Onsite Training Programme on
"Planning and Designing of Faecal Sludge Management Systems"
(September 16-18, 2025)

Session 2:India's sanitation shift: Progress on FSM and wastewater management

Dr Sumita Singhal
Programme Manager, Water Programme (CSE)
Email – sumita.singhal@cseindia.org

water & sanitation
Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

WATER RESEARCH COMMISSION

JG AFRIKA
EXPERIENCE QUALITY INTEGRITY

Our evolving sanitation journey: why this paradigm shift to affordable and inclusive sanitation is needed?

(Non Sewered Sanitation – paradigm shift)

Where are we today? What are the new and old challenges for tomorrow

Our agenda together

Sunita Narain

The Policy and Practice Forum April 2023

BIG CHALLENGES AND NEW SOLUTIONS

- Need to ensure sanitation for all
- Need to ensure our rivers are not polluted with untreated sewage
- Need to ensure water security, getting worse in the age of climate change
- A new paradigm of managing excreta from households (faecal sludge) has emerged in the cities of the South
- **Needed imagination and courage to adopt different pathway**
- **Need for an Integrated Wastewater/Used Water and Faecal sludge Management**
- Now we need to ensure that this works: **Our agenda together**

CONTEXT: OUR CHALLENGE

INDIA	
1.4 billion	Population with
35%	% residing in Urban space
32%	Urban HHs connected to Sewers
10%	Cities with Sewerage network
68%	HHs dependent on Onsite Sanitation Systems like Septic tanks

- Need to ensure sanitation for all
- How will we save our rivers and groundwater from pollution?
- **There is a need for Faecal Sludge Management**

TRAJECTORY OF FSSM IN INDIA

2008

India launched a National Urban Sanitation Policy (NUSP) but did not consider FSSM

2016

NFSSM Alliance
- supported MoUD for a Primer and Rapid Assessment Tool for FSSM budgeting by ULBs.
- Mysuru city and Sikkim state declared as ODF

Devanahalli builds India's first FSTP

2017

Launch of India's first **National Policy on FSSM**, signed by 100 cities

2018

- 19 out of 36 States and Union Territories published policies or operative guidelines on FSSM.
- 22 FSTPs operational.

2019

- **India declared as ODF country.**
- 442 towns in India announce or issue tenders to set up FSTPs.

2020

More than 700 towns/cities are in stage of FSSM Implementation

2021

2021 NITI Aayog releases Faecal Sludge and Septage Management in Urban Areas Service and Business Models

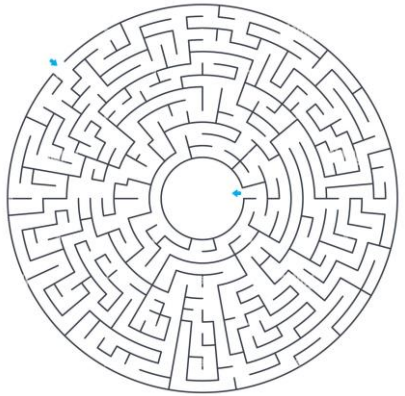
2021- SBM 2.0

2021- AMRUT 2.0

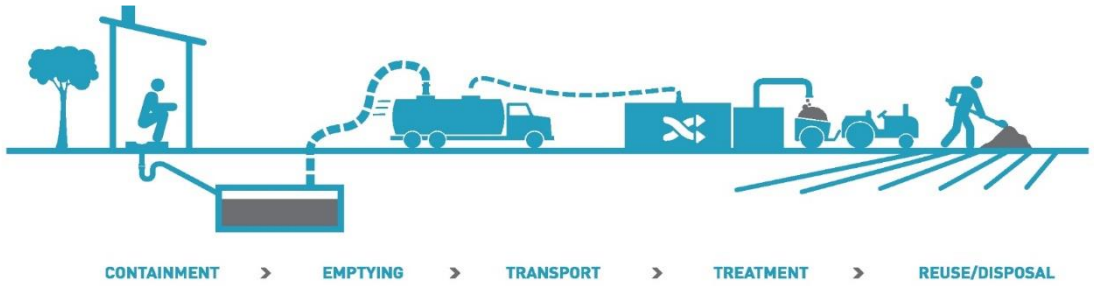
Guidelines for Safe Reuse of Treated Water

EVOLUTION AND PARADIGM SHIFT

Infrastructure Creation



Shift from **Infrastructure creation to Service Level Improvement** (Service Level Benchmarks)



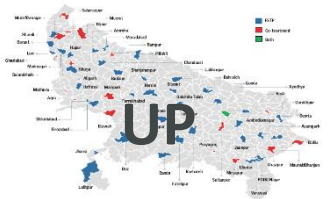
Shift from Sanitation **Service Provision to CWIS:**

Infrastructure Creation
Water supply, sewers coverage

FSM - Paradigm Shift from Centralized Sewered Sanitation Systems to Non-Sewered Sanitation Systems (NSS).

Outcomes: Inclusion, Safety, Sustainability Improving **Functions**: Accountable and Responsible Management, Governance and Planning.

SPREAD OF FSSM PROJECTS IN STATES



Co-treatment in existing STPs-69	Co-treatment in existing STPs 50	Co-treatment in existing STPs 2	Co-treatment in existing/proposed STPs 28	Co-treatment in existing STPs In Hyderabad (12 No.s)
Independent FSTPs (co-located at SWM plant) **327** All towns covered	Independent FSTPs **59** Population covered 2.5 Cr (75% urban pop;600 towns)	Independent FSTPs **97** Cities covered ALL	Independent FSTPs **77** All towns covered	Independent FSTPs **71 (PPP-HAM)+70 (EPC)** All towns covered
Total investment 45 Cr	Total investment 200 Cr	Total investment 298 Cr	Total investment 259 Cr	Total investment 250+ Cr

Co-treatment is the disposal of Faecal Sludge at existing Sewage Treatment Plants with some excess capacity for treatment along with the incoming sewage. It utilizes existing capacity and is hence cost effective and fast.

UP also has undertaken Co-treatment* and FSTP implementation in 50+ towns

Co-treatment (20)

Independent FSTPS (39)

