

CITYWIDE INCLUSIVE SANITATION (CWIS): A PUBLIC SERVICE APPROACH FOR EQUITABLE SANITATION SERVICE DELIVERY

Roshan Shrestha, PhD
Deputy Director
Water, Sanitation Hygiene, Global Growth & Opportunity

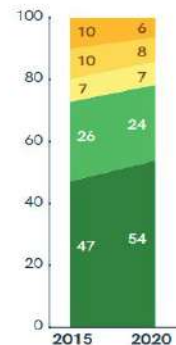
3.6B

people globally lack access to
safely managed sanitation

7%

Increase in proportion of global
population using safely managed
services since 2015

Nearly half the world's population
lacked safely managed sanitation
services in 2020



Global sanitation coverage, 2015-2020
(%)

Safely Managed

Improved and not shared - excreta
safely disposed in situ or off-site¹

Basic

Improved and not shared - excreta
not safely disposed

Limited

Improved (e.g. sewer, septic, VIP
latrines) and shared facilities

Unimproved

Use of pit latrines without a slab or
platform, hanging and bucket latrines

Open Defecation

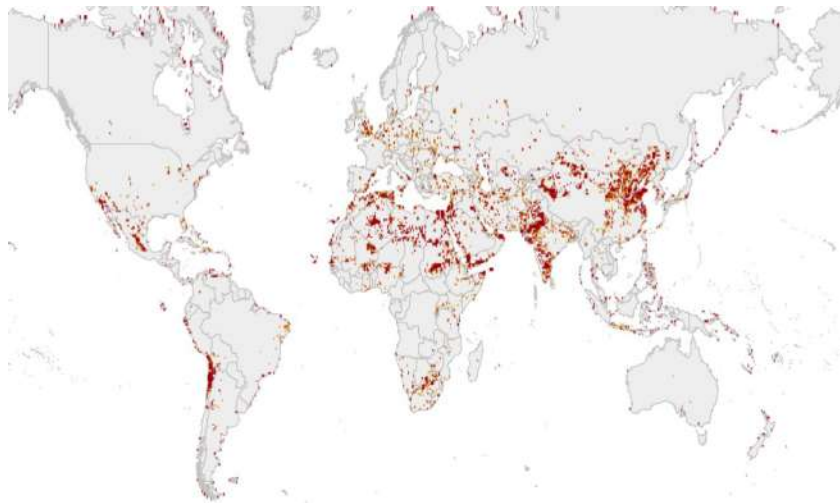
Disposal of human faeces in fields, or
other open spaces or with solid waste

**Faster progress required to achieve the SDG goal of
safely managed sanitation by 2030**

1. Transported and treated offsite

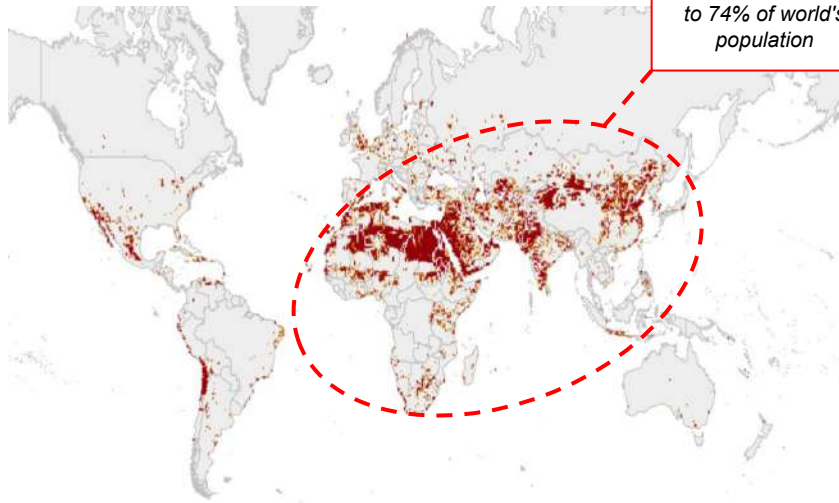
SUSTAINABLE HUMAN WASTE MANAGEMENT WILL BE REQUIRED TO ADDRESS INCREASING WATER SCARCITY

Baseline: 2000



In 2000, ~1.7B people were living in water scarce areas

Future: 2030



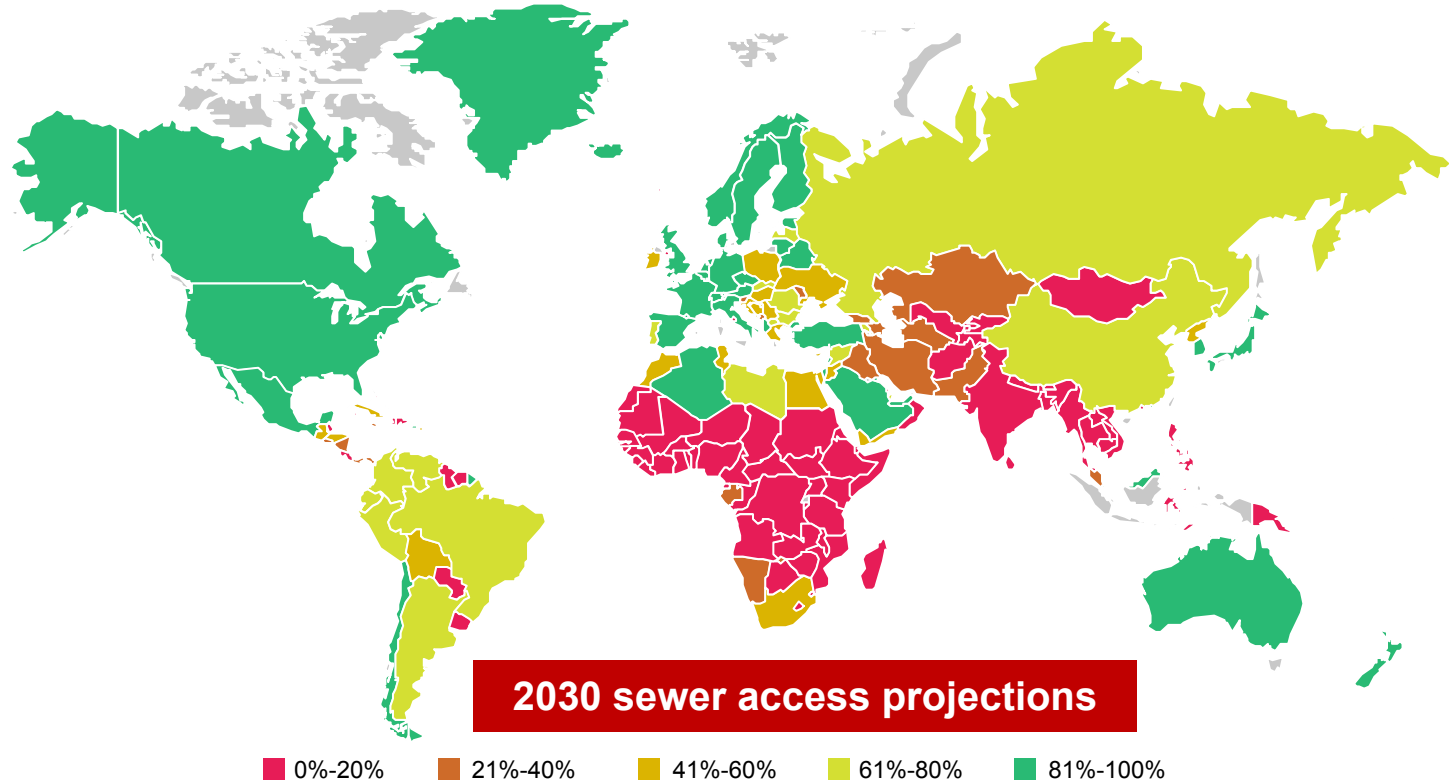
By 2030, ~2.7B people will be living in water scarce areas

AVERAGE WATER AVAILABILITY PER PERSON

● <500m³ ● 500-1,000m³ ● 1000-1,700m³ ● >1,700m³

Source: "Water Scarcity Clock" (June 2022), World Data Lab

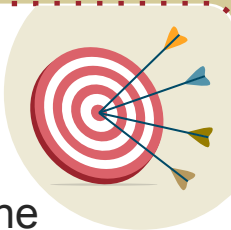
MANY PARTS OF THE WORLD WILL CONTINUE TO LACK ACCESS TO SEWERS



BILL & MELINDA GATES FOUNDATION WSH TEAM STRATEGY

WSH VISION

Through diverse and equitable partnerships, fundamentally transform the sanitation sector to reach universal use of sustainable sanitation, contributing to better health, economic, and gender equality outcomes for the world's underserved



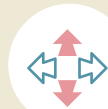
INITIATIVES



**CITY WIDE INCLUSIVE
SANITATION**



**TRANSFORMATIVE
TECHNOLOGIES &
COMMERCIALIZATION**

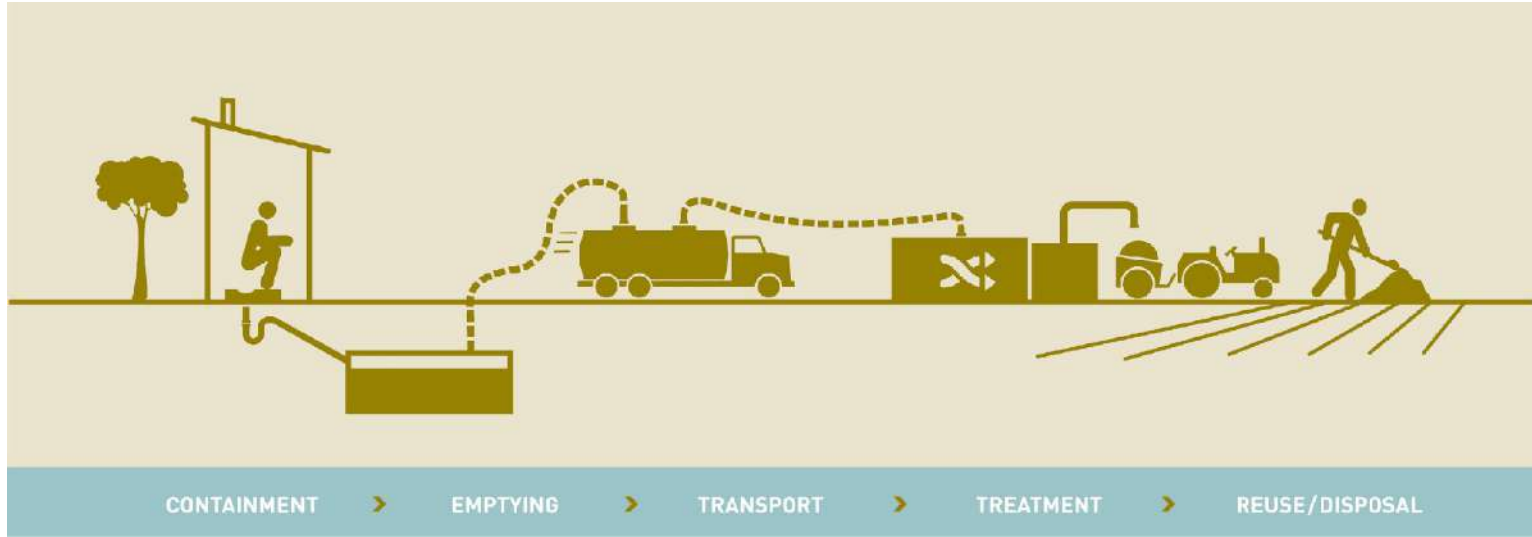


**GENDER & STRATEGIC
LEARNING**



**POLICY &
ADVOCACY**

WE FOCUS ACROSS THE SANITATION SERVICE CHAIN



We focus on two fundamental sanitation challenges:

1. Expanding and improving sanitation without central sewers, because this is – and will be – by far the most common type of sanitation service used by the poor
2. Making sanitation services safe and sustainable by addressing the failure to effectively transport, treat, and reuse waste captured in on-site facilities

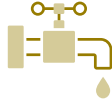
MACRO TRENDS MAKE TRANSFORMATIVE SANITATION TECHNOLOGIES INCREASINGLY NECESSARY



Growing population with urbanization

Population growth frequently outpacing infrastructure growth

68% of global population projected to be urban in 2050



Aging infrastructure

Centralized wastewater treatment systems often at/near capacity

Infrastructure repairs costly and disruptive



Water scarcity and stress

By 2030, 1/2 of world facing recurring water shortages, > 1/3 living full-time in water scarce areas

