



Global Water & Sanitation Center

INTRODUCTION

22 Aug 2024



BILL & MELINDA
GATES *foundation*



A new partnership between the *Bill and Melinda Gates Foundation* and *Asian Institute of Technology* to scale

Citywide Inclusive Sanitation [CWIS] and Transformative Sanitation Technologies in the region



VISION

To accelerate the access to reliable, inclusive and sustainable WASH for all in Asia, by 2030



MISSION

To assemble & run a catalytic platform aggregating bright minds, expertise, innovations to solve for challenges and the inequities in WASH sector

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DREAM TEAM

Visionaries, Enthusiasts, Optimists, Performers

ADVISORS



Dr. Roshan Raj Shrestha
Advisor



Neelima Thota
Advisor

MANAGEMENT



Prof. Sangam Shrestha
Co-Director



Prof. Thammarat Koottatep
Co-Director

OPERATIONS



Dr. Kavinda Gunasekara
Chief Operating Officer |
Manager



Isha Basyal
Deputy Chief
Operating
Officer

IN-COUNTRY TEAM



Makfie Farah
Bangladesh Resident
Program Manager



Kimberly Tupaz
Technical
Coordinator



Mostafizur Rahman
Technical
Coordinator

TECHNICAL TEAM



Hendra Gupta
Knowledge
Management
Officer



Sikshya Adhikari Rana
Gender Expert

FINANCE & ADMINISTRATION



Suchitra Piempinsest
Admin & Finance
Officer



Supaluck Luchatawachee
Secretary



Vencent Jacob
Technician

Project staff



Santosh Dhungana
Data Innovation Expert



Harshi Sirisena
Technical Coordinator



Sichu Shrestha
Geospatial Expert



Thusitha de Silva
Communication
Officer



Suwas Ghimire
Senior Research
Associate



Chawalit Chaiwong
Senior Research
Associate



Yaowalak Chirasuwannaphot
Research Associate



Rossukhon Chansong
Research
Associate



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AIT
Asian Institute of Technology

GSGS University PARTNERS



NETWORK OF EXPERTS



GWSC's Portfolio

Services, Thematic Areas and Partnership

CLIENTS

BI-LATERAL & MULTI-LATERAL
FINANCING INSTITUTIONS



Targeted INDUSTRY



Targeted MARKET



Bangladesh



India



Indonesia



Nepal



Thailand

ECOSYSTEM OF STAKEHOLDERS

Strategic Partners, Program Partners, Execution Partners, Funding Partners



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■ TECHNICAL ASSISTANT-HUB ■

TA-Hub | Connecting the Unconnected

Global Water & Sanitation Center



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GENESIS OF TA HUB

A '**platform and vehicle**' to scale citywide inclusive sanitation (CWIS), a public service approach summarized by SDG 6.2 outcomes.

- **Aggregate** WSH sector expertise
- Provide **strategic support** to Governments, IFIs and Development Partners in project conceptualisation, preparation, implementation and
- **Mainstream** CWIS in large-scale flagship investments

THE TA HUB FOCUSED TO:



Improve quality of project preparation and implementation



Support in any or all elements of the Project Cycle



Incorporate innovative approaches and technologies



Real-time support – rapid mobilization



Provide consistent metrics & knowledge sharing

TA-HUB OPERATIONS

Funding Mechanism

CITY WIDE INCLUSIVE SANITATION (CWIS)



SANITATION IMPROVEMENT PROJECTS

CWIS mainstreaming, integration of Innovative Technologies and IMIS

OP Kathmandu Valley Water Septage Sludge Manager



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- Retrofitting NSS guided by the CWIS principles in the proposed sewer DPR in Dhanbad and Ranchi.
- Developing a Citywide Inclusive Sanitation (CWIS) Plan for Thoothukudi in Tamil Nadu, India.
- Feasibility Study for Developing a Citywide Inclusive Sanitation Package Under the Concept of Urban-Rural Convergence for Udaipur, Dharmanagar and Bishramganj in the State of Tripura, India.
- Ganga Project Under River City Alliance, Preparation of Urban River Management Plan.
- Scaling City Institutions for Asia and India (SCI-AI): Evidence based Research and Practice to Promote Inclusive & Sustainable Sanitation.
- Rapid Technical and Financial Assessment of s-HRT + solids-free sewer + FSM for Safe Treatment and Disposal of Domestic Wastewater.
- Feasibility Study for Implementation of OP (L&T).