Total Investment under AMRUT 200+ Cr

Source: NFSSM Alliance analysis

TRAJECTORY OF FSSM IN INDIA

Cotreatment plant - TN

FSTP – Chunar, UP

FSTP – Odisha

FSTP - TN

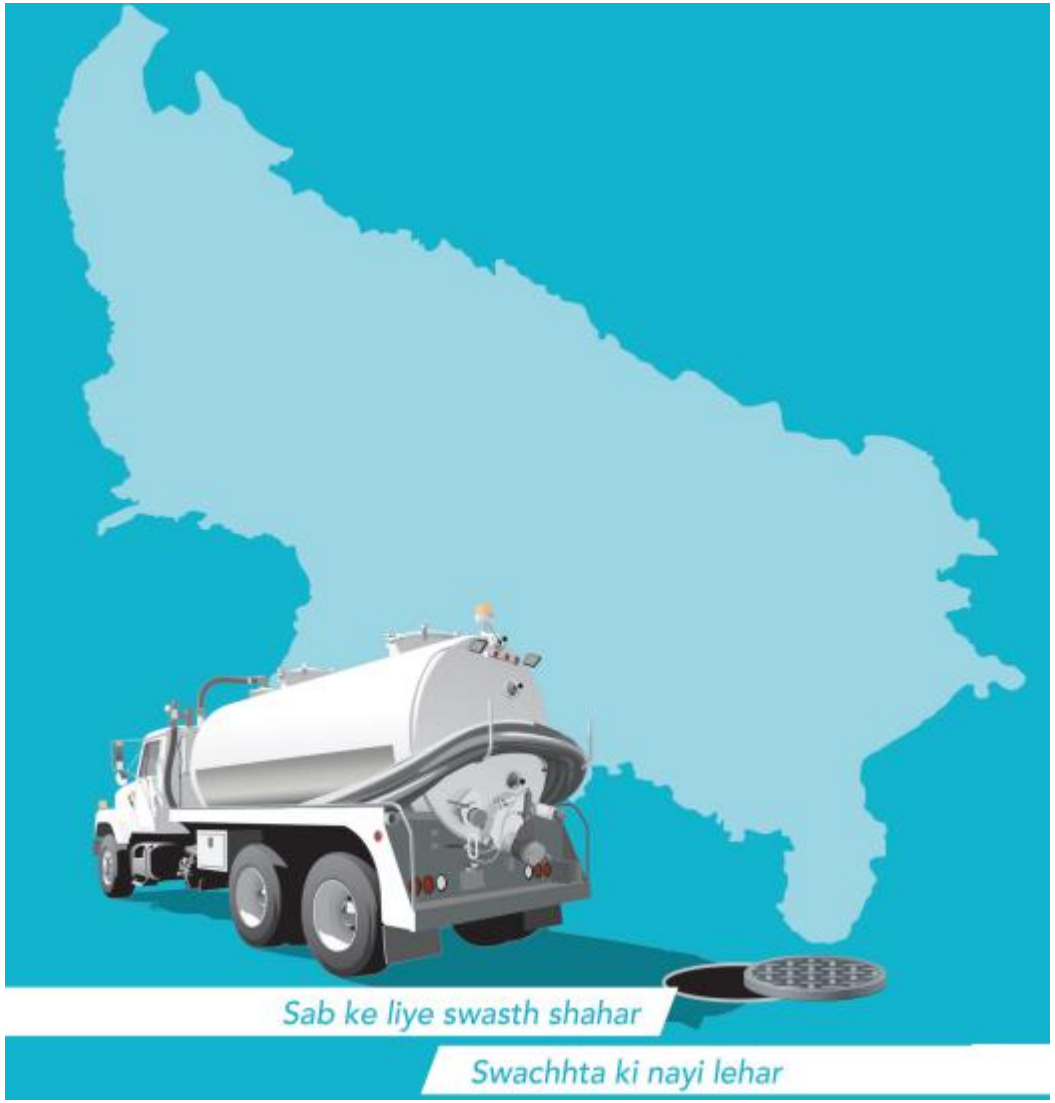
FSTP– Jhansi, UP

Co-treatment plant – Bijnor, UP

THE RECENT GOVT. POLICY

- **GOI SBM 2.0 guidelines (2021)**: *To ensure that no untreated faecal sludge or used water is discharged into the environment, and all used water (including sewerage and septage, grey water and black water) is safely contained, transported and treated, along with maximum reuse of treated used water, in all cities with less than 1 lakh population.*
- *Cities can invest in STP or FSTP or co-treatment to achieve the above*
- **Not technology prescriptive but the emphasis is on the treatment of all used water/faecal sludge and on the reuse of this treated water**
- **SBM 2.0 targets 3901 cities of less than 1 lakh population**.

UP STATE FSM JOURNEY : FROM 2 TOWNS TO 62 TOWNS



UP STATE: SANITATION PROFILE

2,43,286
Area
(Square km.)

912:1000
Gender Ratio
(F:M)

60
AMRUT
Towns

241Million
(projected
for 2022)

762
ULBs

11
SMART
Cities

75
Districts

52.4
Million
Urban
population
(Projected
for 2022)

31
NMCG
Priority
towns

Urban Sanitation Status

90% of population is not served by sewage or septage treatment facilities

Out of 762 ULBs in UP, only around **15% ULBs have (partial) sewerage network**

67.9%

Population dependent on non-sewered sanitation systems[1]

[1] Estimated using extrapolated population dependent on non-sewered sanitation systems, considering data provided in Census 2011

31 cities out of 735

Have sewage treatment plants

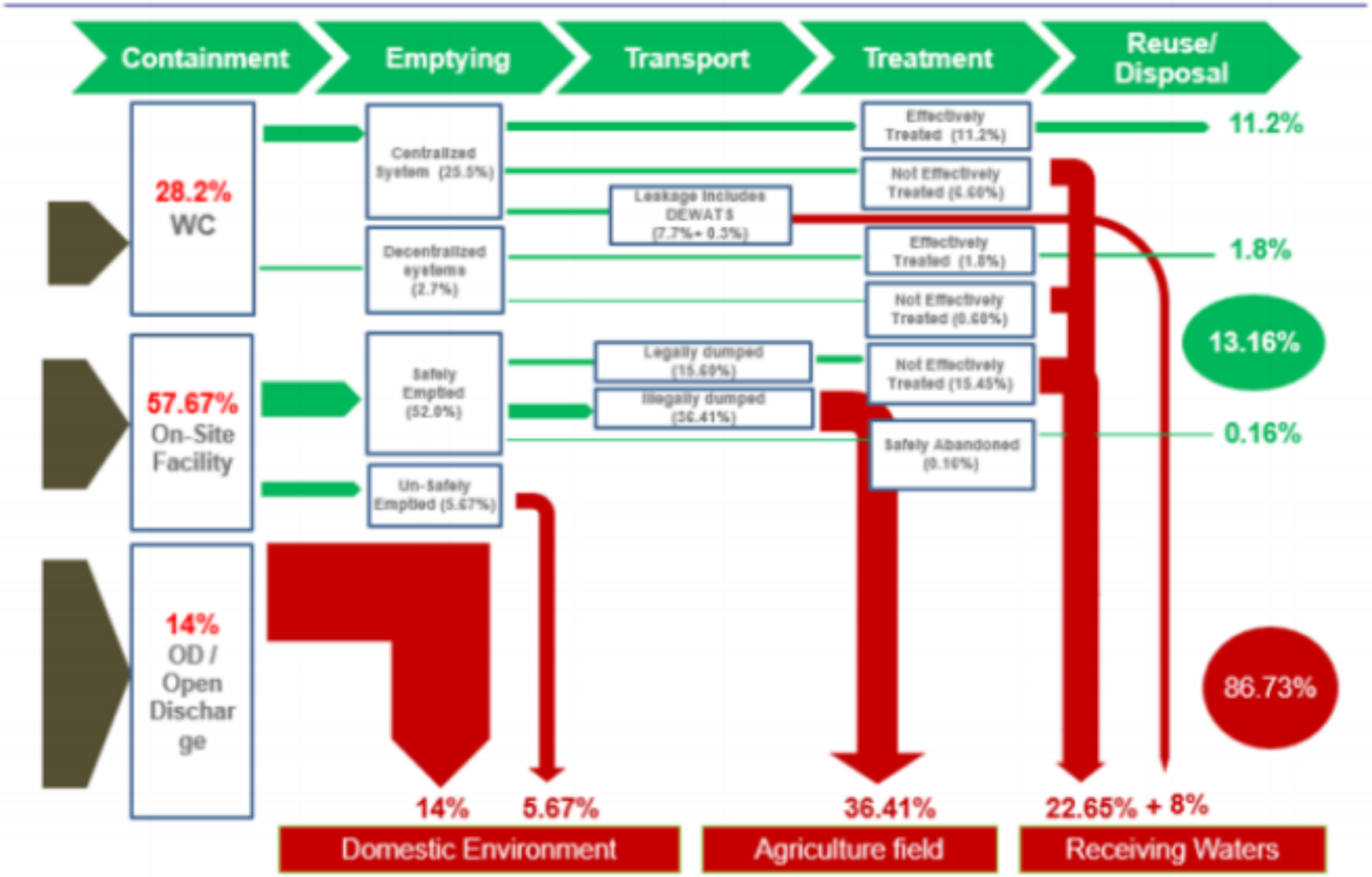
40 cities

Have sewage and septage infrastructure

75 cities out of 735

Have existing/ proposed sewage and septage infrastructure

SHIT FLOW DIAGRAM – UTTAR PRADESH



UP STATE: FAECAL SLUDGE MANAGEMENT JOURNEY

2016

The Union Ministry of Urban Development (MoUD) directs states to prepare septage management proposals and investment plans under AMRUT State Annual Action Plan.

CSE initiated capacity building programme for City Sanitation Planning in 4 Ganga basin towns in UP

2017

CSE partners with the Department of Urban Development (DoUD) in UP

The Union Ministry of Urban Development (MoUD) issues National FSSM Policy

2018

Jhansi sets up the first faecal sludge treatment plant of the State

State issues FSSM operative guidelines with the technical support of CSE.