Demand could outstrip supply by 40%

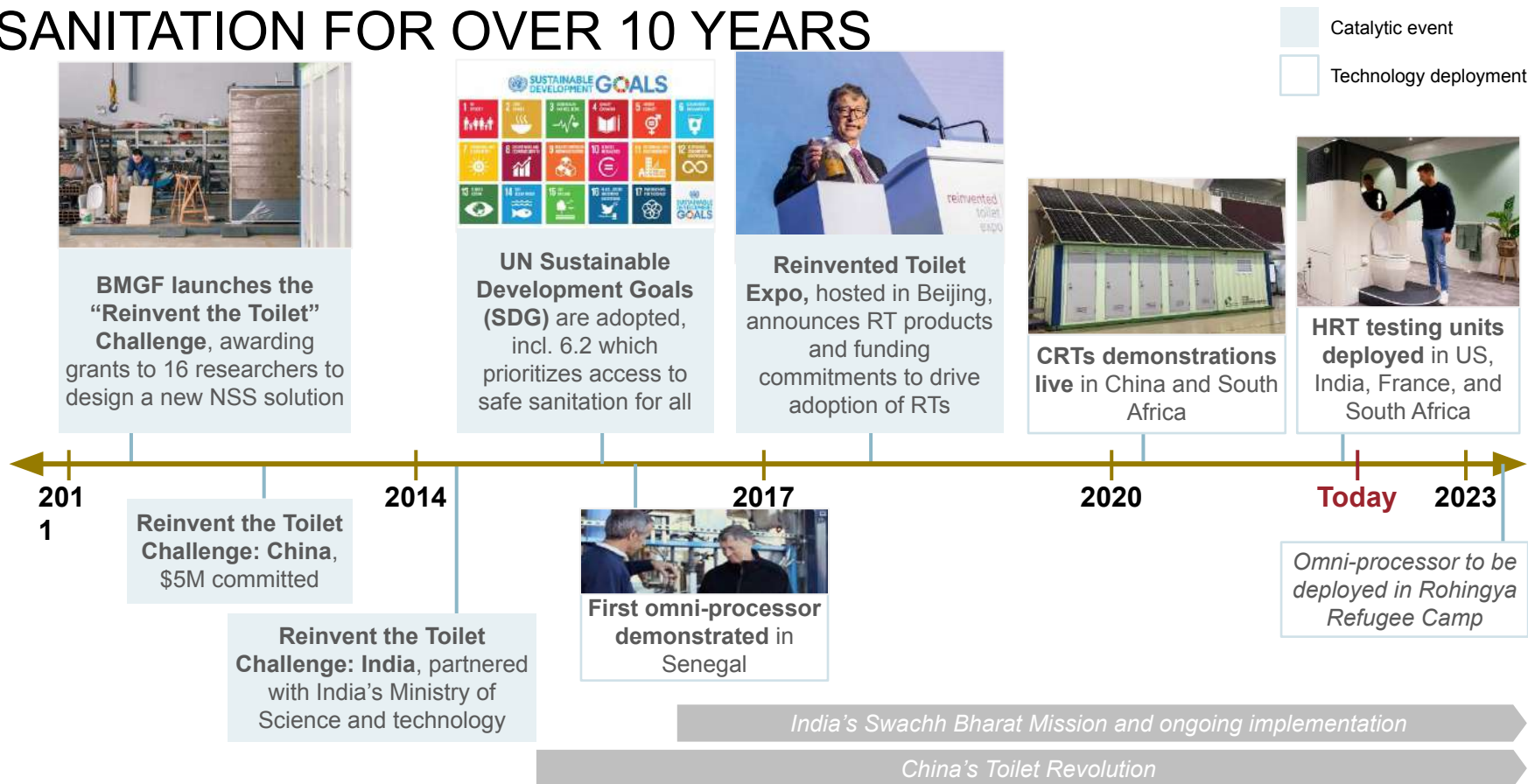


Policy changes

Government programs and initiatives focused on sanitation, esp. in developing markets

"Eco-friendly" policies to support sustainable development

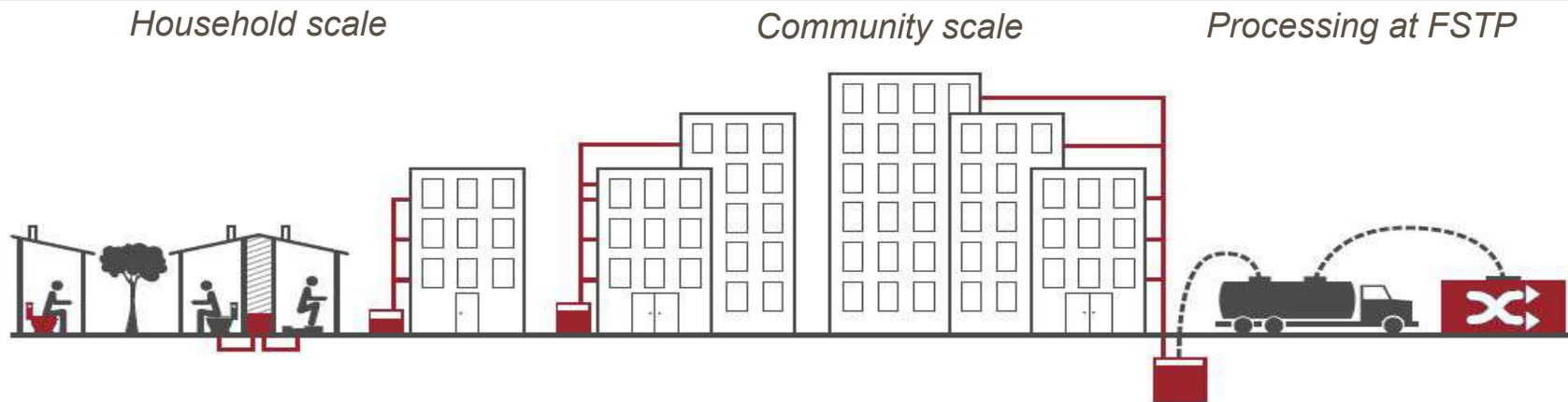
BMGF HAS PRIORITIZED THE TRANSFORMATION OF SANITATION FOR OVER 10 YEARS



OUR TRANSFORMATIVE TECHNOLOGY PORTFOLIO

REINVENTED TOILET

OMNI PROCESSOR



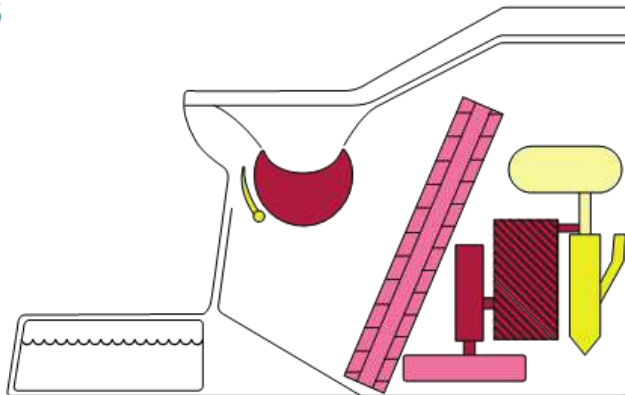
THE TRANSFORMATIVE TECHNOLOGY & COMMERCIALIZATION (TTC) INITIATIVE IS DESIGNED TO ADDRESS TODAY'S LIMITATIONS

ELIMINATE PATHOGENS

- Eliminate safety concerns via handling
- Reduce disease burden
- Improve environmental safety

OPERATE OFF GRID

- Eliminate need for external inputs such as water and energy
- Make portable and easy to install



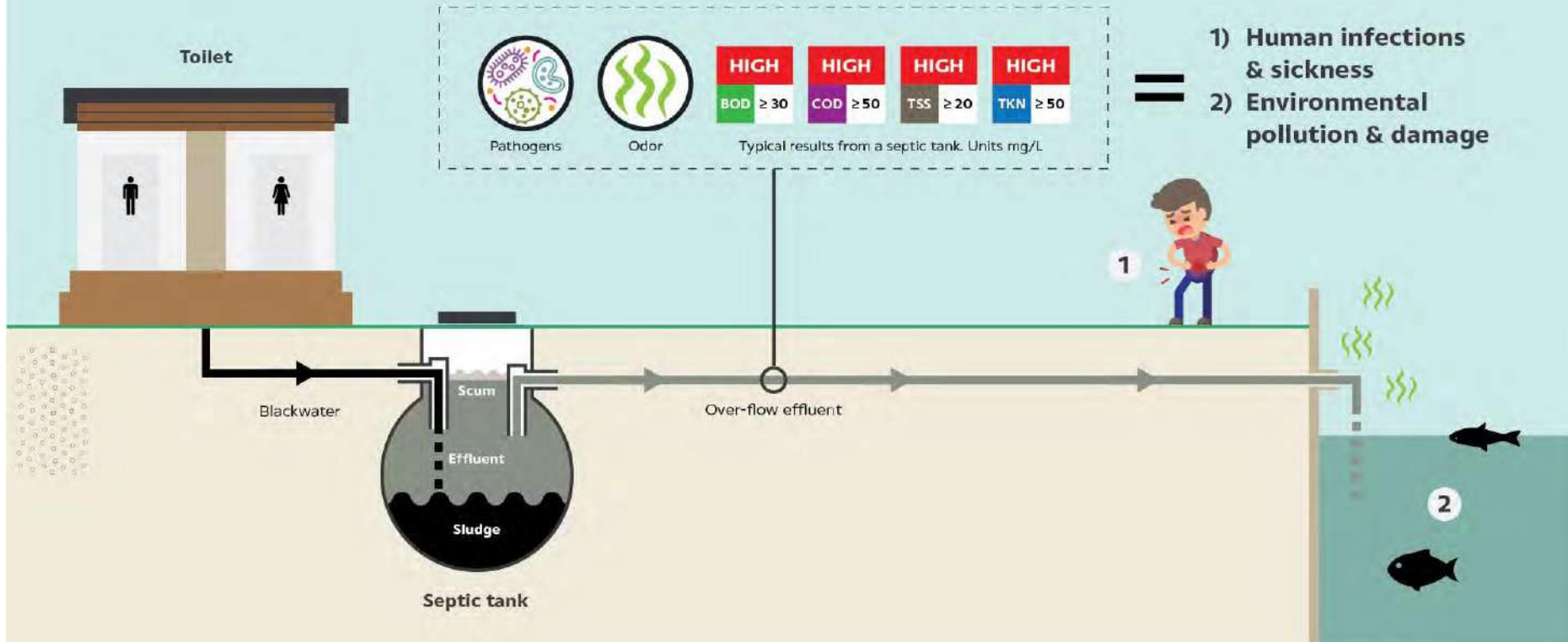
CONVEY LOW LIFE-CYCLE COSTS

- Reduce need for pit emptying
- Ensure a sustainable business model, including maintenance via service providers

PRESENT MODULAR, ATTRACTIVE INTERFACE

- Reduce / eliminate construction costs
- Provide clean and dignified product
- Eliminate odors and waste

Septic tanks – cons



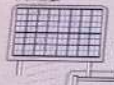
ELECTROCHEMICAL 电气化学技术

REQUIRES
需要

MAKES
成为



SOLAR PANELS
太阳能板



TOILETS
洗手间



LIQUID PROCESSING
液体处理

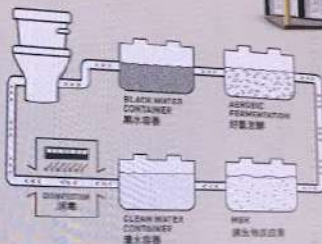
SOLID PROCESSING
固体处理

ANAEROBIC
TANK
厌氧罐



BIOLOGICAL 生物学技术

REQUIRES
需要



DRY COMBUSTION 干式燃烧

MAKES
成为



WET OXIDATION 湿法氧化

MAKES
成为







Cranfield Blackwater Household Reinvented Toilet S-500 (b-HRT)

Ultra-low Water Pre-wetting Frontend
Membrane Distillation Liquid Treatment
Pyrolyzer Solid Treatment

By Cranfield University

b - H R T

CRANFIELD S-500 (b-HRT)

This Reinvented Toilet is a combination of three modules:

Frontend: Users encounter a pedestal toilet with a rotating odor barrier and bowl cleaning mechanism. System includes a novel pre-wetting system that injects a small amount of water into the bowl to reduce smearing. The toilet includes a unique waste management system that efficiently separates the solid waste from the liquid waste.

Liquid Treatment: Water vapor is produced by heating the liquid waste using an electrical heater and/or combustor waste heat. A hydrophobic membrane presents a barrier for the liquid waste but allows for water vapor to directly pass through the membrane pores. The processed water can be reused as toilet flush water or safely discharged to the environment.

Solids Treatment: Solid waste from the frontend enters an electrically heated dryer to reduce the water content of the wet waste. The dried waste then enters the pyrolyzer, where the fecal solids are thermally decomposed in an oxygen-free environment to create a pathogen-free biochar.

KEY FEATURES & ADVANTAGES

- Designed to treat the waste created by a 5-person household
- Visually attractive, robust pedestal toilet that blocks the user's view of the waste
- Operation requires no behavioral change for users (flush and forget)
- Membrane distillation produces a liquid effluent that complies with ISO 30500
- Sterilized biochar, a fertilizer, is the only solid waste product created
- Waste treatment process has a minimal footprint due to the compact form factor of the pyrolyzer

USE CASES & POTENTIAL

CAPACITY: Designed to treat liquid and solid waste of a 5-person household

RANGE OF USERS: All components can treat liquid and solid waste for a household of 10 or more people

APPLICATION: Designed for single-family households that do not have access to safely managed sanitation. It is a suitable sanitation solution for locations where offsite fecal sludge processing is not possible or is too expensive.



TOILET BACK-END TREATMENT SYSTEM

Eco-san is one of the leading developers of Caltech technology, focusing on the development and production of containerized public toilets and back-end water treatment systems. To enable the onsite treatment of blackwater from household toilets, Eco-San has created an inexpensive and compact back- end treatment system based on their core waste processing technologies that is compatible with multiple front-end options. The Toilet Back-end Treatment System features a multi-stage biological treatment process, a polishing treatment stage and disinfection system to treat the household generated blackwater to the appropriate reuse standards.

KEY FEATURES & ADVANTAGES

- Process wastewater can be recycled as toilet flushing, especially in water- scarce areas.
- Design is fully containerized with a small footprint.
- No external sewer network is required.
- Easy maintenance with low operating costs.
- Complimentary treatment processes remove all microbiological pathogens.
- Advanced biological treatment system ensures the effluent water quality satisfies the ISO 30500 requirements and the GB/T 18920-2020: Urban wastewater recycling urban miscellaneous water quality.
- Easy to install with the only on-site requirements being water and electrical connections, and a level concrete foundation.