Feasibility Study of Omni-Processor in Hua Hin

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- Feasibility Study and Cost-Benefit Analysis for FSM Options and Market Sounding for Byproducts in Pagla Catchment.
- Comprehensive Feasibility Study on Sanitation and Waste Management in Cox's Bazar.
- OP Operational Assessment Study in Cox's Bazar.
- Operational Collaborative Tool of Ongoing Practices in Urgent Sanitation (OCTOPUS).
- Faecal Sludge Management (FSM) and Greywater Management (GWM) guided by the City-Wide Inclusive Sanitation (CWIS) approach in 7 Towns of Bangladesh.
- Safely Managed On-Site Sanitation: Technological Solutions for City Dwellers and Authority in DNCC.
- Feasibility Study of OP in Chittagong WASA.
- A situational Analysis to Identify the potential Interventions for Improving Sanitation Condition of Selected Areas (zones 2, 3, 6, and 10) of DNCC.
- Rapid Baseline Study of "Women in Sanitation Enterprises (WISE) Project".
- Siem Reap CWIS Institutional Systems Development.

CWIS

Innovative technology

Supportive research

Disclaimer: Borders are blurred for political reasons

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Different TA Projects

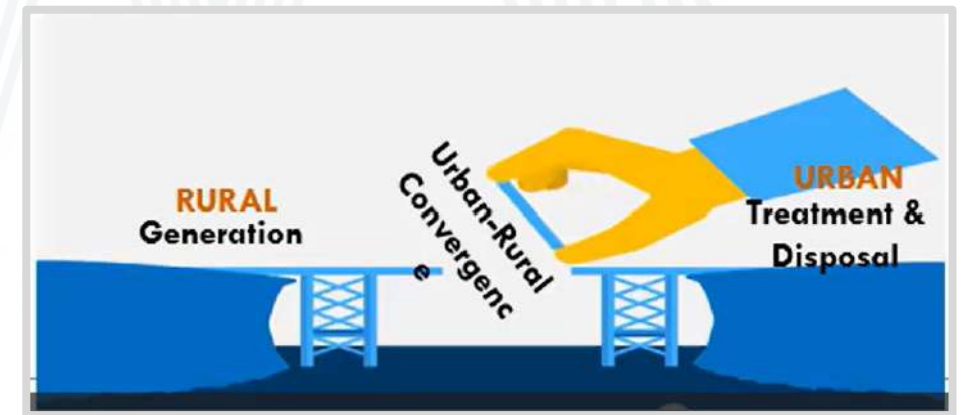
Type of the Project	Project Location	Type of the Study	Duration	Client	Technical Partners
CWIS		TA Tripura Feasibility Study	Nov. 2023 – May 2024 ~6 months	 	
		TA Tamil Nadu CWIS Plan	From early 2023 Initial Phase		TBD
Innovative Technology (OP related projects)		OP Hua Hin Feasibility Study	July 2023 – Sept. 2024 ~14 months		
Supportive Research & Studies		WISE Rapid Assessment	May 2023 – July 2024 ~3 months	 	
		OP Site Selection Rapid Assessment	Initial Study (1 Month)		Individual Consultants, CDD India

TA Tripura

Feasibility Report for Developing a CWIS Package Under the Concept of Urban-Rural Convergence in Udaipur, Dharmanagar & Bishramganj

Scope of this Study:

- Identify current sanitation conditions and specific community requirements based on the CWIS framework
- Regulatory and policy analyses considering local regulations and guidelines
- Technical feasibility of proposed sanitation solutions and available technologies
- Financial feasibility identifying funding sources
- GESI assessment
- Provide Recommendations to the ADB's ongoing efforts





■ DATA INNOVATION HUB ■

DI-Hub | Data Driven Culture

Global Water & Sanitation Center



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THE GENESIS OF DI HUB



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Transforming sanitation landscape in the region by instilling culture of data-driven evidence-based decision-making

- Leverage regional resources and expertise to foster data innovation and support CWIS planning.
- Promotes unified ecosystem of public data systems for sanitation.
- Integrated Municipal Information System (IMIS) regional resource hub.