SBM (Urban) introduces ODF++ ratings for cities and accords specific focus to septage treatment

2019

The UP Jal Nigam (UPJN) floats tenders for 31 FSTPs under AMRUT and 21 co-treatment plants.

Unnao sets up the first FSTP under AMRUT

UP issues Septage Management policy

2020

CSE partners with NMCG to develop one town each for FSTP and co-treatment system.

CSE releases it's report on Managing septage in Ganga towns

2021

The first Namami Gange FSTP gets commissioned in Chunar

2022

The first Namami Gange co-treatment gets commissioned in Bijnor

OPPORTUNITY FOR CSE – UTTAR PRADESH

Capacitating Urban Local Bodies in for developing city sanitation plans U.P & Bihar – in partnership with SBM, AMRUT, Namami Gange and respective state govt.

Supported by Bill & Melinda Gates Foundation - BMGF

To Create Enabling State Level Framework

i) **Completing sanitation chain** with containment, extraction, transportation, treatment, and disposal / re-use of all faecal sludge/ septage and other liquid waste.

ii) **Define roles and responsibilities** of government entities and agencies, and of other key stakeholders

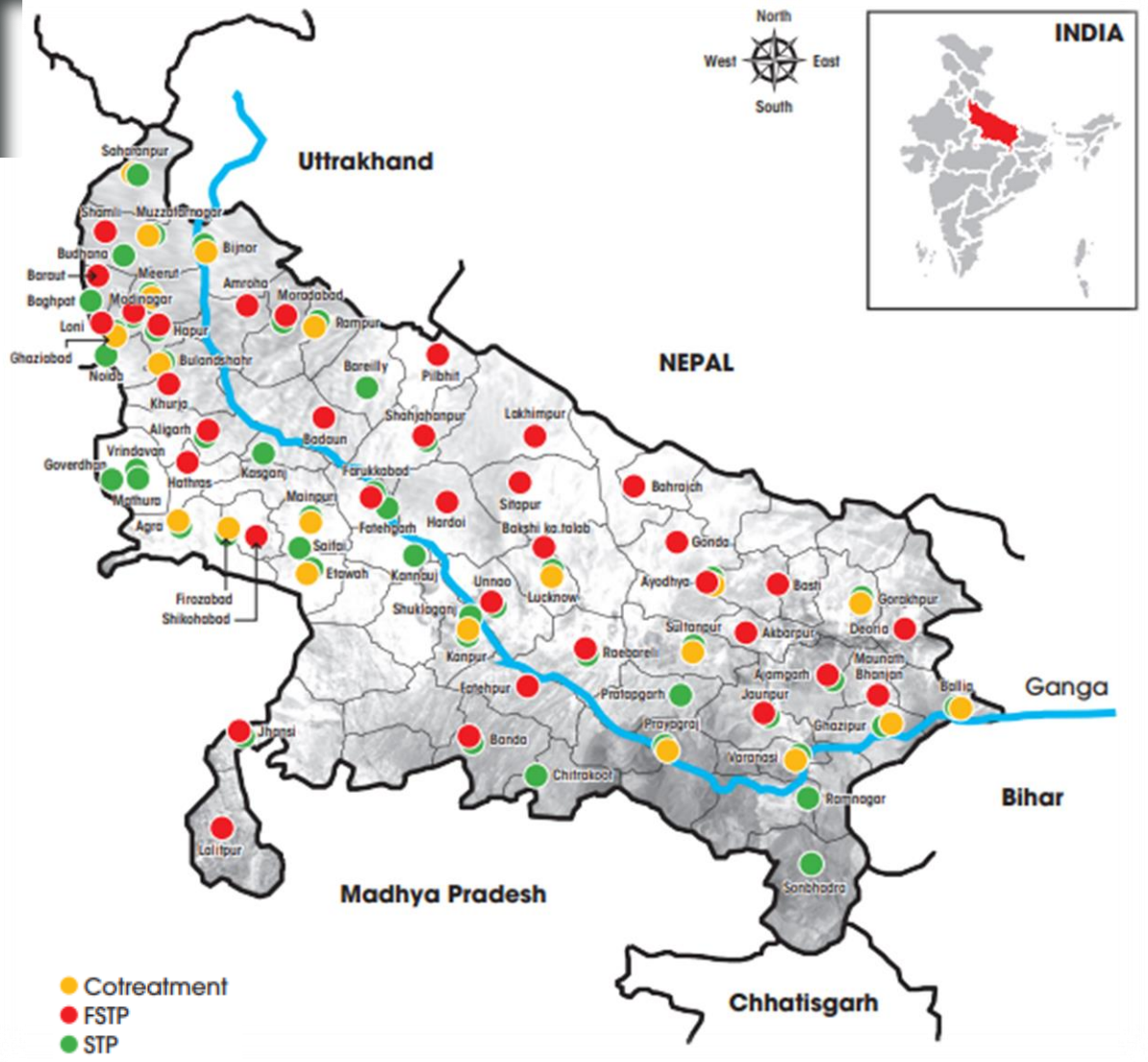
Phase II: Capacitating Urban Local bodies in the Ganga basin on small scale, onsite wastewater and septage management systems

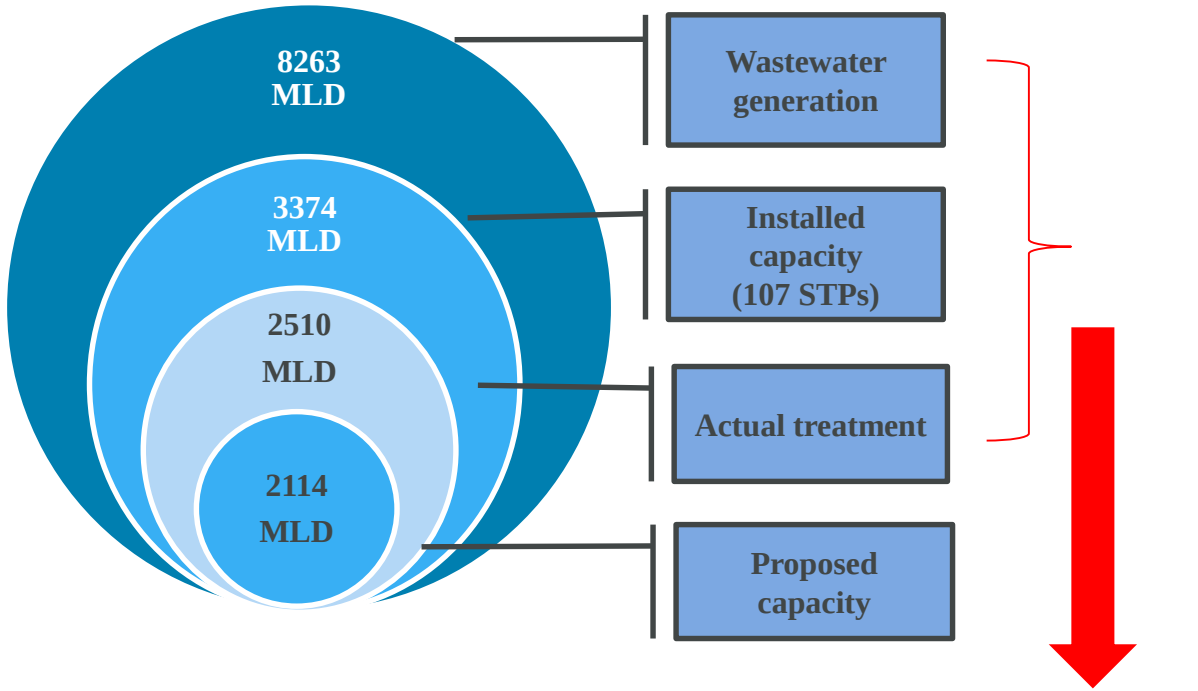
National Mission Clean Ganga

90 State and ULB officials trained in Phase I

- 1 Workshop
- 4 CSP Trainings
- 4 National / intl exposure visits
- 1 media workshop