USE CASES & POTENTIAL

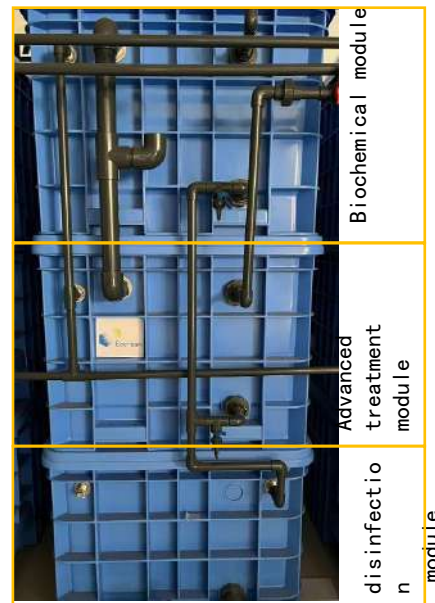
CAPACITY: Designed to process up to 100 liters/day RANGE OF

USERS: TBD – depends on flush water volume APPLICATION:

Design for single-family households



b-HRT



internal treatment modules

Aquonic 600 – solution



Capacity

600 liters of liquid per unit p/day

Treatment process

Biological and electro-chemical

Energy requirement

Approx. 4kWh per tank p/day

– 2 x submerged pumps + EC electrodes
+ control box

Maintenance

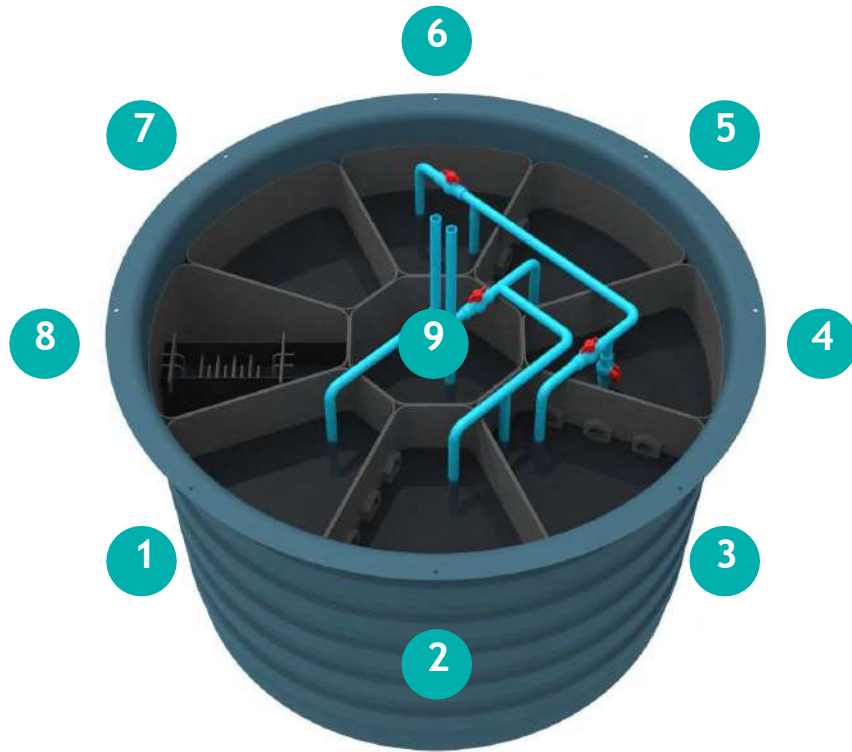
Filter media changed every 2-3 years

Electrodes yearly

Product material

Polyethylene

Aquonic 600 – treatment process



1. Up-flow filter chamber
2. 1st Sedimentation chamber
3. Anaerobic chamber
4. Aerobic chamber
5. Anoxic chamber
6. Recirculation chamber
7. 2nd Sedimentation chamber
8. Electrochemical disinfection
9. Treated water chamber

Installation Example 1



Kindergarten Islamic School

Minburi, Bangkok, Thailand

Status: Operational since September 2022

Facility:

- 20 toilet cubicles
- School with over 300 pupils and staff
- Lunchtime kitchen

Treated Waste:

- Blackwater from flushing toilets + grey water from kitchen
- Approx. 2000L p/day

Technology setup:

- 2 x Aquonic 1000L tanks with EC Box
- Site designed 3 chamber septic tank made from pre-cast cement rings and grease trap for kitchen water

Installation Example 2



Police Apartments

Thungsonghong, Bangkok, Thailand

Status: Operational since June 2020

Facility:

- Residential apartment block
- 80 apartments

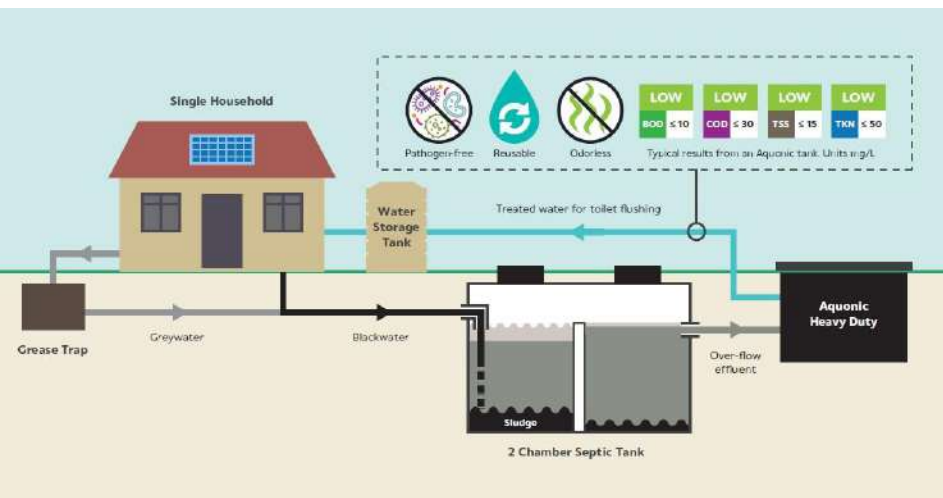
Treated Waste:

- Only 600L of blackwater per day from existing waste storage tank

Technology setup:

- 1 x Aquonic 600 tank + EQ balancing tank

Typical Installation Schematic



Suitable for treating black and greywater from :



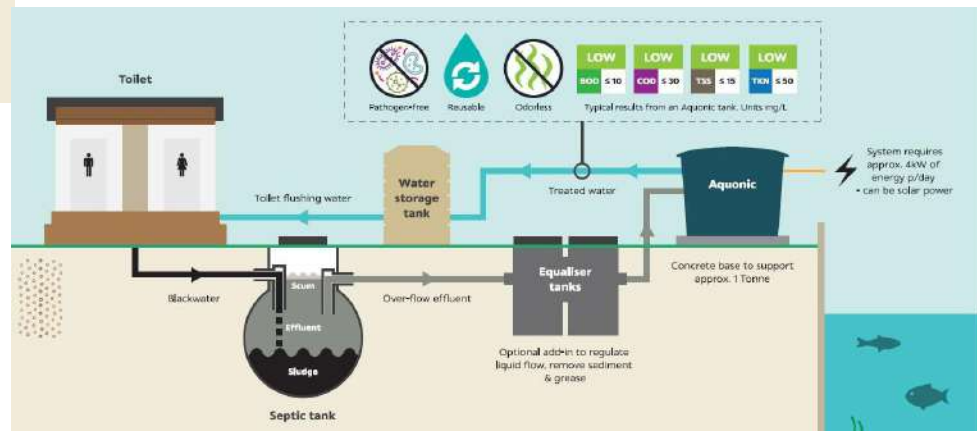
Septic Tank



Urinal



Shower & Sink



Omni Processor Technology Portfolio

Pyrolysis-Omni Processor (P-OP)



- The P-OP technology was developed by Biomass Controls, USA. Headquartered in Connecticut, Biomass Controls (with partners) created the technology solution as part of Bill and Melinda Gates Foundation's Reinvented Toilet challenge in India in 2014. This technology can also be used as solutions for environmental rejuvenation and returning nutrients to the soil. The P-OP provides Thermochemical treatment of high moisture materials such as manure, human excreta, agriculture residue and food waste.
- The license to manufacture the P-OP has been taken up by Kalyani Cleantech, Pune, India
- The P-OP can handle a capacity range of 8-20 KLD of Faecal Sludge and Septage.

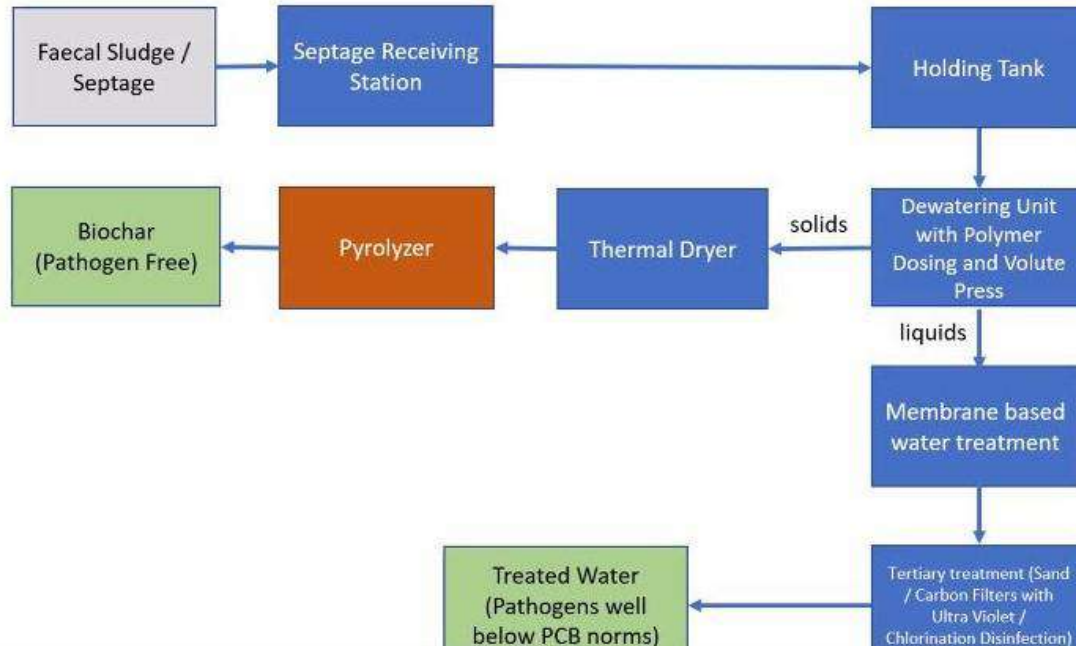
Ankur-Omni Processor (J-OP)



- In 2011, Sedron Technologies (formerly Janicki Bioenergy) accepted the Bill and Melinda Gates Foundation's challenge to address the universal problem of human waste. The organization with waste processing and waste-to-energy as its core focus came up with the Janicki Omni Processor (J-OP) which is an innovative decentralized waste treatment plant that combines three well-proven processes i.e Solid Fuel Combustion, Steam Power Generation and Waste Water Treatment into a single package.
- Later, Ankur Scientific became a licensee for the J-OP technology (A-OP). Ankur Scientific is a Company which has been working in the Waste to Energy field since 1986 with gasifiers.
- The A-OP can handle a capacity range of 200-600 KLD of Faecal Sludge and Septage.

Pyrolysis Omni Processor (P-OP) based FSTP Process Flow Diagram and Site Images

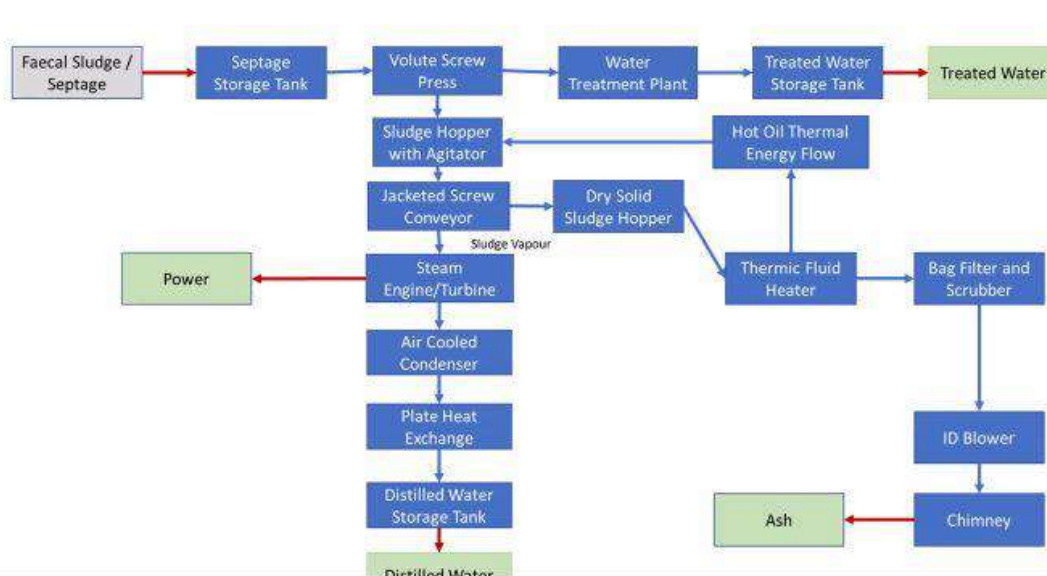
Pyrolysis of septage, done with a limited oxygen supply destroys all pathogens present in excreta, and provides fast volume and mass reduction, a net positive energy output (thermal energy) and a usable end product in the form of biochar is produced. Biochar provides excellent soil enrichment when used with compost. Energy neutrality has been achieved at Wai with Solar power supplement.



Indicative site images

Ankur Omni Processor (A-OP) FSTP Process Flow Diagram and Site Images

- The Ankur Omni Processor (A-OP) is an innovative decentralized waste treatment plant that combines three well-proven processes i.e Solid Fuel Combustion, Steam Power Generation and Water Treatment into a single package.
- The A-OP is a decentralized waste treatment system that kills pathogens while recovering valuable resources from fecal sludge, biosolids, and other waste streams. The first 200 KLD (200 m³/day) OP plant is working successfully at Vadodara Municipal Corporation. The plant is attached to 2 STPs of 46MLD each and receives the STP Sludge from there.