THE DI-HUB AIMS AT:



Fortifying Public Data
Systems for Sanitation



Improve Sector
Policy and
Regulatory Reforms



Investment Prioritization,
Efficient Resource
Allocation and Planning



Effective Service
Delivery



Robust Monitoring
and Evaluation and
Innovations



FLAGSHIP DATA UNIFICATION PROJECTS

Strengthening of Public Data Systems for Sanitation in Bangladesh and Nepal



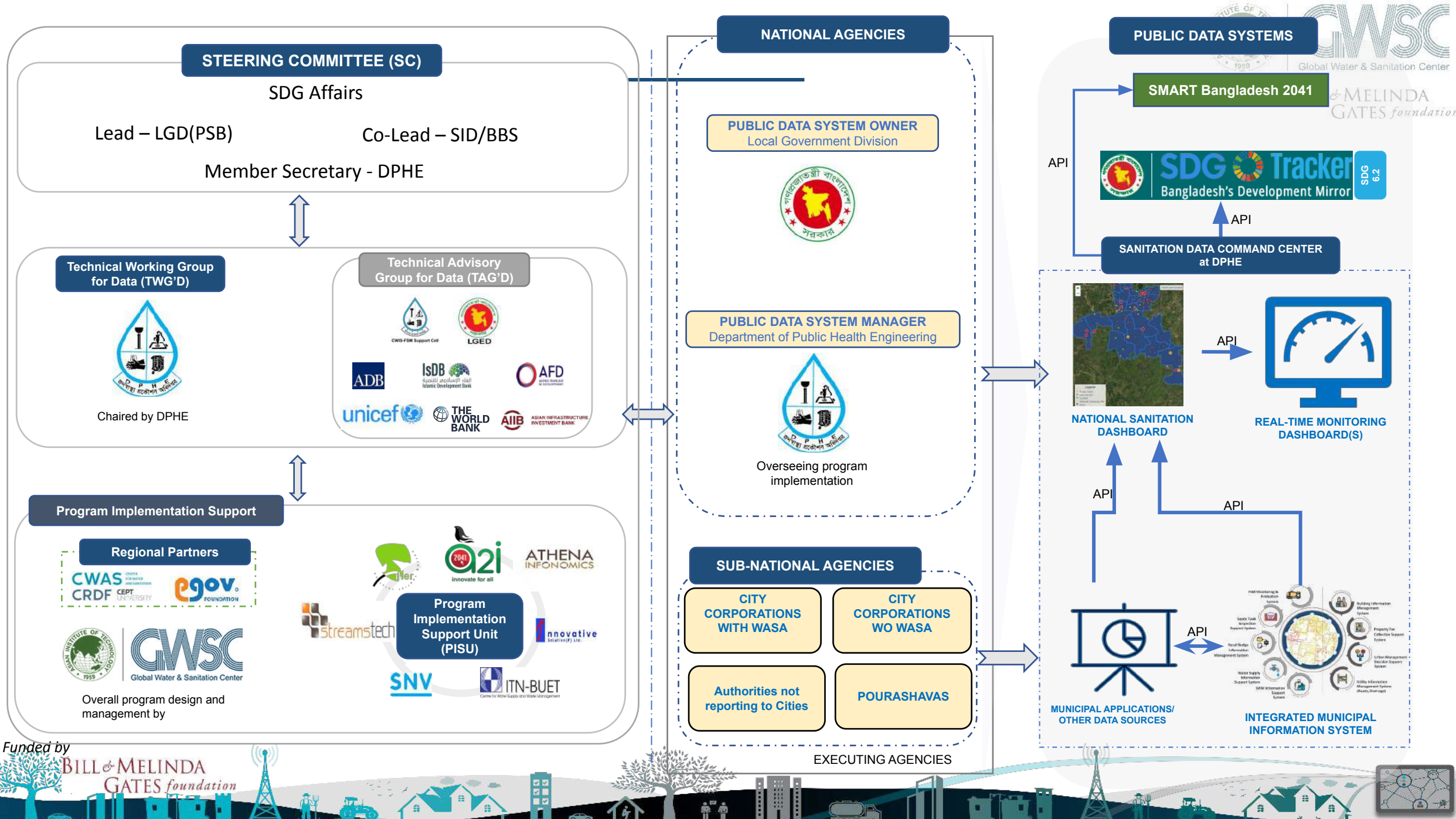
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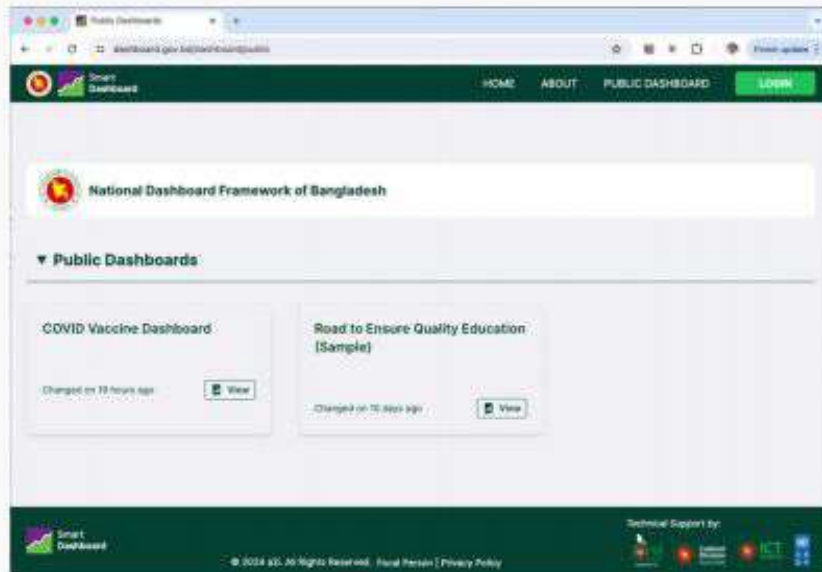
Vision