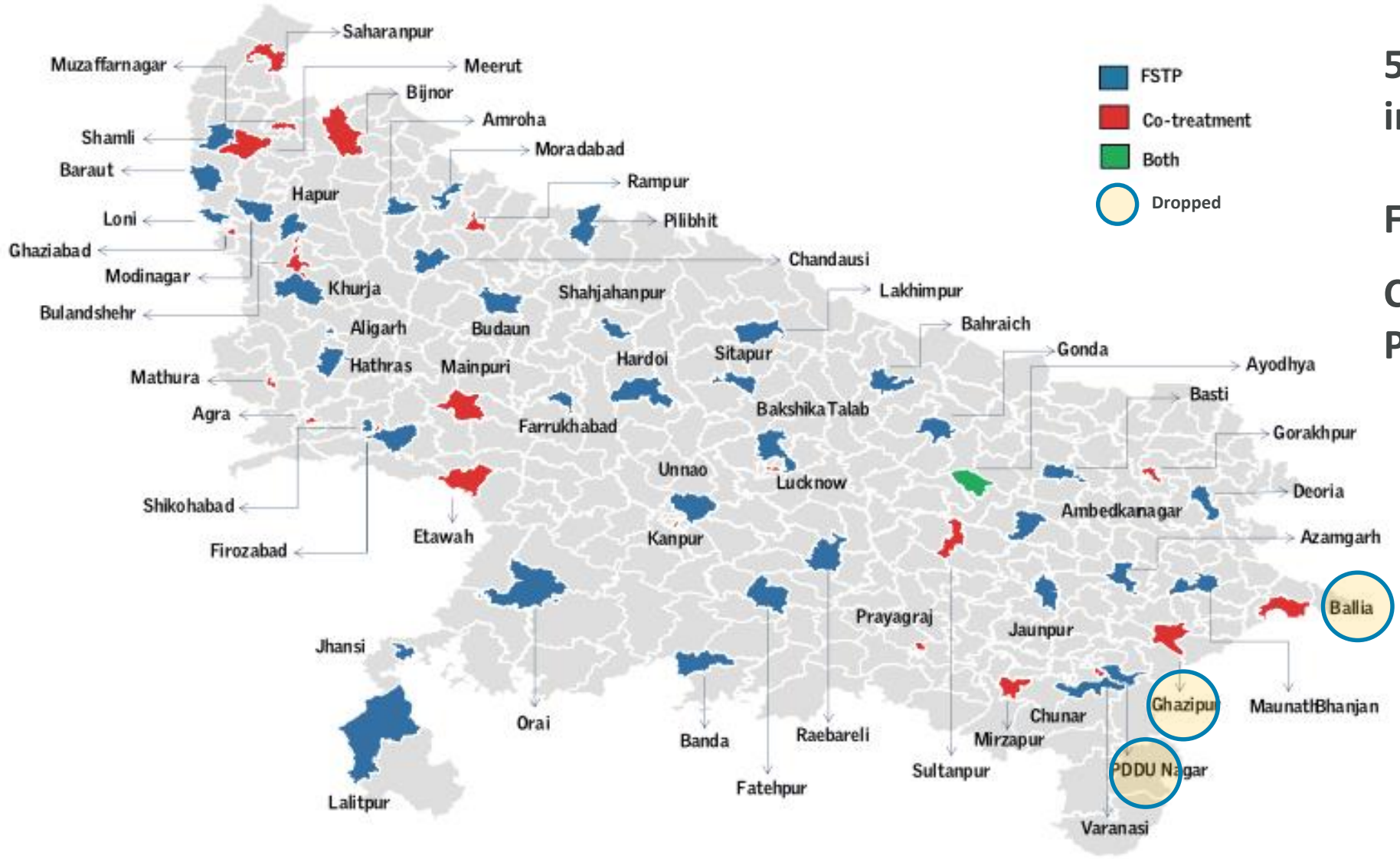
FSM IN UP – A JOURNEY TOWARDS CWIS





Surface & ground water contamination

FSSM IN UP



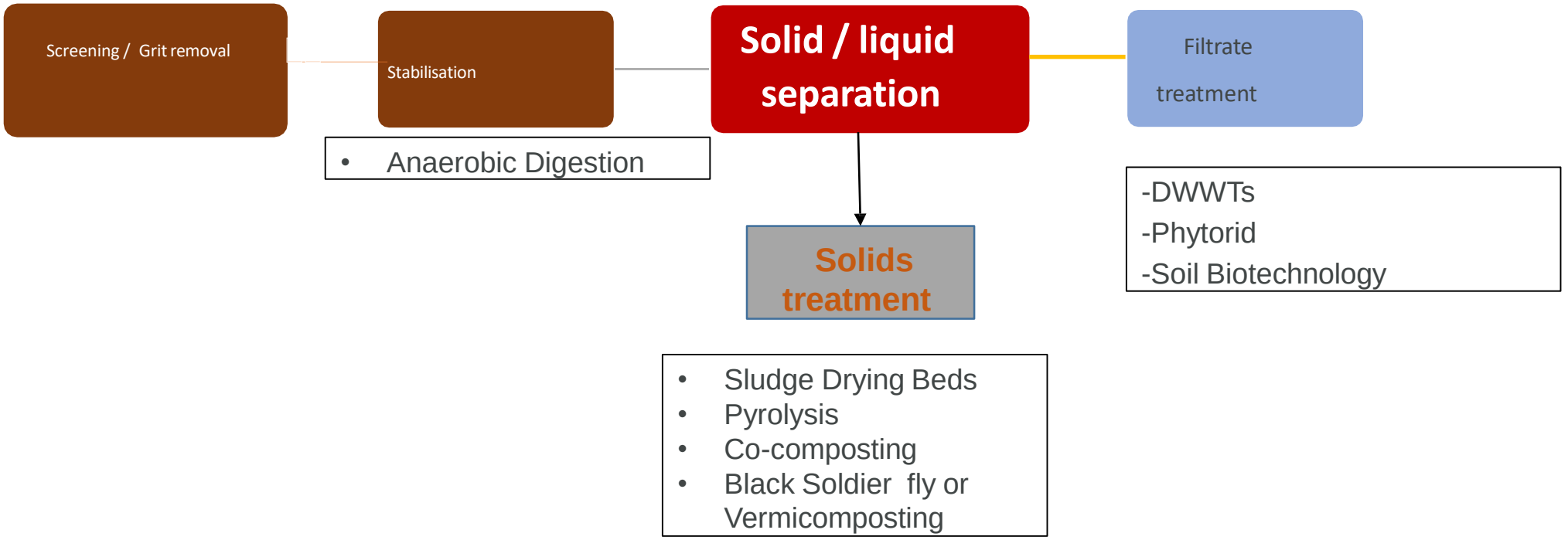
59 FSSM Projects in 56 ULBs:

FSTPs- 39 Plants

Co-Treatment- 20 Plants

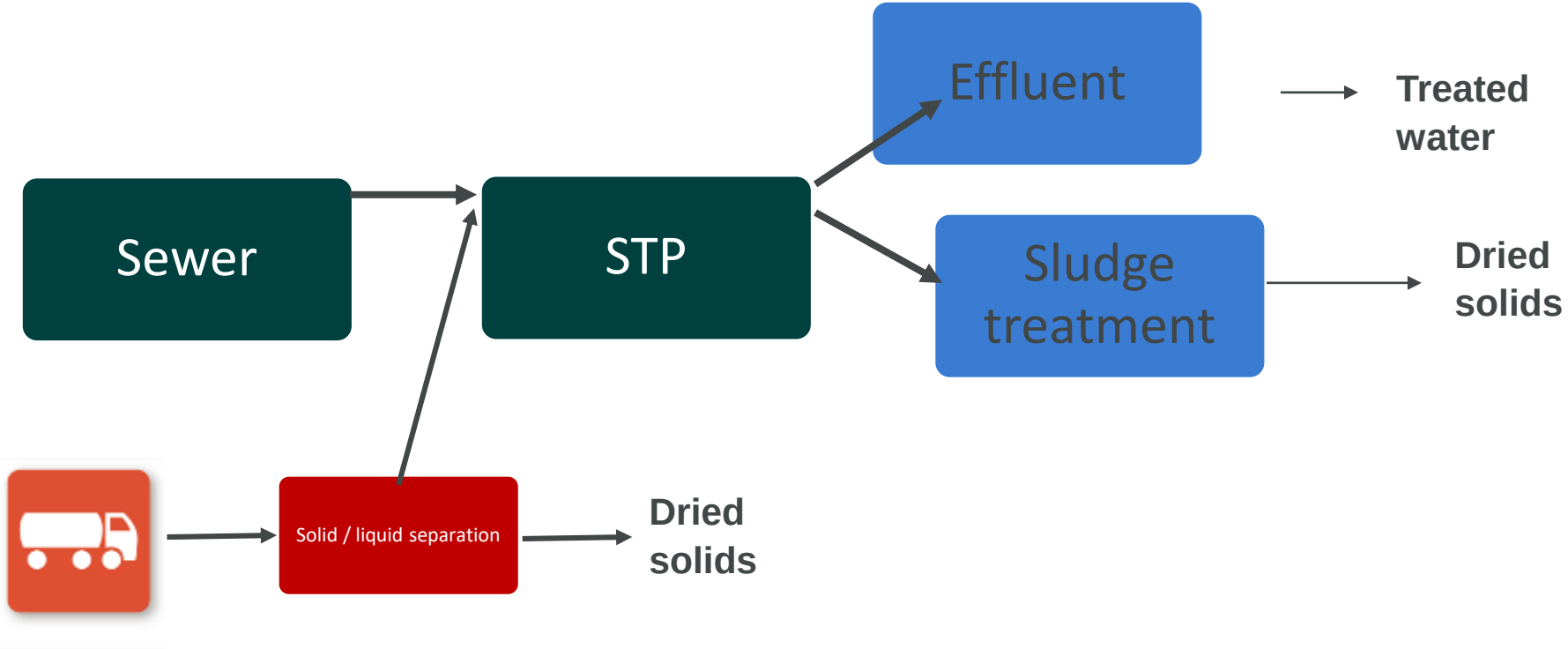
TECHNOLOGY

TYPICAL SCHEMATIC OF AN FSTP



Sludge Treatment must be decided based on the end use

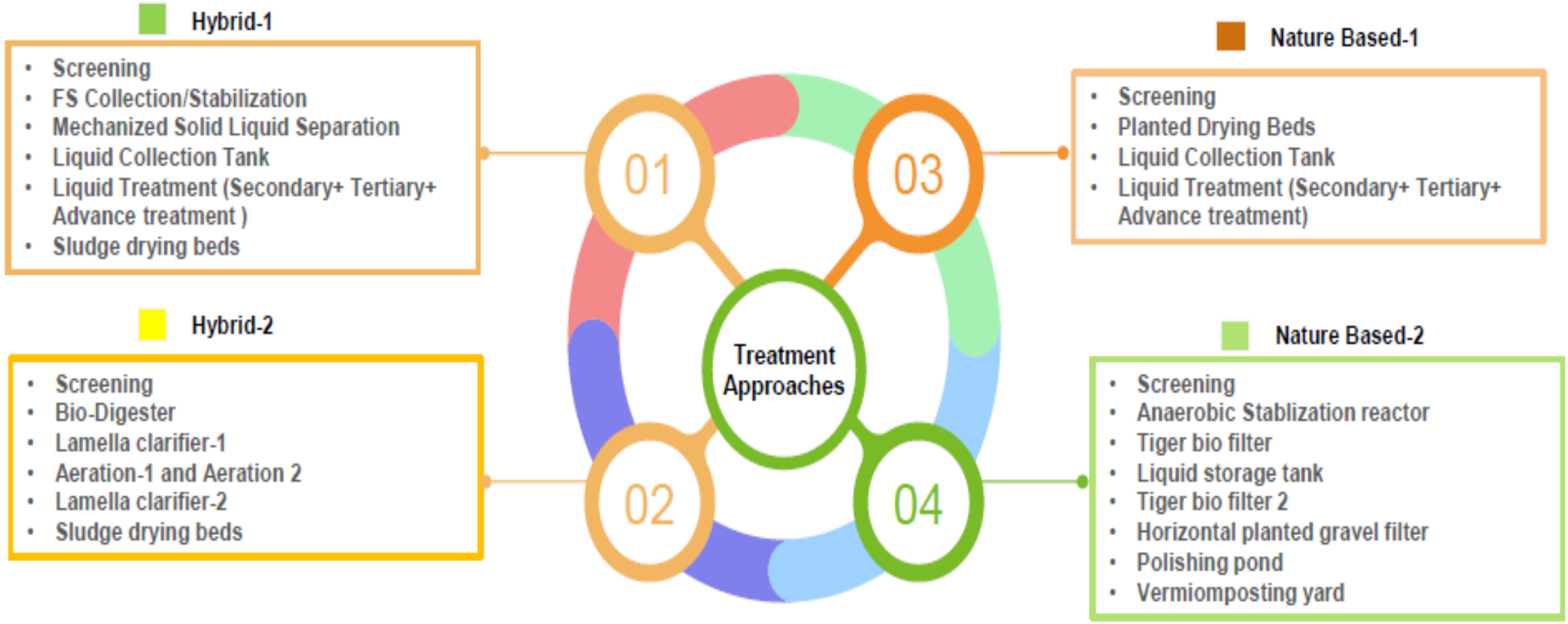
CO TREATMENT OF FS /SEWAGE



GOOD OPTION WHERE STPs EXIST OR ARE BEING PLANNED, WHEN DONE PROPERLY

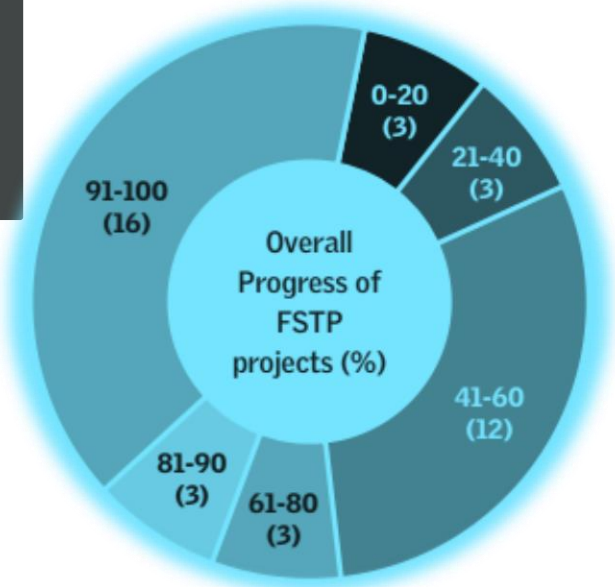
FSTPS IN UP: WHAT CAN BE IMPLEMENTED BY DEFAULT

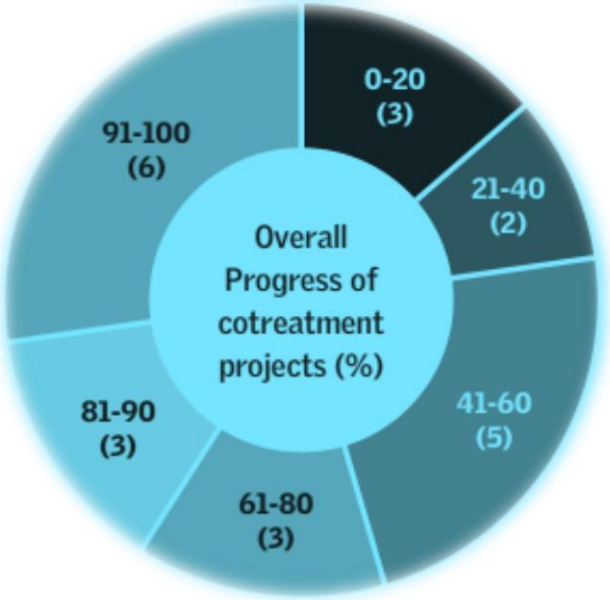
In 2022, CSE assessment of FSTPs and co-treatment plants observed that two typologies of treatment systems including four treatment chains were used across 39 FSTPs