Vadodara Site images

BMGF Project – Vadodara – Fecal Sludge + MSW to Energy + Water



Input

- Fecal Sludge of 200 KLD
- Dry Solid in the Boiler – 10 TPD
- MSW – 30 TPD

Output

- Industrial Grade Water – 180 KLD
- Distilled Grade Water – 20 KLD
- Power – 170-kW/hr



BMGF-SUPPORTED REINVENTED TOILET ACCELERATOR PROGRAMS TO ACCELERATE MARKET DEVELOPMENT



R&D to overcome technical challenges and de-risk product and component innovation



Marketplace Readiness

- Government engagement to enhance demand for sanitation, focus on pathogen removal and water reuse
- Support implementation of international product standards (ISO 30500)
- Engage DFIs to facilitate access to financing



Early Adoption

- Identify early adopter opportunities & early market entry requirements
- Develop RT value proposition and economic positioning



Awareness & Perception

- Build awareness and change perception of the decentralized sanitation



Technical & GTM Assistance

- Develop product requirements for identified customer segments
- Assist in pilot and demonstration projects
- Guide GTM strategy and tactics

THE NEED FOR CWIS

PAST

TRADITIONAL APPROACHES

- Master planning/ investment only for **centralized systems**
- Financed by **central gov't/loans**
- **Wealthy/business districts** prioritized
- **Limited coverage**
- **Sustainability challenges** for O&M
- **Resource recovery not considered**
- No **performance management**
- **On-site, small network not considered**



PRESENT

NSS / FSM APPROACHES

- **Often standalone pilots**, not mainstream
- **NGO / pilot financed**
- FSM value chain/fecal sludge treatment plants
- Poor communities targeted but often missed
- **Informal businesses, NGOs independent from service authorities**
- Business models often **unable to scale**
- Limited **professional capacity**



THE FUTURE



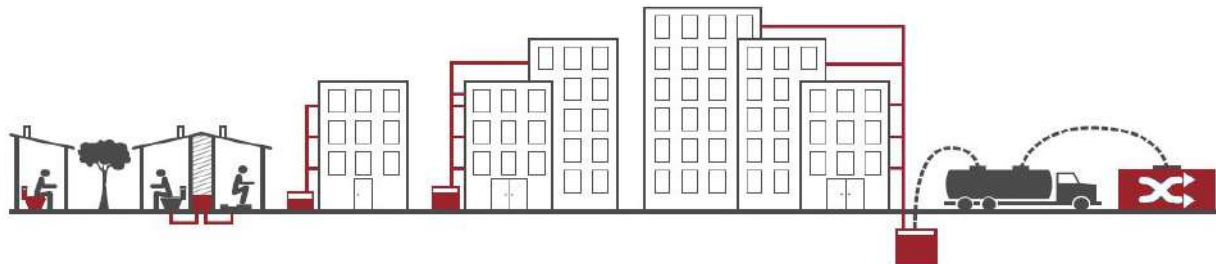
CITY-WIDE INCLUSIVE SANITATION



CWIS focuses on promoting approaches to ensuring everyone in an urban area is served by **safe, equitable, and financially viable sanitation service systems**. This means systems are designed to **reach the poor and to ensure human waste is safely managed** along the whole sanitation service chain.

THE FUTURE: CITY WIDE INCLUSIVE SANITATION

We aim to achieve the following outcomes for sustainable changes in sanitation management:



EVERYONE BENEFITS

from safe services and public investment equitably, with a focus on reaching the poorest



GENDER & SOCIAL EQUITY

are designed into planning, management, monitoring



Human waste is **SAFELY MANAGED ALONG THE SANITATION CHAIN**, starting with containment



Authorities operate with a **CLEAR, INCLUSIVE MANDATE, PERFORMANCE TARGETS**, resources, and accountability



Authorities deploy **RANGE OF HARDWARE, FUNDING & BUSINESS MODELS** to meet goals



Comprehensive long-term planning **FOSTERS INNOVATION, PRO-POOR FINANCING**; informed by analysis of needs, resources



POLITICAL WILL & accountability incentivizes improvements in capacity, leadership, outcomes

GATES FOUNDATION CWIS FRAMEWORK:

Promoting a Public Service Approach

[List of indicators](#) [Measurement approaches](#)

[Learning documents](#) [sanitation dashboard](#)



**CORE CWIS
OUTCOMES**



EQUITY

Services reflect fairness in distribution and prioritization of service quality, prices, deployment of public finance/ subsidies



SAFETY

Services safeguard customers, workers and communities from safety and health risks by reaching *everyone* with safe sanitation



SUSTAINABILITY

Services are reliably and continually delivered based on effective management of human, financial and natural resources



**CORE CWIS
FUNCTIONS**

RESPONSIBILITY

Authority(s) execute a clear public mandate to ensure safe, equitable and sustainable, sanitation services for all

ACCOUNTABILITY

Authority's(ies') performance against mandate is monitored and managed with data, transparency, and incentives

RESOURCE PLANNING & MANAGEMENT

Resources—human, financial, natural, assets—are effectively managed to support execution of mandate across time/space



MARKET UPTAKE OF
TRANSFORMATIVE
TECHNOLOGIES

CITYWIDE INCLUSIVE



AT SCALE

SANITATION (CWIS)



POLICY &
ADVOCACY



FINANCING:
MULTI-, BI-LAT,
DOMESTIC

PLATFORMS FOR REPLICATION; INSTITUTIONAL & REGULATORY ENVIRONMENT

REPLICATE & SCALE CWIS IN SUB-SAHARAN AFRICA & ASIA

Implementation of CWIS programs and policies in focus countries and moderate engagement countries, and scaling through regional platforms



City examples &
guidance

Country
implementation

DEMONSTRATE, ENABLE &
STRENGTHEN
CWIS APPROACHES

Proof points, **examples**, tools &
normative guidance developed



DEVELOP MARKETS FOR
INNOVATIVE SANITATION TECH

Create **markets** for transformative
sanitation technologies



Institutional change in key
partners

INFLUENCE DEV & FINANCING
PARTNERS

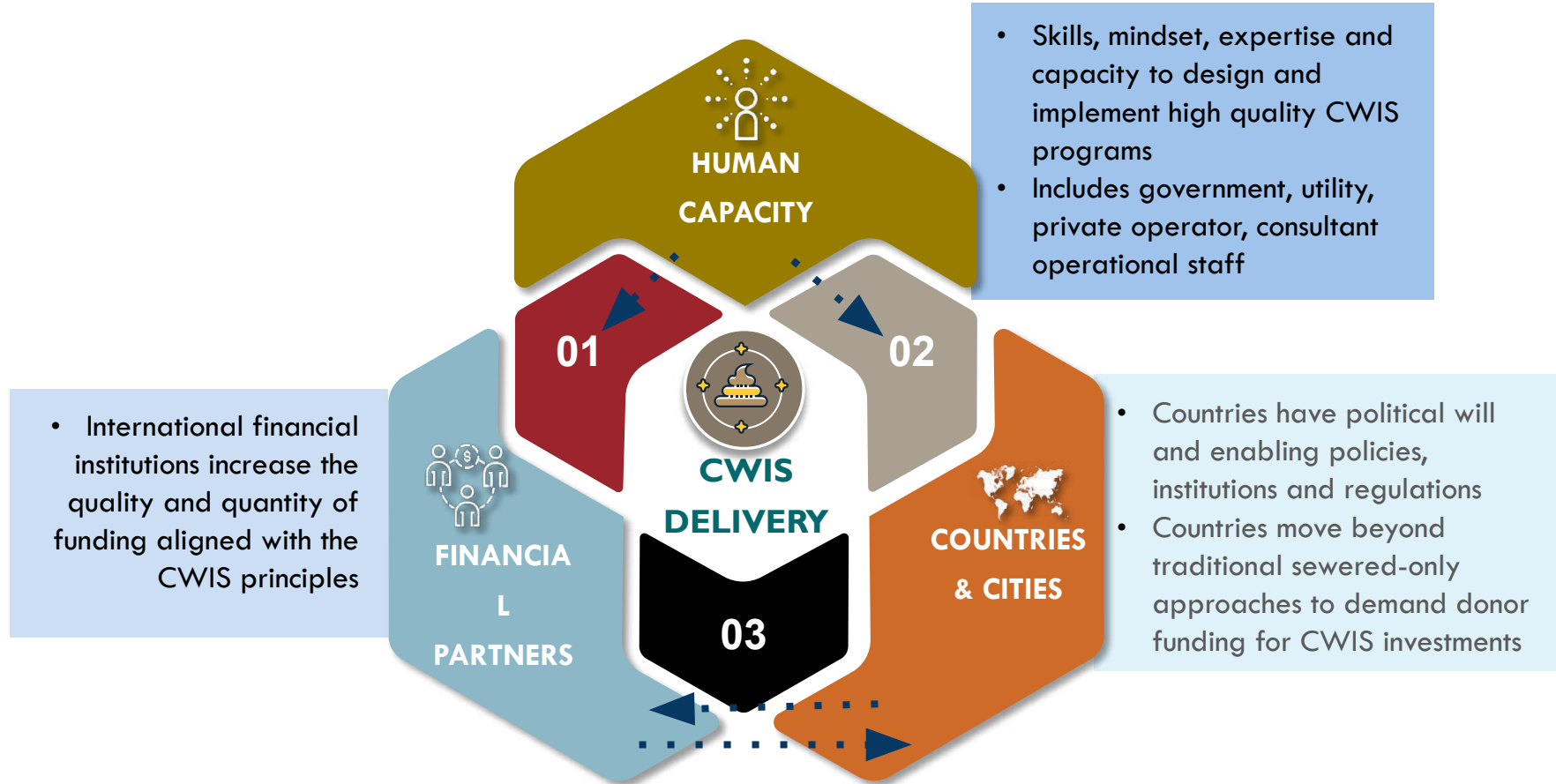
Institutional change in critical
financing and dev partners for scale



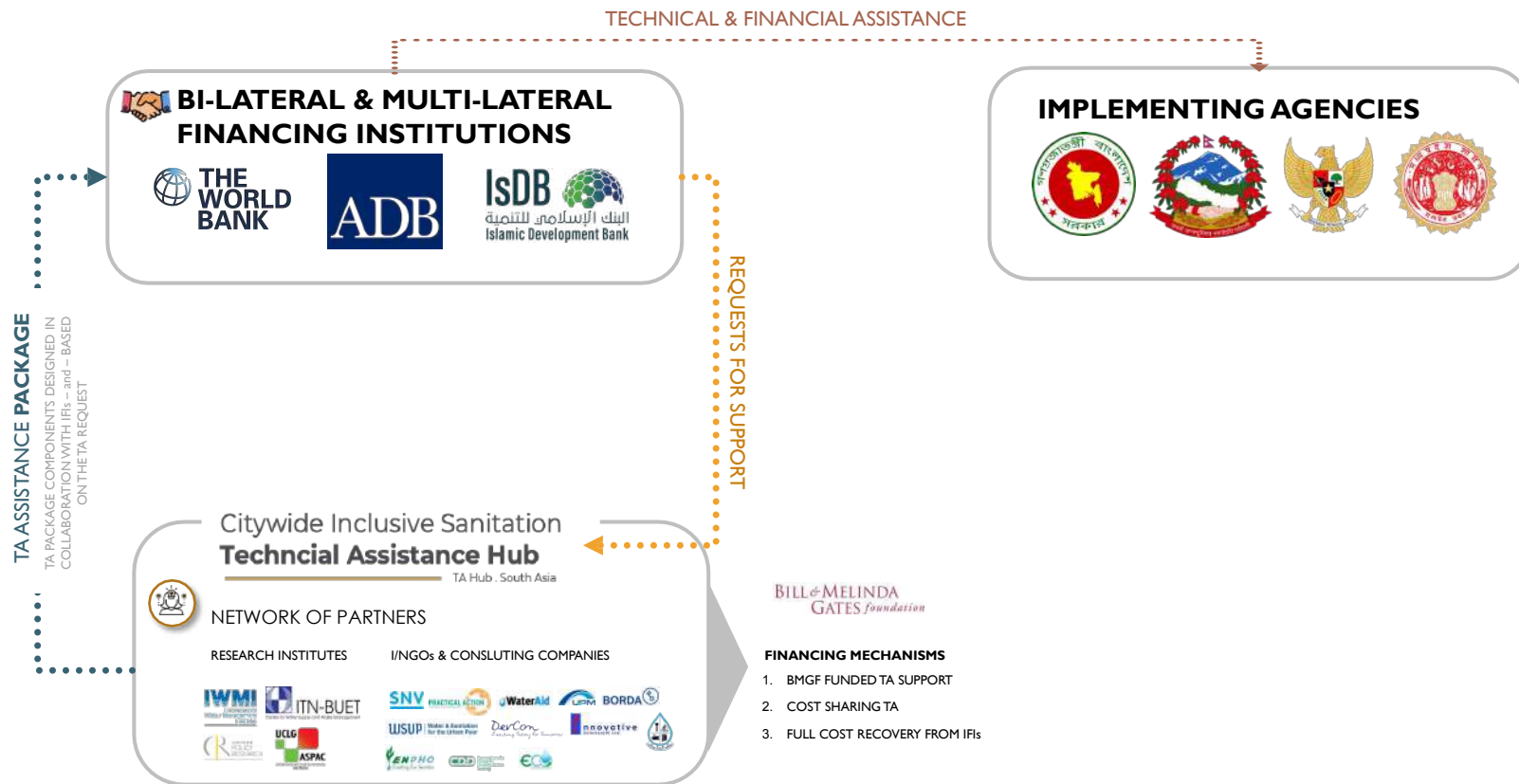
INCLUSIVITY | DATA MEASUREMENT | GENDER



WHAT WILL IT TAKE TO SCALE CWIS?