"To build a robust and reliable nationally owned integrated public data systems for Sanitation to support GoB in planning, resource mobilization, budgeting, service delivery, monitoring & evaluation and reporting"





Expected Integration to National Dashboard Framework



<https://dashboard.gov.bd/dashboard/public>

TRANSFORMATIVE TECHNOLOGY COMMERCIALIZATION HUB

TTC-Hub | Innovative Sanitation Technologies

Global Water & Sanitation Center



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Transformative Sanitation Technology



- Resource recovery: converts waste into reusable and valuable end products such as: nutrients, energy, and water.
- Improved environmental health: eliminates pathogens from human waste, diminish pollutants, and green house gases.
- Innovative examples are Omni Processor and Non-sewered sanitation system

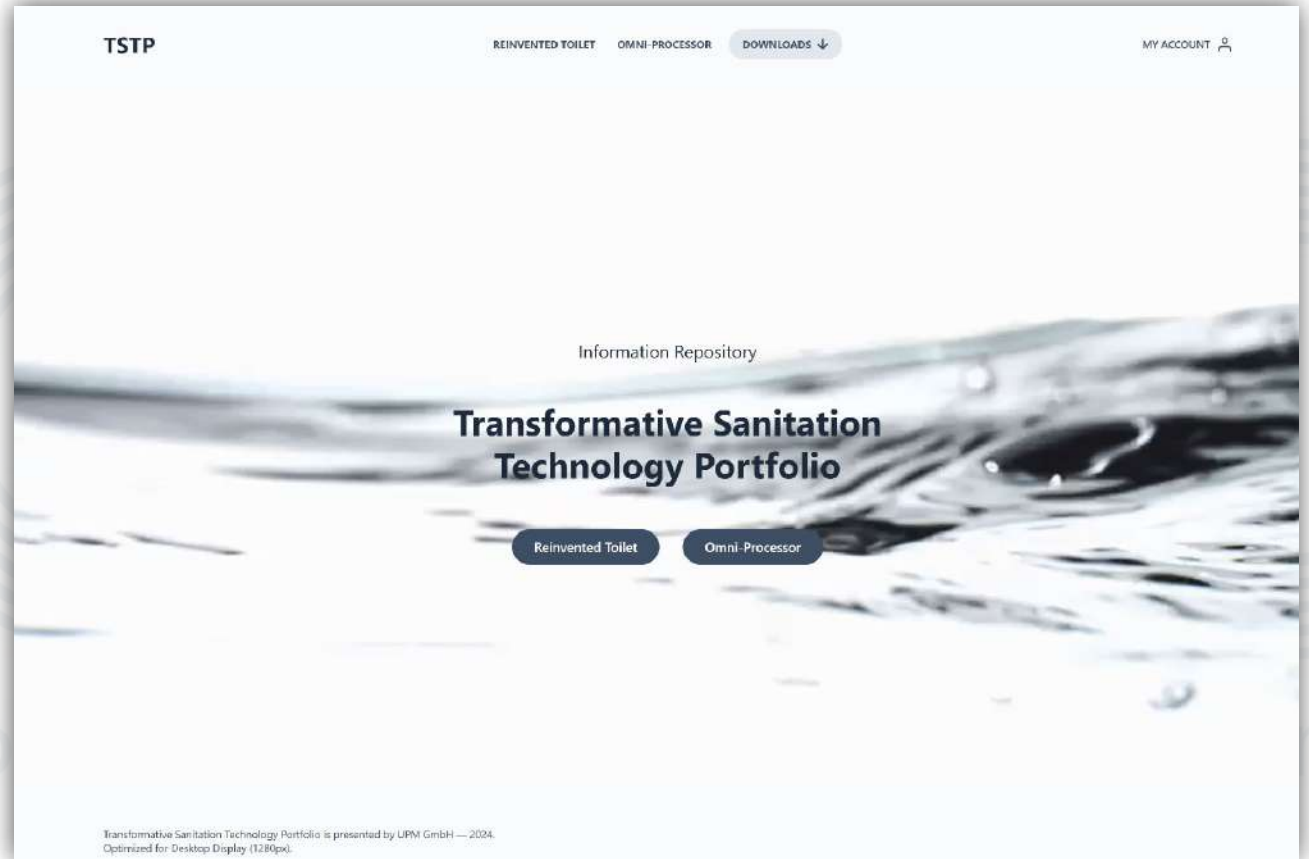
Reinvented Toilet Demonstration in Indonesia

- Implementing 30 Aquonic systems in Yogyakarta and Surakarta, Indonesia.
- Enhancing the sanitation infrastructure in alignment with the City Sanitation Strategy of both cities.
- Ensuring compliance with Indonesian discharge standards for domestic wastewater effluent.
- Producing pathogen-free, odorless effluent suitable for non-consumption purposes such as irrigation and flushing.



Transformative Technology Awareness Package

- Comprehensive knowledge resources and actionable dissemination plan to support awareness-raising and comprehension of Transformative Sanitation Technologies among identified target audience,
- Thus, facilitating strategic actions and well-informed decisions within their respective organizations.



An aerial photograph of a densely populated urban area, likely in Dhaka, Bangladesh. The image shows a mix of low-rise buildings with corrugated metal roofs and a few taller, more modern structures. A river or canal flows through the lower portion of the image. The overall scene depicts a complex urban environment with significant infrastructure challenges, particularly in sanitation and waste management.

Fecal Sludge Management (FSM) – Quality Management System

Dhaka North City Corporation
On-site Sanitation Feasibility Report
2023

- The result framework serves as a comprehensive guide for achieving the overarching objectives and purpose of the initiative.

- Through the realization of the specified results, the initiative aspires to drive positive transformations in waste management practices, water quality, and ecosystem health, ultimately leading to improved well-being for Dhaka's citizens and a more harmonious coexistence with the city's water bodies.