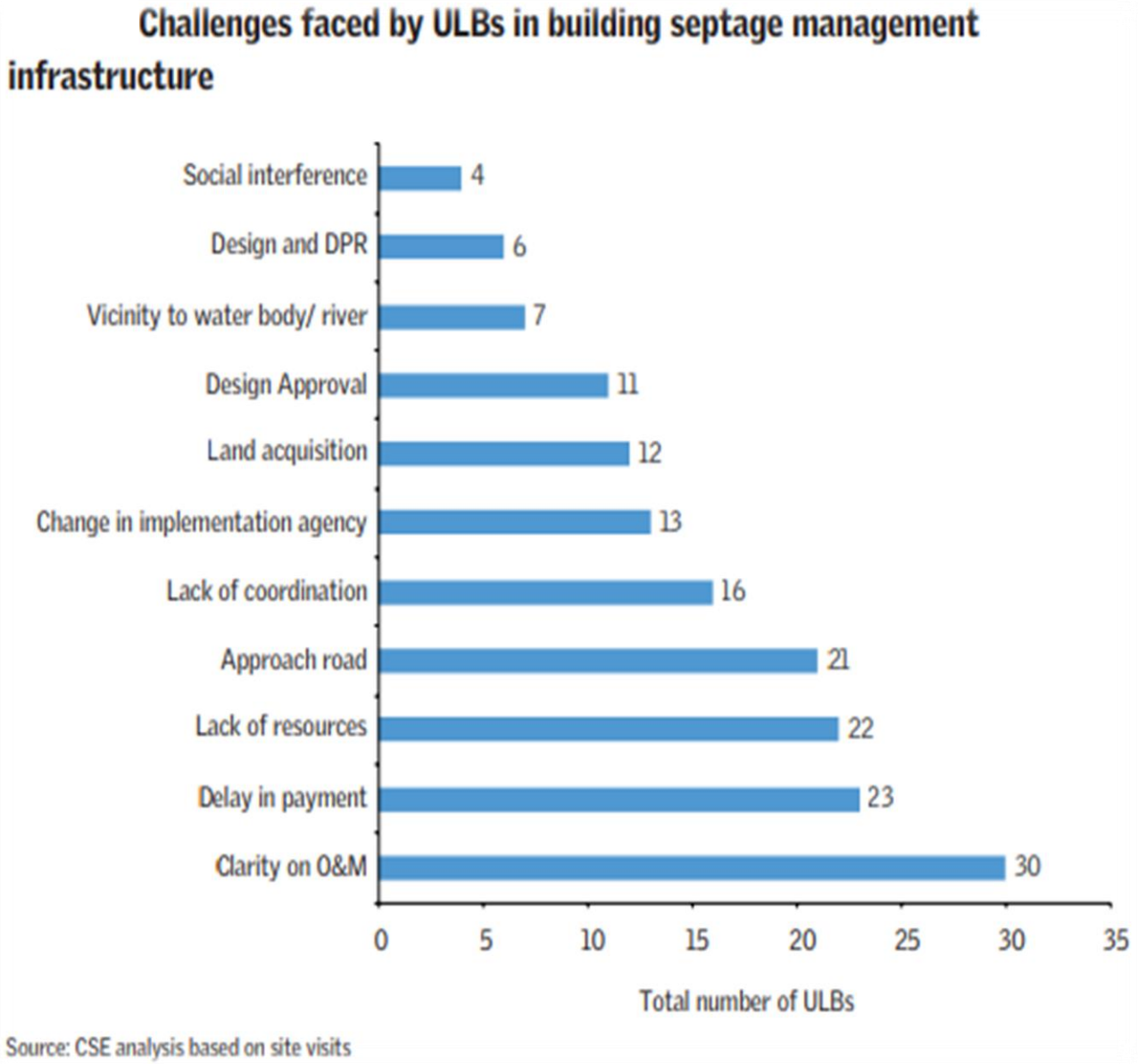


O&M AND SUSTAINABILITY

SUSTAINABILITY & ACCOUNTABILITY CHALLENGES







Source: CSE analysis based on site visits

An FSTP site located close to a river (flood-prone area).

Improper approach road to FSTP in Pilibhit

PRIORITIES : SUSTAINABILITY, ACCOUNTABILITY, RESOURCE PLANNING AND MANAGEMENT : CSE UP WORK

Last mile challenges : physical connectivity of roads, final payments to contractors

O&M Cost Recovery by Private Operators is simplified, timely and assured payments based on work done

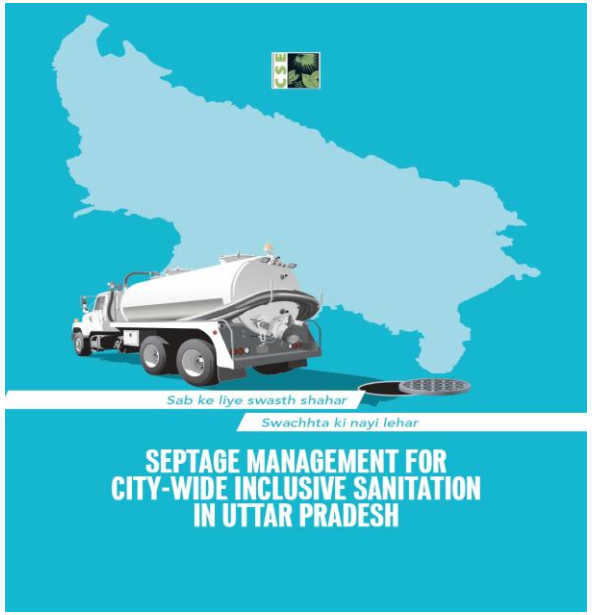
FSTPs get adequate faecal sludge and septage on a daily basis to become operational

A dedicated cell at Department of Urban Development level to support upscaling of and sustainable operations of septage treatment plants and co-treatment infrastructure.

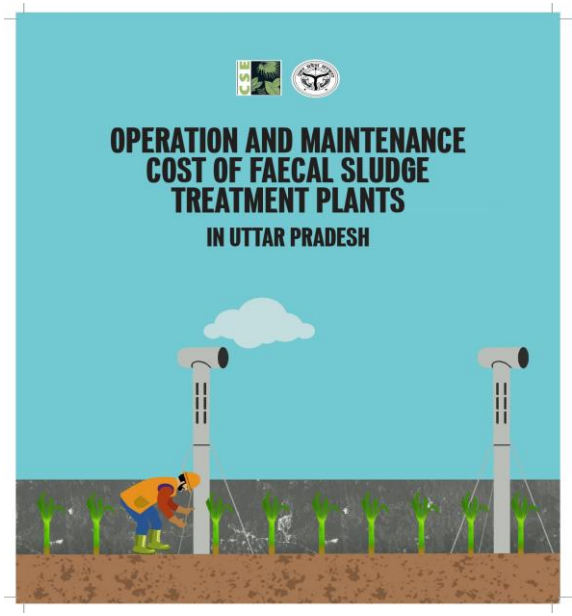
Enabling Policy (Advisories, Bye Laws and Legislation), Capacity Development, Behaviour Change, Awareness generation

Avoid indiscriminate combination of hybrid treatment chains for FSTPs.