TECHNICAL ASSISTANCE HUB FOR SCALING



CITY WIDE INCLUSIVE SANITATION (CWIS)



REQUESTS FOR SUPPORT



NETWORK OF EXPERTS

Available resources within the I/NGOs & specialized organizations in South & Southeast Asia & globally pooled together as **'technical partners'**



Citywide Inclusive Sanitation
Technical Assistance Hub

TECHNICAL ASSISTANCE

TA HUB

TECHNICAL ASSISTANCE PLATFORM
to support large scale development project in
mainstreaming CWIS

CLIENTS

BI-LATERAL & MULTI-LATERAL
FINANCING INSTITUTIONS



IMPLEMENTING AGENCY



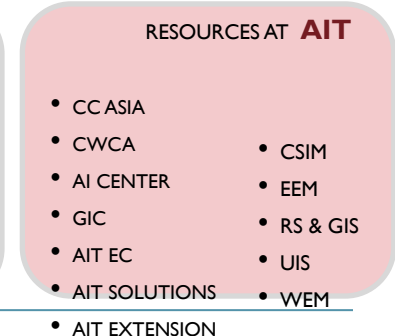
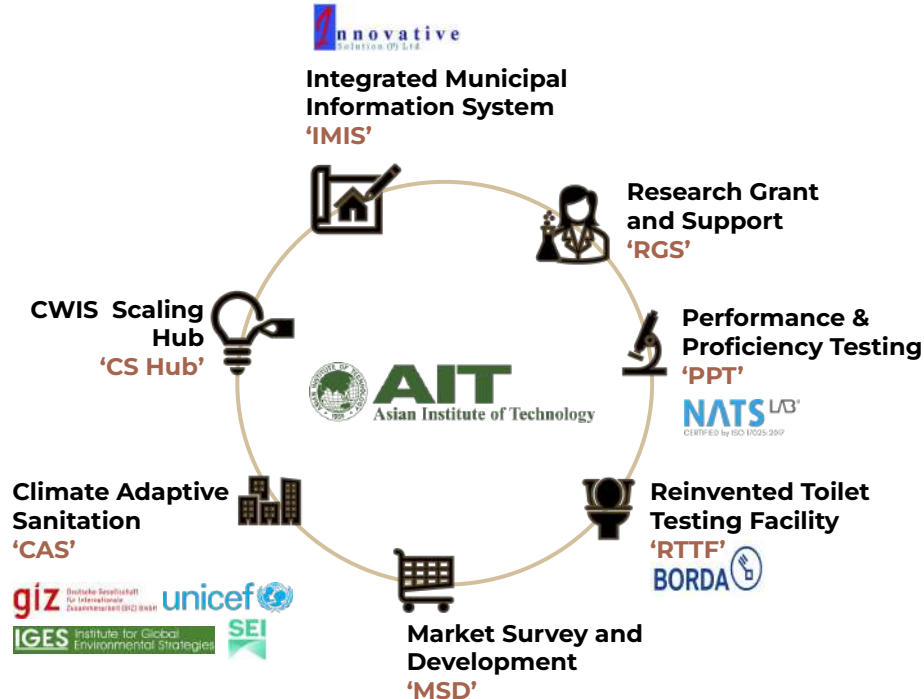
CWIS-FSM Support Cell
SUPPORTS DPHE



ITN-BUET
Centre for Water Supply and Waste Management
**CAPACITY BUILDING
HUB**

TA ASSISTANCE PACKAGE

Global Water and Sanitation Center at AIT



REGIONAL INITIATIVE - TA HUB

Influencing close to
\$1B in CWIS-inclusive investments

FSM / NSS INTEGRATION



- Develop a Comprehensive Faecal Sludge Management Program for 18 municipalities for integration into Wastewater Master Plan in Kathmandu Valley

CWIS IN SANITATION INVESTMENT PLANNING



- Pilot and demonstrate a 'municipality-wide' model for local WASH service delivery – managing wastewater and FSM through CWIS approach

[PROJECT PREPARATION]

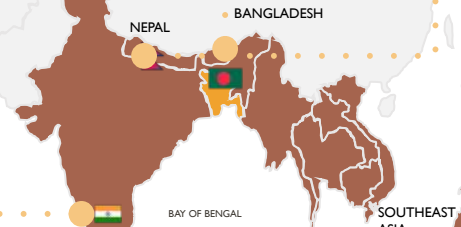
CWIS MAINSTREAMING



- technical advisory to Madhya Pradesh Urban Services Improvement Project Phase II is to guide **the integration of the CWIS principles** into the sanitation system planning with inclusion of non-network sanitation solutions

LEVERAGE

\$100M (ADB) – Sanitation Component and overall \$270M (WASH)



FOLLOW UP INVESTMENTS

POTENTIAL FUNDING / INVESTMENT LEVERAGE:
\$66M

POTENTIAL FUNDING / INVESTMENT LEVERAGE:
\$200M

POTENTIAL FUNDING / INVESTMENT LEVERAGE:
\$50M+ - Sanitation Component

POTENTIAL FUNDING / INVESTMENT LEVERAGE:
\$300M estimated

61-TOWN PRE-FEASIBILITY



- Integration of CWIS components
- Development of GIS dashboard for planning and monitoring for FSM and SWM services
- Developed a technology catalogue for FSM and SWM

INVESTMENT PROJECT PREPARATION – 10 TOWNS



- Supporting IsDB funded Lives and Livelihood Project
- Assisting the bank in shaping investments in the 10 selected towns

INVESTMENT PROJECT PREPARATION – 25 TOWNS



- (pipeline project)

30 TOWNS PROJECT – IMPLEMENTATION SUPPORT



- TA to World Bank in shaping the project to be CWIS-inclusive – across 30 towns

SANIMAS EVALUATION



- critically assess the success of the SANIMAS approach and the feasibility of introducing the SANIMAS model as a sustainable approach for providing decentralised sanitation in future SANIMAS investments.



Ambition 2019-2030:

10,000⁺

sanitation professionals educated by

100⁺ academic institutions.

GLOBAL
SANITATION
GRADUATE
SCHOOL

BILL & MELINDA
GATES foundation

FSMA



unicef



UNITY KNOWLEDGE LLP

UTEC

TU Delft

eawag

aquatic research

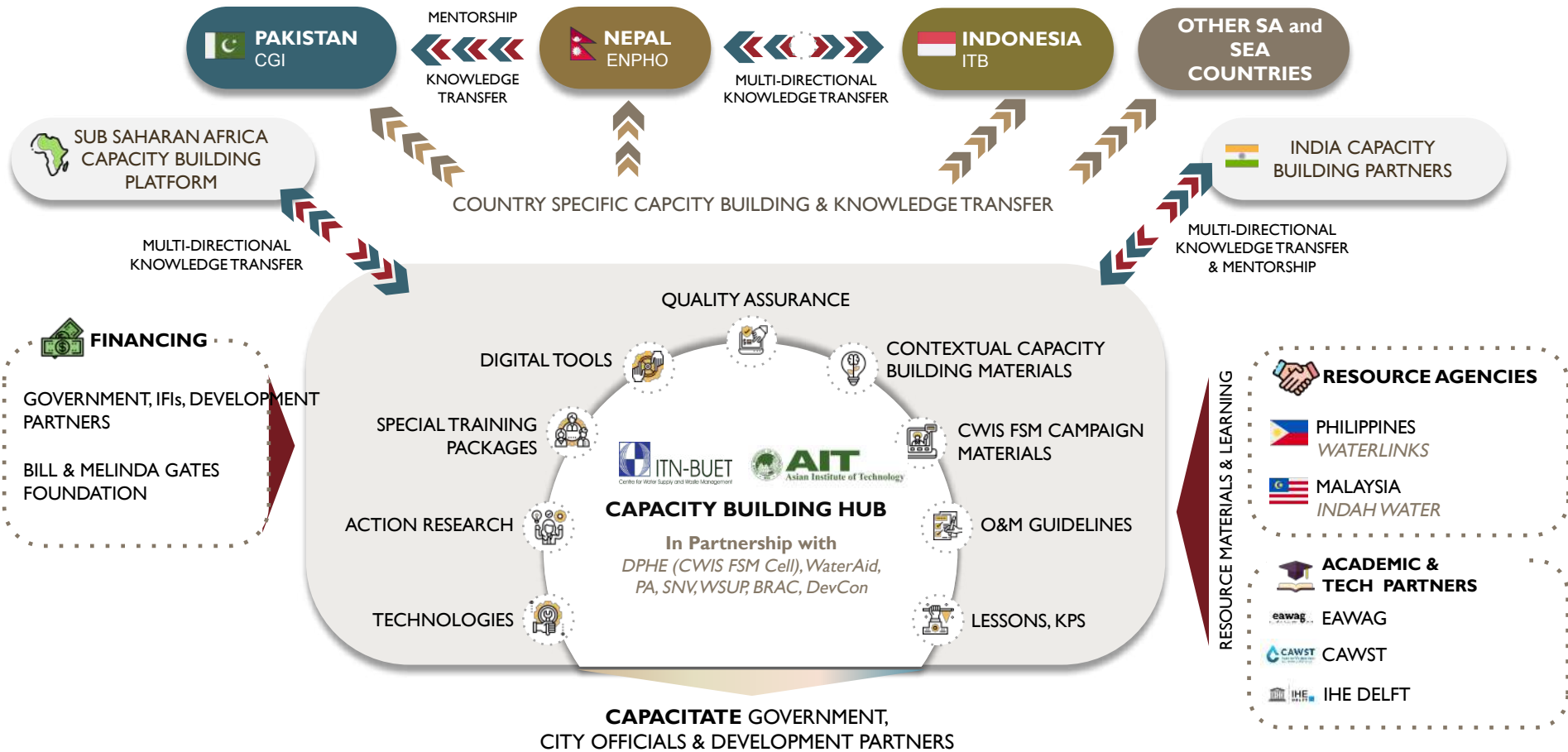
香港科技大学
THE HONG KONG
UNIVERSITY OF SCIENCE
AND TECHNOLOGY



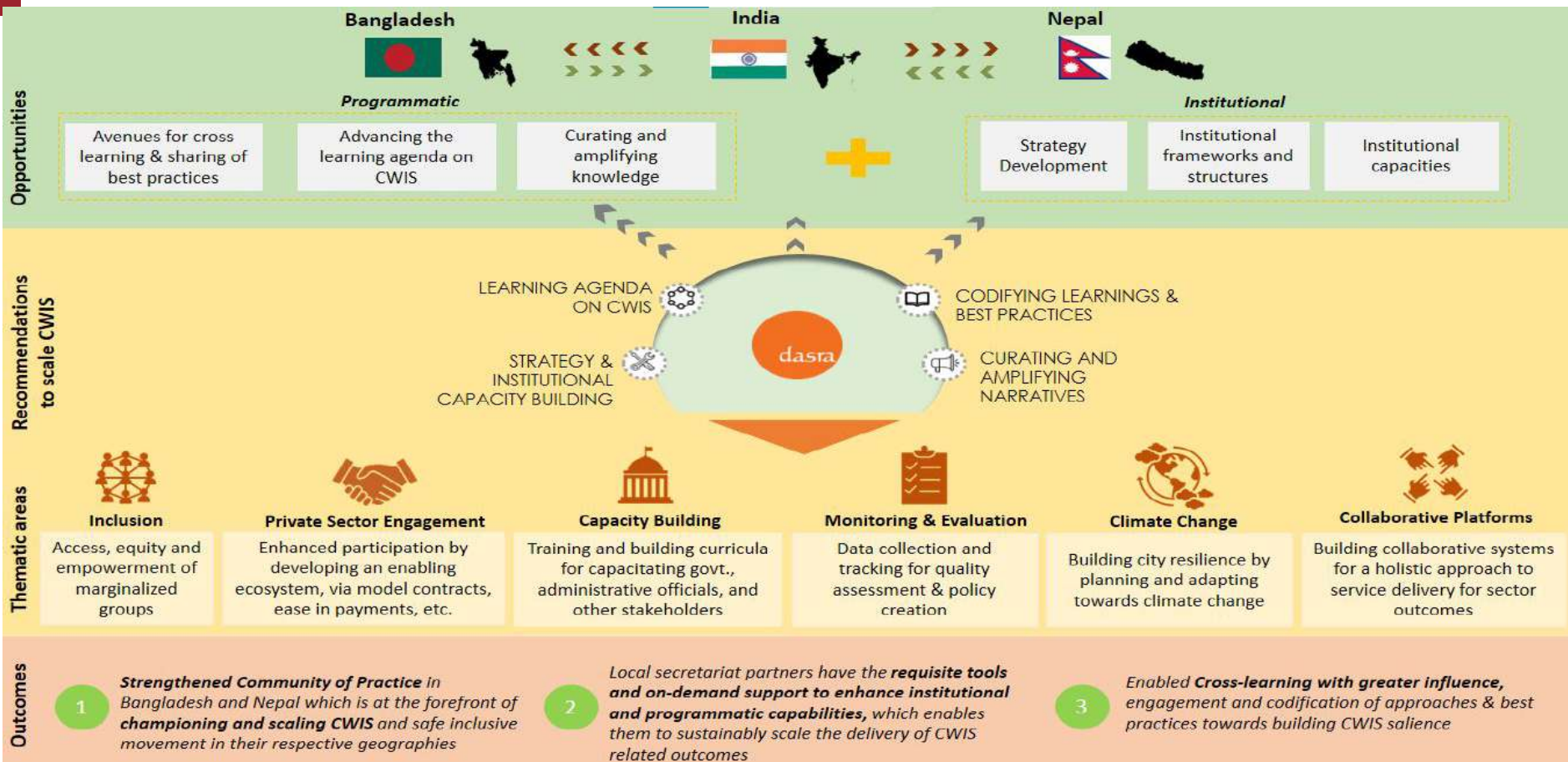
CEPT
UNIVERSITY



SCALING CWIS: REGIONAL CAPACITY BUILDING HUB



COUNTRY TO COUNTRY COLLABORATION





Water Secure and Resilient
Asia and the Pacific

SANITATION FINANCING
PARTNERSHIP TRUST FUND

Water Financing Partnership Facility

BILL & MELINDA
GATES foundation



ADB – strong
IFIs partner
for scaling
CWIS in Asia

Unicef Regional
Office – a
potential partner
for Policy &
Advocacy for CWIS
in Asia by using
ASEAN and
SACOSAN Platform



CAPACITY BUILDING COURSES AND TOOLS

Education & Training

IHE Delft offers a wide range of flexible, high quality, specialized educational programmes to respond to the needs of diverse clients from the water sector.

- MSc programmes
- Short courses
- Online courses
- Tailor-made training



ConCaD

consulting capacity development
for urban sanitation services



Capacity training in the BOP in India, Bangladesh. Participants mapping different non-served sanitation facilities for urban townhouse concepts, using the ConCaD service charts.

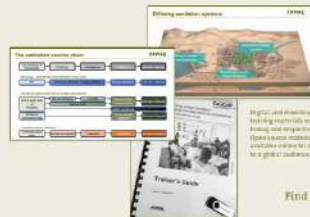
The ConCaD capacity development initiative is a global programme to improve consulting capacity for improved urban sanitation services.



ConCaD training in Kampala, Uganda. Participants preparing a sanitation investment bid to upgrade a local wastewater system.