[illegible]

Assumption	
No. of private owned trucks	
Average vol. of trucks	
Total volume of trucks	
No. of trips/truck/day	
No. of days/month	
No. of buildings served	1
No. of population served	60
Est. Vol. of septic tanks	4.8
Est. Vol. of FSS	2.5
No. of workdays required	
Equals to no. of months	



Assumption	
No. of private owned trucks	
Average vol. of trucks	
Total volume of trucks	1
No. of trips/truck/day	
No. of days/month	2
No. of buildings served	23
No. of population served	19,38
Est. Vol. of septic tanks	8,33
Est. Vol. of FSS	2,63
No. of workdays required	4
Equals to no. of months	



OSS Technologies - DNCC

ON-SITE CONTAINMENT OVERVIEW

Available On-Site Containment Systems

			Decentralized Systems								Single Integrated Systems				
			Conventional Septic Tank	Prefabricated Septic Tank	Anaerobic Baffled Reactor (ABR)	Sequencing Batch Reactor (SBR)	Membrane Bio-Reactor (MBR)	Moving Bed Biofilm Reactor (MBBR)	Electro-Coagulation Reactor (ECR)	Biofil Digester	Biopipe System	Johkasou Tank	NEWgenerator	Aquonic	R3H2O
			C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13
Overview	Input	Blackwater	●	●	●	●	●	●	●	●	●	●	●	●	●
		Greywater	●	●	●	●	●	●	●	●	●	●	●	●	●
	Output	Effluent	●	●	●	●	●	●	●	●	●	●	●	●	●
		Capacity m³/day	Minimum	2	1	2	2	1	5	0.5	up to 0.5	1	5	1	0.6
	Maximum	75	10	200	300	6,000	300	200		1,000	100	20	1	50	
Suitability	Holding Type	Residential	🏠	🏠	🏠	🏠	🏠	🏠	🏠	🏠	🏠	🏠	🏠	🏠	🏠
		Educational	🎓	🎓	🎓	🎓	🎓	🎓	🎓		🎓	🎓	🎓	🎓	🎓
		Institutional	🏢	🏢	🏢	🏢	🏢	🏢	🏢		🏢	🏢	🏢	🏢	🏢
		Healthcare				🏥	🏥	🏥	🏥						🏥
		Business	🏢	🏢	🏢	🏢	🏢	🏢	🏢		🏢	🏢	🏢	🏢	🏢
		Industrial				🏭	🏭	🏭	🏭						🏭
	Construction	Space Requirement	==	—	==	—	==	==			—	—	—	—	—
		Tech Complexity	—			==	==	==	==	==	—	—	—	—	—
		Aboveground		—	—	—	—	—	—		—	—	—	—	—
	Underground	==	==	==	==	==	==	==			==			==	
Planning	Watertight		🛡️		🛡️	🛡️	🛡️	🛡️		🛡️	🛡️	🛡️	🛡️	🛡️	
	Uses Electricity				⚡	⚡	⚡	⚡		⚡	⚡	⚡	⚡	⚡	
O&M Requirements				—	—	==	==	==	==	==	—	—	—	—	
Investment Costs			—		—	==	==	==	==	—	==	==	==	—	
Certified for Bangladesh								🇬🇧	🇬🇧						

LEGEND:

● Blackwater	● Residential	● Low
● Greywater	● Educational	● Medium
● Effluent	● Institutional	● High
● Free of Pathogens	● Healthcare	● Aboveground
● Low % of Pathogens	● Business	● Underground
● High % of Pathogens	● Industrial	● Watertight
		● Uses Electricity

ON-SITE SANITATION SYSTEMS FACTSHEETS

Partial Solutions

Membrane Bio-Reactor (MBR)

C5

Overview

Input	● Blackwater ● Greywater
Output	● Effluent ● Sludge
Capacities (m ³ /day)	Min 1 Max 1,000
Output Quality	** Low % of Pathogens Effluent quality (mg/L) 1 – 10 BOD 5 – 30 COD 1 – 5 TSS Removal efficiencies (%) 90 – 99 BOD 90 – 99 COD 95 – 99 TSS
Important Requirements	- Electricity supply. - Wastewater holding tank (e.g. adjusted septic tank) prior MBR, if no holding chamber is integrated. - Accessibility for desludging services. - Post-treatment for effluent.

Visualization



FIGURE 06: View into MBR system with membrane modules. Source: Chem Limited.

