resilience. Participants appreciated the comprehensive content, interactive discussions, and collaborative platform for knowledge exchange.

Despite time constraints and technical challenges, the workshop met its objectives by fostering engagement and raising awareness of sustainable sanitation practices. Recommendations for improved discussion structure, interactive tools, and in-person sessions will guide future initiatives. The workshop marked a significant step toward fostering innovation and building resilient sanitation systems to address climate challenges in Bangladesh.