Target audiences are consulting firm staff and freelance consultants working or bidding for 'at scale sanitation investment projects' anywhere in the world and especially in the ConCaD target or nearby countries (India, Nepal, Bangladesh, Uganda, Ivory Coast and Zambia).

Course delivery is through face-to-face short courses at selected partner training institutes (PTIs). Additionally, a three-week on-line course will be delivered on the Coursera learning platform and made available on YouTube for a global audience.



Find out more: www.sandec.ch/concad



This initiative is funded by the DfW & Mercedes Gates Foundation

Multi-Country Twinning Program FSM Knowledge Exchange

Facilitating sustainable FSM programs through collaborative, knowledge-sharing, and action-oriented partnerships.



Our Mission

Advance the knowledge and expertise of FSM professionals and their organizations through exposure visits to successful FSM programs and lessons learned in other countries. Develop a platform and initiate actions to encourage knowledge-sharing within and among countries. Create opportunities for FSM professionals to network and foster development of long-term twinning relationships between organizations and utilities.

Learn more about CWIS:
www.worldbank.org/cwis





ESAWAS



CITY SERVICE DELIVERY ASSESSMENT



ATHENA CWIS DASHBOARD

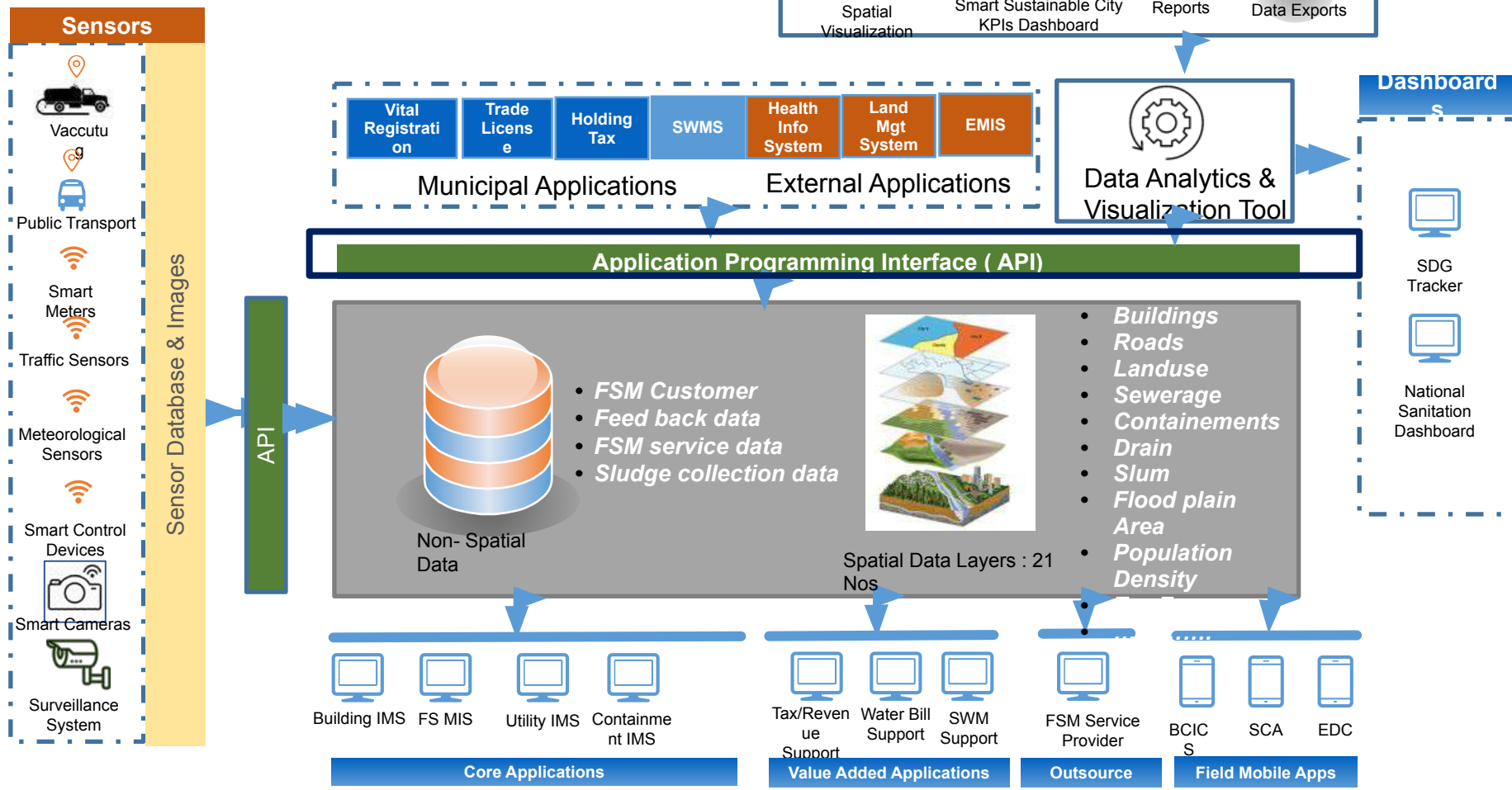
INTEGRATED MUNICIPAL INFORMATION SYSTEM (IMIS) & CWIS

IMIS Landscape

- Municipal GIS-based database and CWIS baseline of the town
- Strategic sanitation planning and decision-making tools for authorities
- Service delivery management
- Municipality's 'regular business process mapping
- Real time monitoring and evaluation – tax payments, service delivery, KPIs
- Link to external databases – health, emergency response
- Plan infrastructure investment



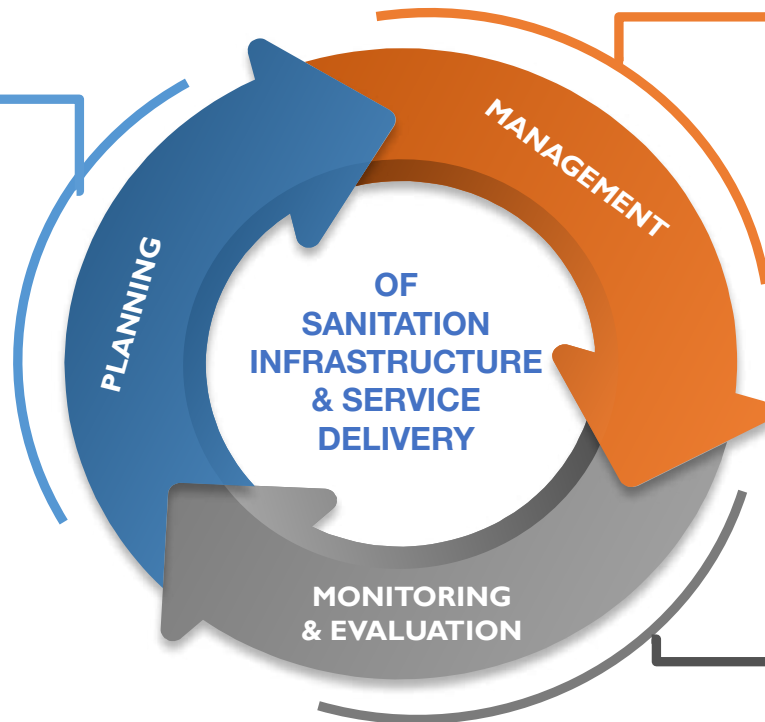
ACCURACY, RELIABILITY, RELEVANCE AND TIMELINESS OF DATA FACILITATED



WHAT WILL IMIS FACILITATE?

PLANNING

- a) **equitable** access to safe, adequate & efficient infrastructure
- b) **sustainable** infrastructure, assets and services
- c) **gender** intentional and socially **inclusive** services and infrastructure
- d) fair and strategic **pricing** of services
- e) the use of **public finances** for the expansion of infrastructure and services and
- f) sanitation **workers' rights**, protections and safety nets

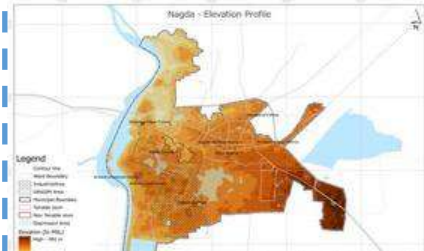


MANAGEMENT

- a) **safe** management of sanitation infrastructure and services
- b) the fair distribution of **public finances** for the expansion of infrastructure and services;
- c) implementation of equitable costs and efficient cost recovery
- d) implementation of pro-poor, gender intentional and socially inclusive mandate;
- e) institutionalization of **key performance indicators** (KPIs)
- f) implement **accountability** measures as well as enforce **regulations** including incentives and penalties.

MLE

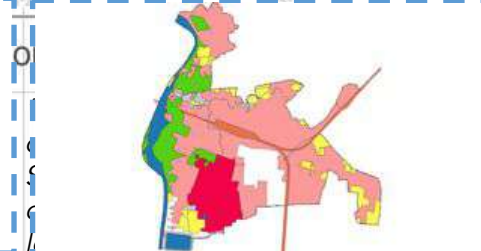
- a) the **quality** and **distribution** of services and infrastructure,
- b) service **authority performance** vis-à-vis the KPIs and targets;
- c) **financial sustainability** of service delivery and infrastructure,
- d) public health and environmental **outcomes** and
- e) pro-poor, **gender** intentional and socially **inclusive** targets.



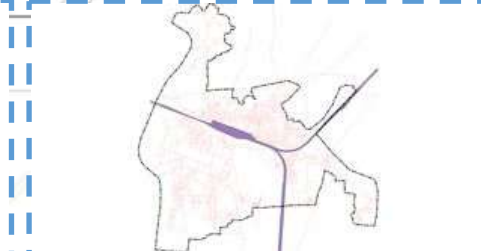
DEM - SRTM Global DEM



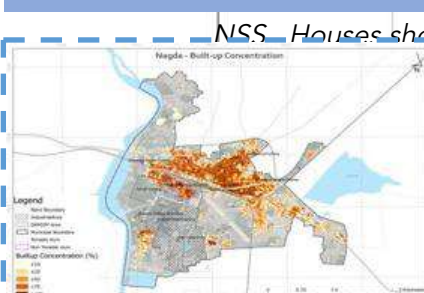
Low Income Settlements, Source: Town



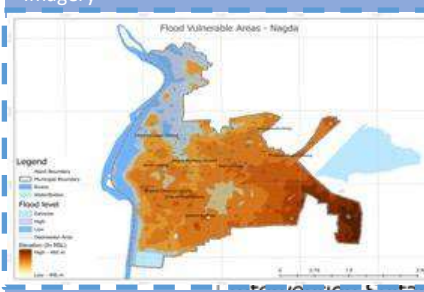
Landuse - Town



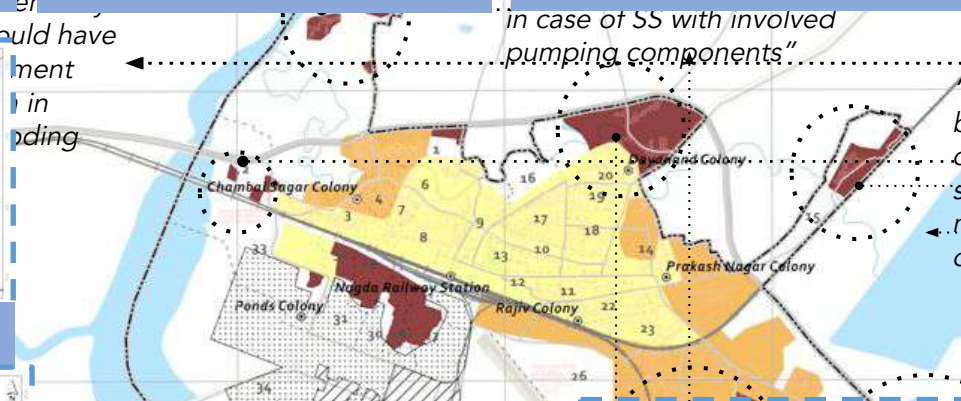
Infrastructure - Town



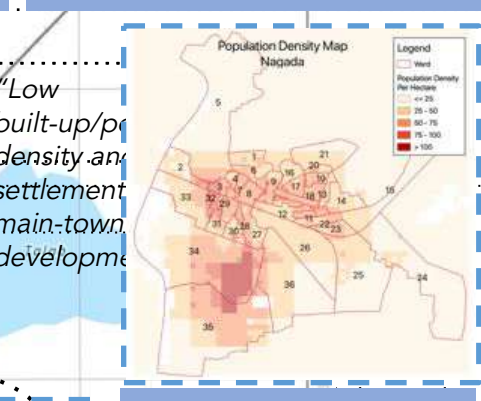
Property Data from Town & Landsat Imagery



DEM & Water danger line from Water Resource Department MP



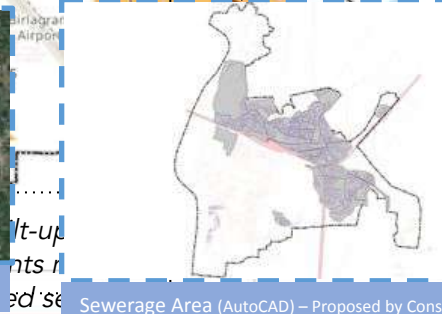
Satellite Image, Source Google



Pop Density, Source: worldpop.org

in case of SS with involved pumping components"

"Low built-up/population density and organic settlement growth of town, may be covered with SS zone, during 2nd phase of interventions"



Sewerage Area (AutoCAD) – Proposed by Consultant

"Low built-up/population density and with organic settlement growth of town, may be covered with SS zone, during 2nd phase of interventions"



OUR APPROACH TO GENDER & INCLUSIVITY

The WSH team is committed to increasing our emphasis on gender and diversity, equity and inclusion.