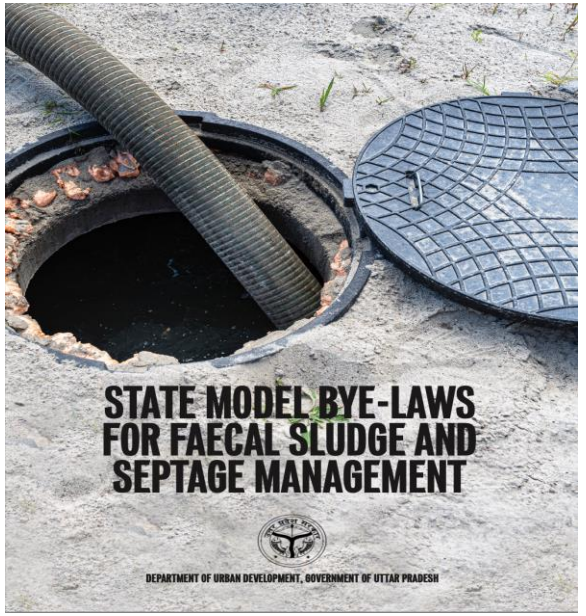
O&M AND SUSTAINABILITY PRIORITY



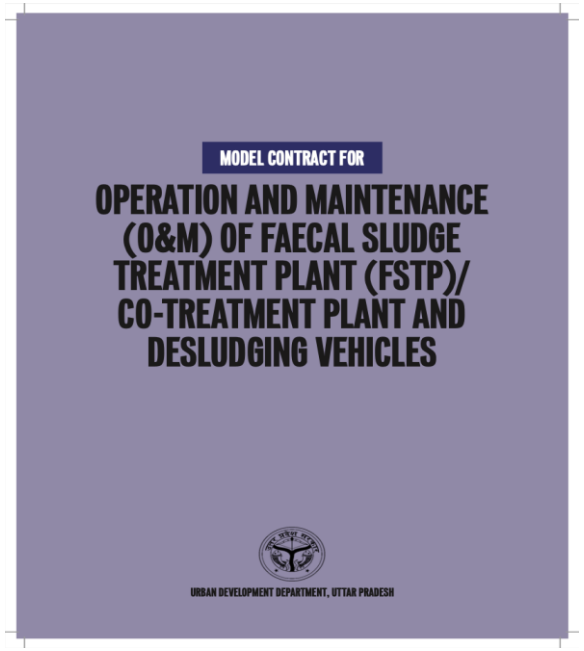
Status of plants



Costing of O&M of plants



Regulation at the city level



Contracting for O&M

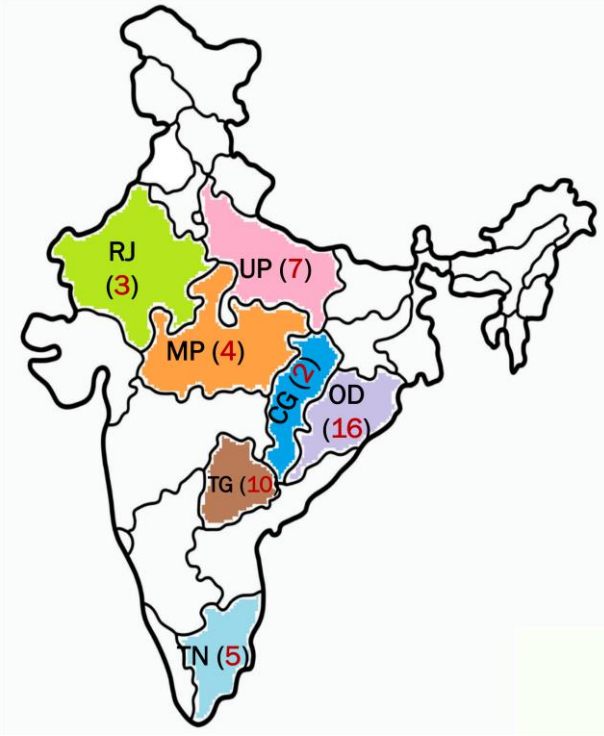
CAPACITY BUILDING- CSE WORK FOR NSS

Advocacy and awareness : SFD tool	
TA for Government : Policy, Advisory, Review of DPRs	
Our Light house FSM projects	Chunar – FSTP
	Bijnor – Co Treatment Plant
Learning collaterals	Tracking functionality and sustainability of FSM infrastructure
	Developing Enabling Norms and Bye laws
	Addressing De sludging challenges in congested settlements
Trainings	Planning and Designing: DWWTs, FSM, IWSM, Co Treatment
	Grey water and ground water management
	Operations and Maintenance of FSTPs

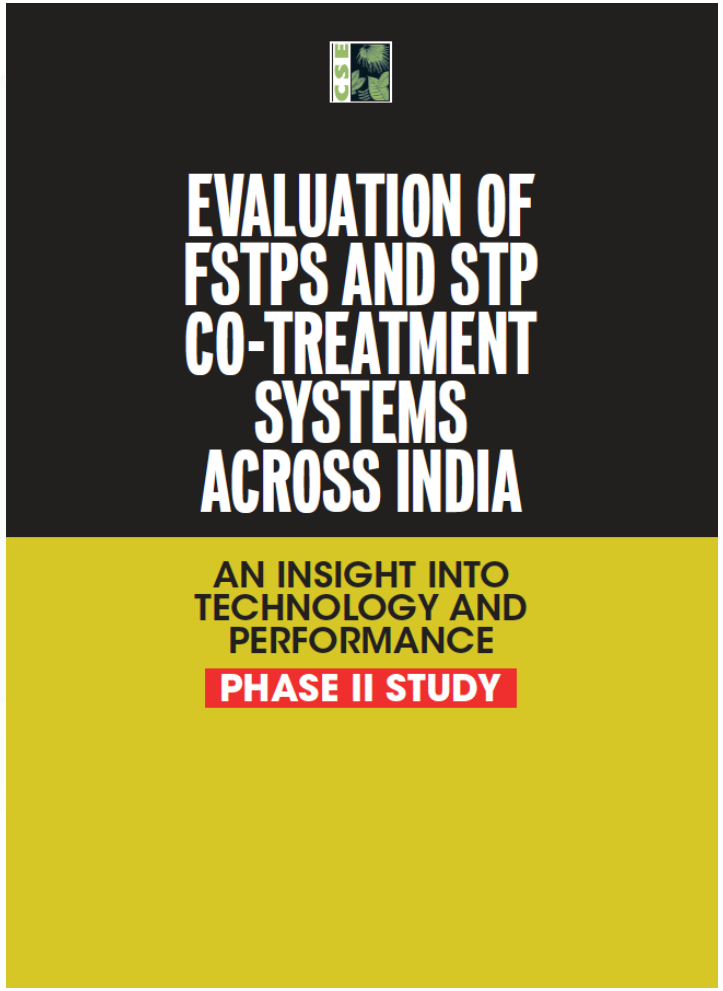
IDENTIFYING & DEVELOPING A STRATEGIC SET: NUMBER OF HIGH-QUALITY FSM TRAINING MODULES

FSSM Orientation
FSSM Technology and Financing Orientation/Field visit
FSSM Planning
FSSM Design
Integrated Waste Water And Septage Management(IWSM) – Planning
IWSM - Design
Septage-Sewage Co Treatment – Design Module

PERFORMANCE OF PLANTS

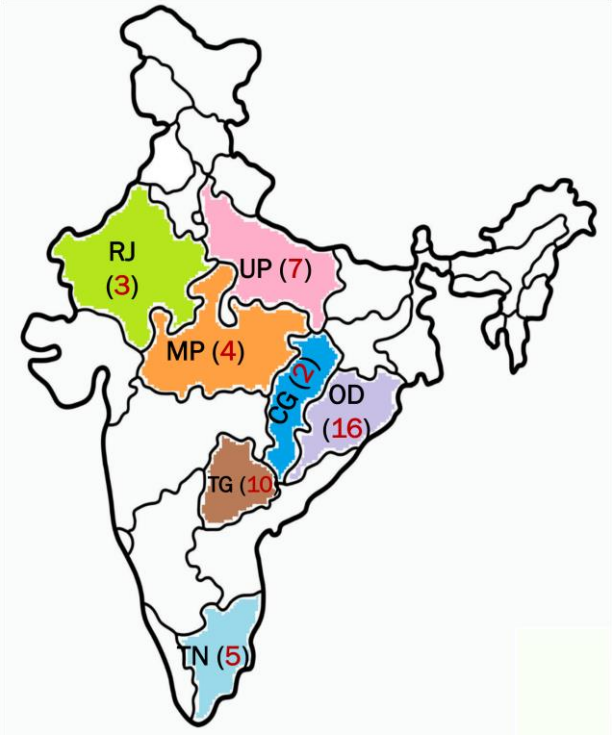


Different technologies evaluated
69 treatment plants (47 FSTPs)