Technical Description

- The Membrane Bioreactor (MBR) is an advanced wastewater treatment system that combines biological treatment using an activated sludge process with membrane filtration.
- Comparing all partial solutions, MBR systems can reach the highest effluent quality.
- Several companies are offering MBR systems in Dhaka, with differing features.
- The main treatment steps are:
 - Screening and storing:** The wastewater (WW) are screened to remove debris, inorganics, excessive oil and grease, and flows into the WW holding tank or chamber, either for settling or equalization.
 - Aeration with activated sludge (AS):** WW enters the aeration tank, where it is mixed with a microbial culture (AS) that biologically degrades organic pollutants. Microorganisms in the AS consume organic matter, transforming it into microbial biomass, carbon dioxide, and water.
 - Membrane filtration:** Following aeration, the WW passes membrane modules consisting of microfiltration or ultrafiltration membranes with small pore sizes (typically between 0.1 to 0.4 microns). The membranes act as physical barriers allowing treated water to permeate while retaining suspended solids, bacteria, and other contaminants.

ON-SITE SANITATION SYSTEMS FACTSHEETS

Partial Solutions

Moving Bed Biofilm Reactor (MBBR)

C6

Overview

Input	● Blackwater ● Greywater
Output	● Effluent ● Sludge
Capacities (m ³ /day)	Min 5 Max 300
Output Quality	** Low % of Pathogens Effluent quality (mg/L) 8 – 10 ^{III} / <50 ^{III} BOD 20 – 25 ^{III} / <200 ^{III} COD 5 – 20 TSS Removal efficiencies (%) 80 – 95 BOD 70 – 90 COD 70 – 95 TSS
Important Requirements	- Electricity supply. - Accessibility for desludging services. - Post-treatment for effluent.

Visualization



FIGURE 06: Containerized MBBR (top). Biofilm carrier "Muttig Blochips 30TM" used by WTB (bottom). Source: Wastewater Solutions, WTB

Technical Description

- The Moving Bed Biofilm Reactor (MBBR) is a biofilm-based biological process that takes advantage of natural cellular processes to decompose the organic matter in wastewater.
- The technology is applied as on-site solution as well as large-scale centralized solution.
- The MBBR process takes place in a reactor or aeration tank made of concrete, steel or plastic.
- The tank is equipped with support material that provides the surface for the growth of biofilm. The support material, also called media or carrier are usually small plastic chips or pellets. Their design intends to maximize the surface area they provide for biofilm and microorganisms to grow on.
- The tank should further be equipped with an aeration grid that helps the media to move and ensure contact with the components that shall be decomposed. It further ensures that oxygen is introduced continuously or intermittently into the tank.
- The main treatment steps are:
 - Aeration with Biofilm Media:** As wastewater flows into the reactor, the microorganisms in the biofilm metabolized and degrade organic pollutants. The aeration promotes the contact between microorganisms and biofilm, and pollutant removal is reached. Biofilm will grow and accumulate, and eventually detach from the biofilm carrier. The detached biomass, as well as any suspended solids form a sludge in the reactor.
 - Clarification / Settling:** The effluent undergoes further clarification that enables it to be either used as irrigation or discharged into drainage.

^{III} WTB Water Technology Bangladesh; effluent values are based on laboratory test.

Internships at GWSC



Ranju Bhatta
| WEM



Indrajith U. Kumara
| EEM



Harune Kaneda
| Gender



Sichu Shrestha
| RS & GIS



Siksha Rana
| Gender



Abraham Tesfamariam
| EEM



Rishab Nakarmi
| WEM



Farheen M. Malek
| Gender



Pragya Pradhan
| WEM

Engagements

- Be part of the project execution team
- Capacity Building programs
- Events conceptualisation & organisation
- Desk-reviews
- Research
- Content creation
- Policy draft

Events Organized with Students

Connect. Create. Celebrate.