Examples of this work on WSH:

WSH Commitments:

- Continued Year/Year increases in the % of WSH grants that are gender intentional and transformative for each initiative
- We are currently piloting a way to measure gender integration results within individual WSH investments

What This Means for our partners:

- Confirm geography served and location of work in each report
- Partnership to think through innovative ways to incorporate DEI & Gender priorities

CURRENT COUNTRIES ENGAGEMENT IN ASIA

Focus Country – India and Bangladesh

- Deeper engagement with national govt, state govt. and municipalities
- Policy and Advocacy intervention
- Demonstration, Replication, and scaling CWIS
- Capacity Building
- Launching technologies (RT and OP) in India (manufacturing and demonstration)

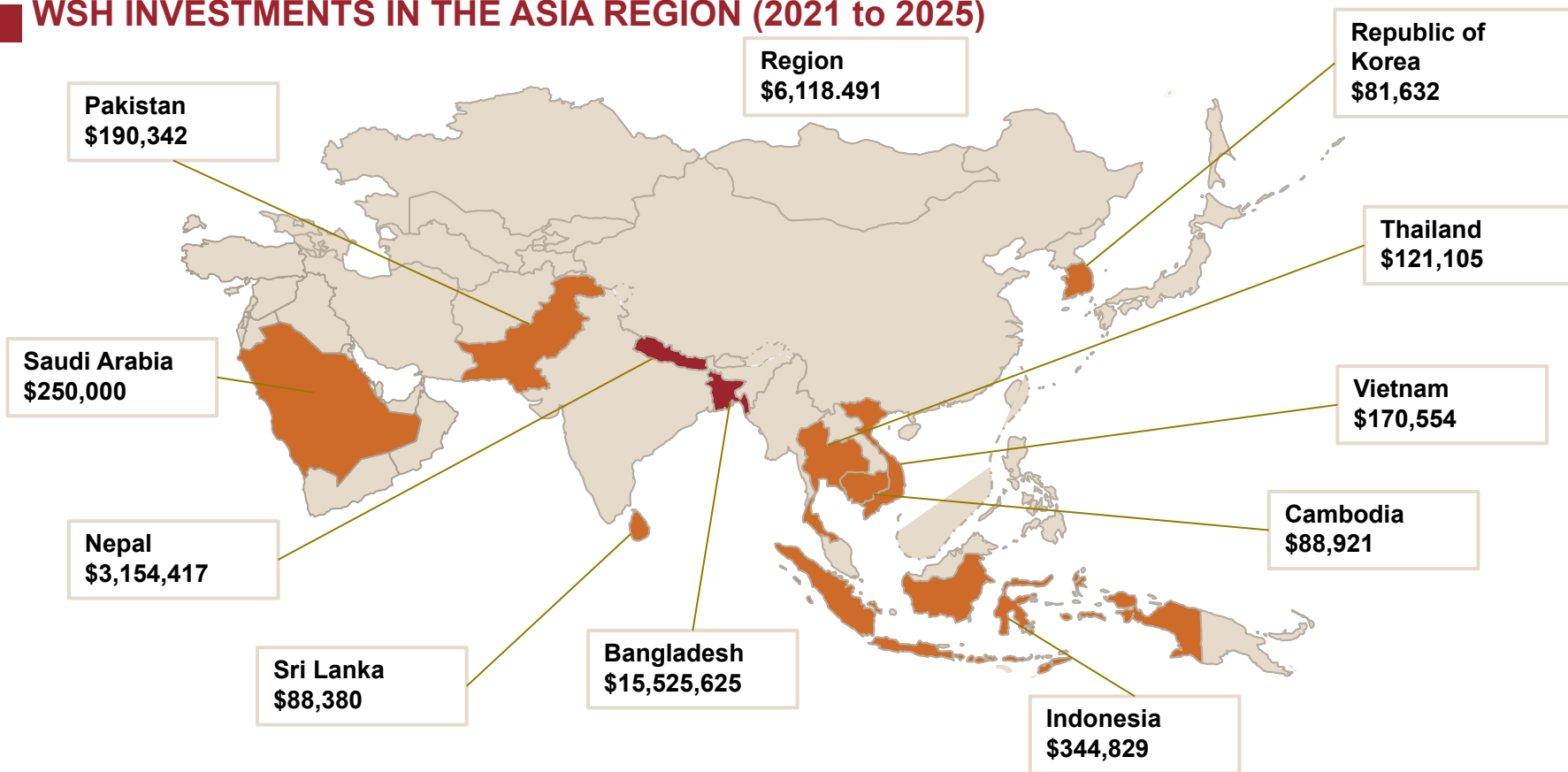
Moderate Engagement Countries

- **Nepal:** Policy and Advocacy support for CWIS-FSM policy and regulation adoption; measurement and tracking; and capacity building for scaling
- **Indonesia:** Exploring engagement with IsDB for SANIMAS phase 2; Market Assessment of RTs and OPs
- **Pakistan:** Market Assessment for innovative technologies (RTs and OPs)

Engagement Through Partners

- **Other countries in the region:** Knowledge and capacity building of IFIs and regional development/advocacy partners to integrate CWIS in their program; explore market opportunities of RTs and OPs

WSH INVESTMENTS IN THE ASIA REGION (2021 to 2025)





5.1

Bangladesh adopts
**CWIS principles
and framework at
the national level**
and initiates its application in
75 cities,
resulting in xx% increase in
safely managed sanitation
services, especially in
low-income communities.

5.2

At least
**2 additional
countries**
put key components of
institutional functions for
CWIS in place at national and
select city levels, with
support from partners.

5.3

**Strengthened
capacity of regional
platforms**
and coordination mechanisms
to scale CWIS.

BANGLADESH WSH STRATEGY

POLICY AND ADVOCACY FOR CWIS/FSM



Support in setting up Regulatory Body for Sanitation, contribute to implementation of National Action Plan for IRF-FSM, and implementation of standards

BUILD CAPACITY FOR CWIS/FSM IMPLEMENTATION



Building institutional & human capacity across a range of targeted stakeholders (LGI, Department and Private Sectors) for sustainable implementation of sanitation programs by following CWIS principles.

EFFECTIVE SANITATION SERVICE DELIVERY SYSTEM



Demonstrate what CWIS service delivery looks like at city level by improving the performance of urban sanitation services as measured by 2x3 framework

INFLUENCE URBAN SANITATION FINANCING



Increase investment on CWIS by the key IFIs, development partners, and local financing institutions and investors

DEVELOP MARKET FOR TRANSFORMATIVE SANITATION PRODUCT & SERVICES



Create enabling environment to introduce innovative technologies, including RTs and OPs with sustainable service and business models.

MEASUREMENT AND DATA SYSTEM



Support establishment of appropriate indicators and targets, and IMIS infrastructure to inform local and national service delivery, accountability, and financing decisions, and to track national progress against SDG 6 commitments .

EMERGENCY/ DISASTER & CLIMATE CHANGE MANAGEMENT



Establish a strong coordination system for emergency/ disaster/climate programs to ensure effective guidance for convergence of efforts of all different sector/ development partners actors towards sustainable outputs.

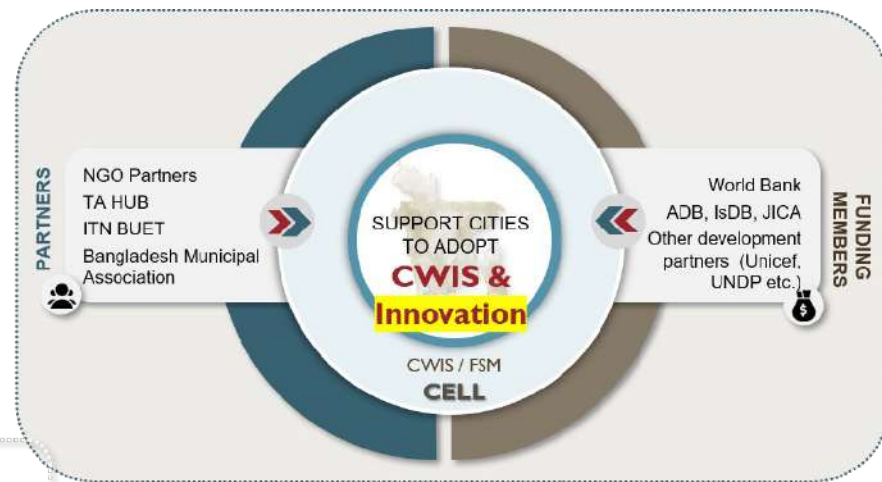
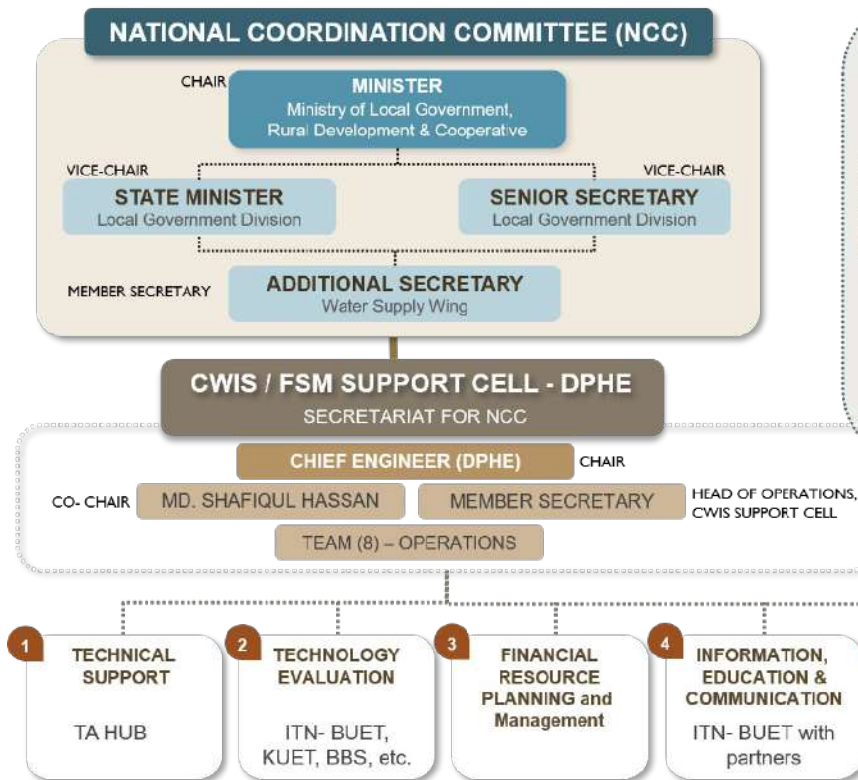
GENDER EQUALITY AND WOMEN EMPOWERMENT



Contribute to revisions of policies, strategies, plans and implementation of services so that these are gender-intentional

Projects with different partners

- DPHE : Sanitation Dashboard; CWIS Support Cell; Project preparation for IsDB, AIIB, and ADB
- ITN BUET : Capacity Building for CWIS and FSM and IRF/NAP development
- SNV: CWIS and FSM projects in Khulna, Jhennaidah, Khustia
- Practical Action: FSM in 6 towns (including Faridpur, Meharpur etc) and sanitation workers
- Water Aid: Policy Advocacy for urban sanitation and sanitation workers
- Unicef – support for large cities (Dhaka, Rajshai and Chattogram) + WSH regulatory body
- MAB/UCLG/ - municipalities strengthening for CWIS + upstream advocacy
- Data partners- A2i, Tiller, Streamstech, SNV, InoSol
- FANSA – low income community engagement and empowerment
- MAWTS – low cost affordable tech eg desludging equipment
- GWSC/AIT – TA Hub mechanism to support Govt and IFIs



THANK YOU!





BANGLADESH PRIORITY TASKS FOR 2022

PRIORITY TASK	HOW	AVAILABLE RESOURCES	RESOURCE GAP
Support to establish regulatory body to implement IRF in medium towns, large and mega cities.	Work closely with Ministry and Policy Support Branch (PSB) – Unicef and CWIS FSM support will be the mediator	Active grant with DPHE and UNICEF	Proposed new grant with WaterLink Additional resource may require for Unicef for Mega cities
Establish national monitoring system of urban sanitation with the CWIS framework	- Upgrading sanitation dashboard with DPHE, LGED and A2i - Prepare large number SFD to demonstrate fast track approach to measure safely managed sanitation	MLE Grant – proposal under preparation – Investment confirm through MEDS	
Operationalize capacity building platform for building implementing capacity of the public institutions (DPHE, LGED and LGIs)	ITN BUET leads the work with our grantees (SNV, Practical Action, Water Aid, WSUP etc) + Municipal Association + DPHE + LGED + WASAs; DASRA to act as a bridge between India grantees	Active grant with ITN BUET and new grant with Dasra	
At least 10 cities (both large and medium sized) establish as a learning cities for rest of the cities in Bangladesh (establish – IMIS, service level improvement, access services by the poor, and institutional reforms)	- Identified cities where large number of CWIS indicators are in place – establish those cities as mentor cities for CWIS - Operationalize IMIS in at least 5 cities to establish as a model for scale by the IFIs project - Demonstrate slum sanitation improvement in partnership with utility and slum sanitation improvement (Khalda, Dhaka)	Grant with Water Aid, UCLG, Practical Action, SNV, Unicef	Proposed IMIS grant
Ensure new investment by IFIs (ADB, WB, IsDB, AIIB and JICA) for CWIS in at least 75 cities	TA Hub to provide TA support in designing new investment (AIIB, ADB, AFD, GoB) and TA to the ongoing projects especially be WB in Dhaka and 30 cities project and LLF IsDB	TA Hub contract	Need some additional funding to fill the gap of We-fi – Supplement to the IsDB Additional funding for sanitation workers
Gender and Social Inclusion	- Engage with Women in Sanitation Enterprises Project (WISE) under Women Entrepreneurs Finance Initiative (We-Fi)/IsDB - Upscaling sanitation cooperative and enhance digital capacity of sanitation workers	New fund We-fi/IsDB	
Build capacity of local company to produce desludging equipment	Follow up, facilitate to establish partnership with PIT VAQ & local company	NVF Grant	
Community engagement and local advocacy	- Support FSM-Net (similar to NFSSM Alliance in India) - Support FANSA local chapter for community engagement - Mentoring from India partners through Dasara	Partial grant with ITN BUET and New grant with FANSA	ACHR/FANSA Grant
Installation of OP in Rohingya and assess market opportunity for OP and MURT and demonstration of feasible option in Bangladesh	- Ecosystem development to operationalize OP in Rohingya - Integration of OP and MURT in new investment of IFIs - prepare tender for OP and MURT CP - Explore any possibilities to demonstrate OP and MURT in LLF for any other IFIs projects	Engage technical team (UPM) with TA Hub; EMR grant with UNHCR	- Partner with EMR team - Develop market strategy - Need additional resources for OP operationalization in Rohingya