Bringing Action and Inspiring Change—One Tiktok at a Time: Global Water and Sanitation Center Hops on Social Media Creativity in Synergizing SDG6

Jack Sim, founder of the World Toilet Organisation visits AIT and GWSC







WORLD TOILET DAY ART CHALLENGE

Art Gallery of humming bird winners

11
19
-
20
23



Grade 3 Jerome Arnold Finch



Grade 3 Mawarisa Incharoen



Grade 3 Taam Kanitnate



Grade 3 Proudporetha Sakumak



Grade 3 Warburpa Cherylle



Grade 5 Siraphop Vichasitwatt



Grade 5 Wariya Keenawadikool



Grade 4 Wariya Keenawadikool



Grade 4 Peerawich Chiamchanya



Grade 4 Junjaochay Marod



Grade 4 Pin Prathankiet



Grade 6 Nita Leeprethakorn



Grade 6 Sofia Ananya



Grade 3 Palin Uthairachit



WWD 2024



International Women's Day

International Women's Day is celebrated in many countries around the world. This is the day women are recognized for their political, economic, social, and cultural achievements. Currently, more than 20 countries set IWD as a national holiday.

As the Global Water & Sanitation Center, we acknowledge the significance of empowering women and girls to access clean water and sanitation services. We aim to honor the roles, contributions, and voices of the dedicated women who have supported GWSC with their hard work and passion.

 Altynay Omirzak Intern	 Apinya Suwannakaew Research Associate	 Pragya Pradhan Senior Research Associate	 Ranju Bhatta Intern
 Bussakorn Krittanusam Research Associate	 Farheen Masfiqua Malek Intern	 Rhutairat Hataitara Research Assistant	 Rossukhon Chansong Research Assistant
 Harshi Tharangika Sirisena Aluthduwe Hewage Research Associate	 Harune Kaneda Student Assistant	 Sichu Shrestha Research Associate	 Siksha Rana Student Assistant
 Isha Baysal Deputy Chief Operating Officer	 Kesirine Jinda Research Associate	 Suchitra Plimpinsest Administrative and Finance Officer	 Supaluck Luchutawachee Secretary
 Kimberly Tupaz Technical Coordinator	 Kittaporn Iamsaing Research Assistant	 Thamornwan Wongsuk Research Assistant	 Wilasinee Chanamarn Research Associate
 Maklie Farah Bangladesh Resident Program Manager	 Panadda Panchai Research Associate	 Yaowalak Chirasuwannaphot Research Associate	



Student Opportunities

Learn. Grow. Succeed.

GWSC SCHOLARSHIPS TO STUDY MASTER'S DEGREE IN ASIAN INSTITUTE OF TECHNOLOGY

GWSC Scholarships are here to provide students with the support and resources you need to turn those career goals of change in SDGs.

Academic Program:

- Water Engineering and Management
- Environmental Engineering and Management

Eligible Countries:

- South and Southeast Asia (Bangladesh, India, Indonesia, Nepal as priority)



Coming soon!

Research Grant & Support Hub

The RGSH supports researchers during every stage of their research.

The assistance offered ranges from funding advice to data management and from outreach support to providing guidelines for conducting ethically



Research Grant
& Support Hub



Altynay Omirzak

Intern



Indrajidh

Research Associate

Internship opportunities

- Priority basis Internships provided
- Always Paid + Choose your own hours
- Multi-Field Opportunities
- GWSC Certification
- Opportunity to join us full time
- 1 additional year stay in thailand post graduation

Research Support

- Grant support up to \$500 on core sanitation thesis
- Additional funding for writing a paper + assistance in publications
- Global Network of more than 43 research institutes across 4 continents.



CLIMATE ADAPTIVE TECHNOLOGY HUB



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Climate Smart WASH Technology Catalogue with Modelling

CLIMATE-SMART WASH TECHNOLOGY CATALOGUE WITH MODELING



- To conduct a comprehensive survey of existing WASH technologies to identify and select the best Climate-Smart WASH solutions for both online and offline catalogues.
- The primary objective of this assignment is to survey and evaluate WASH technologies to develop and publish a Climate-Smart WASH catalogue, featuring detailed technical specifications.
- Additionally, the hub ensures that all our Non-Sewered Sanitation (NSS) projects align with Climate-Smart WASH standards, integrating Climate-Health considerations into our ongoing initiatives.

FOLLOW OUR SOCIALS



Learn more

THANK YOU!