WHAT WE'RE LEARNING SO FAR: **CWIS CITIES**



FUNCTIONS

- **Urban Sanitation Mandates** are sewer-limited, unclear, or decoupled from performance expectations & finance
- **Municipalities are rarely financed or incentivized** to improve service levels, coverage; may not have sufficient autonomy to hire, generate revenue to organize inclusive public sector service
- **Municipal governance reform** may determine limits & opportunities for sanitation system-strengthening
- **Performance Accountability** systems, generally, do not exist for municipalities, are not applied to NSS for utilities, and not backed by measurement systems when applied
- **Civic engagement needs to be built into institutions** to support behavior change, comm engagement, and reinforce transparency
- **Financing** decisions and outcomes still political, opaque, unaligned, inequitable; decision process transparency & clarity requires clear mandates and performance data
- **State/National Systems** that clarify mandates, establish accountability systems, and tie finance to policy priorities, are required if city-level project gains are to be sustained or replicated



OUTCOMES

- **On-site upgrading does not scale or reach the poor** with behavior change and marketing alone. Subsidies are required for safe, inclusive containment & connections
- **Services do not reach LICs** without meaningful and enforced incentives; different private sector engagement approaches are required to reach LICs
- **Formalizing emptying services does not guarantee safe emptying jobs.** Inappropriate/missing PPE gear, manual emptying, manual trash, broken/poorly designed mechanized equipment prevail if workers' labor rights are not actively protected
- **Integrated NSS/SS planning**, service coordination, finances can improve efficiency and accountability
- **Measurement & monitoring approaches** are unharmonized, but often expensive project-based monitoring fills data gaps in lieu of investing in monitoring systems for improved governance
- **Private sector finance** is available if gov't actively structures demand and addresses payment risk; this is required at all stages of 'value chain'



INNOVATIONS

- **City/Utility IMIS** can improve city services; requires training, software integration, time. Success greater if integrated into national accountability/planning requirements (NWASCO/Lusaka, DPHE/Jhenaïdah)
- **Decanting stations** for fecal sludge/septage reduce travel, costs, infrastructure redundancies; ease private sector engagement, safety (Trichy/Lusaka)
- **City-scale revenue** using "payment commitment" devices like levies, property taxes, bundled tariffs are necessary for inclusive services, but insufficient for on-site upgrades or services; strengthens municipal incentives but difficult to tie to performance (Wai, Lusaka, Khulna)
- **Hardware is costly** for dense, unplanned, highwater areas, SS or NSS; no escaping long term gov't investment (Kampala, Warangal, Khulna, Dakar)
- **Revenue from reuse** possible but no breakeven opex outside orchestrated projects (all cities)
- **Gender training** req'd across city/utility departments; gender mainstreaming in all service engagements (Khulna, Warangal, Trichy)

WHAT WE ARE LEARNING SO FAR WITH DFI INVESTMENT



DFI INVESTMENTS

- Upstream work supported through TF (awareness raising and capacity building, client demand creation, knowledge focus) is crucial but not sufficient; country gov't enabling environment is key
- Operational engagement is essential for success at country level – but Gates team spread thin!
- Our optimism can get the better of us; important to openly discuss and agree on realistic timelines, especially for systems change goals
- The desire to shift ways of working is real; Figuring out how to accomplish this is harder than we thought
- We can't change everything! FOCUS on the items we care about most: e.g. '% poor reached with safely managed'
- We must work from within to change the sector: Build trust and internal allies; show practical 'islands of success' and examples of what works
- Change management is all about PEOPLE! Continue to focus on internal training/exposure, identifying & nurturing champions.
- There is appetite for more Cross-bank Collaboration: Q2 cross-bank learning retreat; quarterly teleconferences; Gates-convened moments to share and push one another

WHAT WE ARE LEARNING SO FAR FROM COUNTRY WORK



COUNTRY WORK

- Policy change does not drive change alone
- Financing and infrastructure also required to focus on service delivery
- Few countries have the institutional framework to incentivize provision of inclusive sustainable services
- Capacity gaps at country level are real and pervasive; progress will be difficult without addressing this – and capacity building takes time
- Investments in national-level soft infrastructure is needed for projects results to sustain and scale: eg e-governance, integrated MIS systems and capacity building of implementers
- Utility change management takes time – human resource capacity & internal structure and financing are huge endeavors that can involve ‘pain’



[Home](#) [KNOWLEDGE RESOURCES](#) [Case studies](#)

Case studies



Scaling up of FSM in Odisha



Odisha FSM



FSM Bhudaneswar, Odisha



FSM Puri, Odisha



India for the World

How does India manage its faecal waste?

We trace the journey of a few states in India, which have shown tremendous improvement in treating waste from on-site sanitation systems by putting in place the right policies, regulations and infrastructure.

[VIEW THE STORY](#)

TNUSSP

Empowering stakeholders and communities to drive transformational change

[Read More](#)

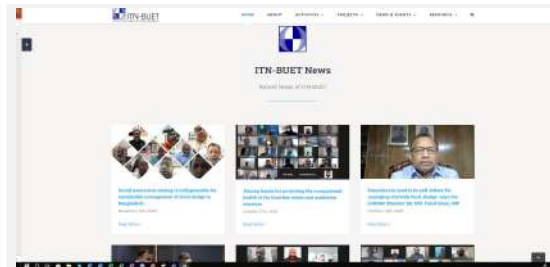
CAPACITY BUILDING PARTNERS AND KNOWLEDGE PRODUCTS



CENTER FOR WATER & SANITATION



FSM ALLIANCE



ITN BUET



CENTER FOR SCIENCE & ENVIRONMENT



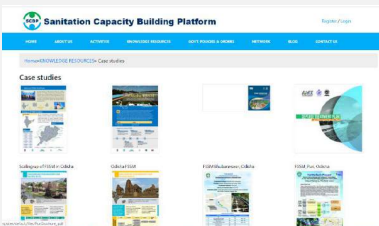
CDD SOCIETY - INDIA



CENTER FOR POLICY RESEARCH



SUSTAINABLE SANITATION ALLIANCE



NIUA



ASIAN DEVELOPMENT BANK INSTITUTE

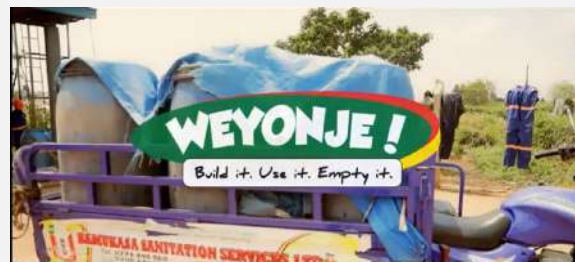


SNV



ENPHO

CAPACITY BUILDING PARTNERS AND KNOWLEDGE PRODUCTS



NEW PUBLICATIONS Citywide Inclusive Sanitation as a Public Service

Please download our new reports which review the CWIS functions - Responsibility, Accountability and Resource Planning & Management

RESPONSIBILITIES



Full Report

Brief Report

ACCOUNTABILITY



Full Report

Brief Report

RESOURCING



Full Report

Brief Report

Framework for Addressing Occupational Safety of De-sludging Operators: A Study in Two Indian Cities

Mamta Gautam, Kavita Wankhade, Gayathri Sarangan, Srinitha Suchakar



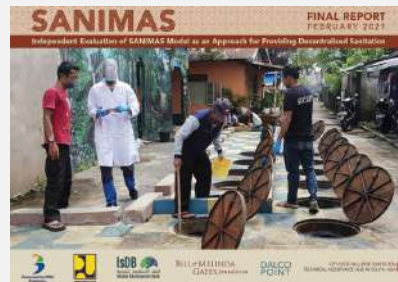
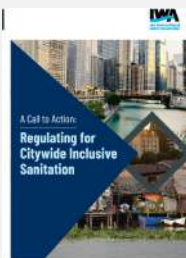
Heart-felt thanks to the entire field team, and all sanitation workers who participated in this study



Integrated decentralized water and sanitation for unserved areas in small Indian towns



Public Health and Engineering (PHE) Department
Union Territory of Ladakh



ADB and WB Publications

1. Asian Development Bank CWIS Knowledge Hub:
<https://adb.eventsair.com/online-adb-sanitation-dialogue-2021/cwis-knowledge-hub>
2. World Bank CWIS resources: <https://www.worldbank.org/en/topic/sanitation/brief/citywide-inclusive-sanitation>

1. What Is Citywide Inclusive Sanitation and Why Is it Needed?

<https://www.adb.org/publications/citywide-inclusive-sanitation-needed>

2. Addressing Gender Equality and Social Inclusion in Urban Sanitation Projects

<https://www.adb.org/publications/gender-equality-social-inclusion-urban-sanitation-projects>

3. Inclusive Financial Mechanisms: Improving Access to Sanitation Services for Poor Households

<https://www.adb.org/publications/inclusive-financial-mechanisms-access-sanitation-poor>

1. CWIS cities program – BMGF: <https://www.cwiscities.com/> - there are numerous city-level resources and cases here - <https://www.cwiscities.com/home/learndocuments>
2. CWIS measurement approach: <https://s3.amazonaws.com/resources.cwis.com/learning/201/CWISMeasurementNote2021Julyv3.pdf>
3. CWIS indicators – full list: https://s3.amazonaws.com/resources.cwis.com/assets/documents/Full+List+of+CWIS+Indicators_July2021_v2.pdf
4. Asian Development Bank CWIS Knowledge Hub: <https://adb.eventsair.com/online-adb-sanitation-dialogue-2021/cwis-knowledge-hub>
5. World Bank CWIS resources: <https://www.worldbank.org/en/topic/sanitation/brief/citywide-inclusive-sanitation>
6. City-level Resources: <https://www.cwiscities.com/home/learndocuments>
7. CWIS Measurement Approach: <https://s3.amazonaws.com/resources.cwis.com/learning/201/CWISMeasurementNote2021Julyv3.pdf>
8. CWIS Indicators: https://s3.amazonaws.com/resources.cwis.com/assets/documents/Full+List+of+CWIS+Indicators_July2021_v2.pdf
9. [ESAWAS Briefs & Guidelines](#)
 - *Who has Responsibility?*
 - *Ensuring Accountability*
 - *Resources Planning & Management*
 - *Guidelines for CWIS Planning*
 - *AMCOW [African Sanitation Policy Guidelines](#)*
10. EAWAG-Sandec [Sanitation 21: A Planning Framework for Improving City-wide Sanitation](#)

Tools

1. [Shit Flow Diagram](#) (SFD)
2. [FSM Toolbox](#) Tools
 - a. *Stakeholder Engagement Planning*
 - b. *City Service Delivery Assessment (CSDA)*
3. [SaniPath](#)
4. [CWIS Service Assessment & Planning \(CWIS-SAP\)](#)

Water Quality Result

comparison	COD (mg/L)	SS (mg/L)	NH ₃ -N (mg/L)	TP (mg/L)	pH	odor	color	E.Coli/counts
before	500-800	----	115	5.2	7.2	smelly	dark yellow	----
after	≤50	<10	<5	0.01	6.8	no	no	0



before

after

distilled water

Installation Example 3



Community Toilet

Bandung, West Java, Indonesia

Status: Operational since March 2022

Facility:

- 5 squat toilets
- 6 urinals
- 2 handwash basins
- Serves 50 households

Treated Waste:

- Up to 1200L of blackwater per day from flushing toilets

Technology setup:

- 2 x Aquonic 600L tanks with EC Box
- Cast-on-site 3 chamber septic tank with platform lid for Aquonic tanks

Our Installations

Kempton Park, South Africa

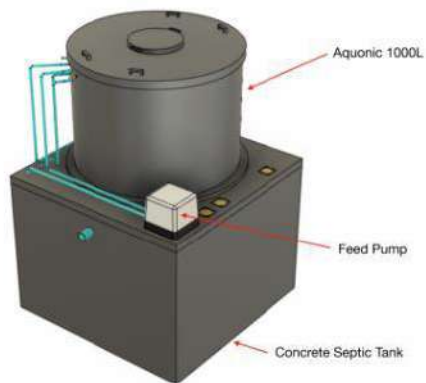


Kindly Note: This is a Demonstration site.
All pipes are concealed for normal installations

Installation Type	: Industrial
Project Type	: Retrofit
No. of Users	: 13
Influent	: Grey & Black Water
Treatment Capacity	: 2000 lt/day
Energy Supply	: Grid Supply



Modular Design



Aquonic 1000 with 4000L Septic Tank



2 x Aquonic 1000 with 8000L Septic Tank & Solar
PV Energy System



3 x Aquonic 1000 with 12000L Septic Tank & Solar
PV Energy System

Value Proposition

- **Small Footprint** : Suitable for both new applications and existing system upgrades, Above & Underground Installations.
- **Scalable & Expandable** : Smooth upgrade and gradual expansion based on just-in time investment.
- **Cost Efficient** : Minimal works, short project life cycle, lower Capex/ Opex.
- **Low energy consumption** : Can be Grid/ Solar powered. Daily consumption from 4kW (Peak load: 1.25kW).
- **Low Maintenance** : Few moving components; Low operational costs; No membranes; Access hatches allow for easy inspection.
- **Durable and Robust** : Manufactured using high strength HDPE which can withstand soil and dynamic loads. It has good impact resistance and great resistance to abnormal stress due factors including soil settlement and ground water.
- **Locally Manufactured** : Locally manufactured in Gauteng using locally sourced materials. Spares are readily available
- **Onsite Manufacturing** : A temporary manufacturing facility can be established near a project site for large projects thus creating employment for the local community and transferring of skills.
- **Continuous Research and Development** : Working towards achieving ISO 30500:2018 product certification and ISO9001:2015 certification

Reinvented Toilet Technology Summary

- Cranfield S-500 (b-HRT)
- SAIT Biothermal Reinvented Toilet
- Eco-san Toilet Backend Treatment System HRT Component
- Eco-san b-CRT Type 2 Reinvented Toilet
- Eco-san Sludge Disinfection Unit

01 December 2022