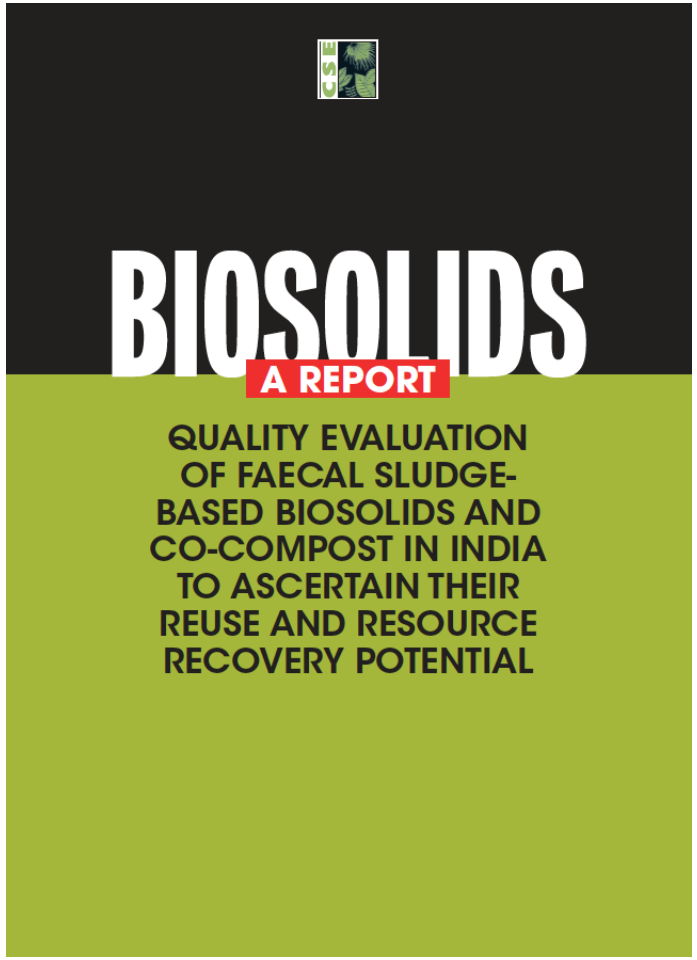


- The performance is almost similar across technologies but operations and maintenance is the issue
- Needs SOP to ensure all parameters within range so that treated water can be reused

PERFORMANCE OF PLANTS

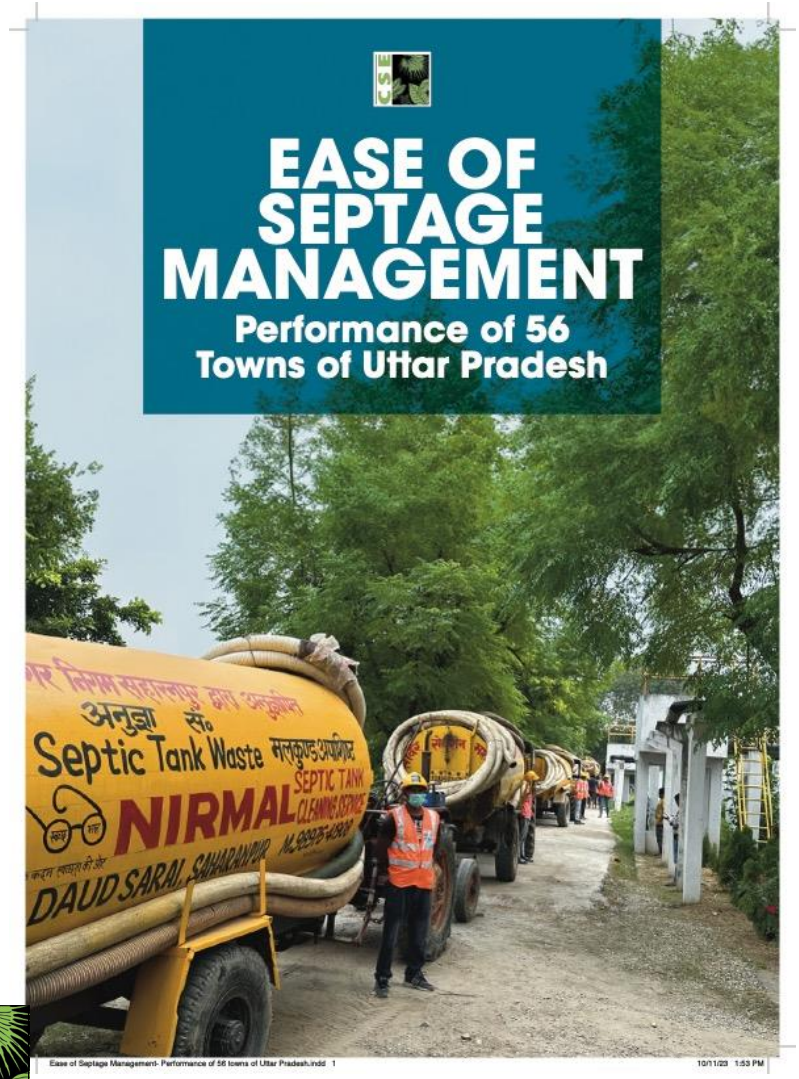


Different technologies evaluated
69 treatment plants (47 FSTPs+14 cotreatment plants)



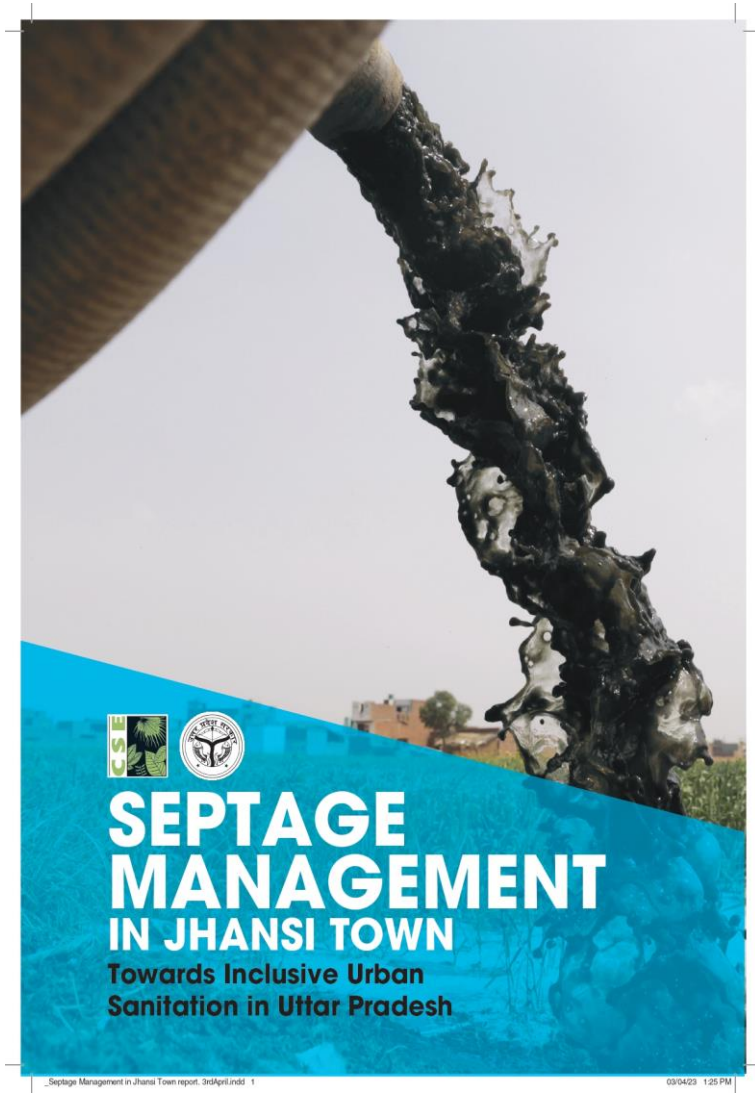
- Analysis of sludge shows that treated sludge is Nitrogen-rich
- Treated sludge is being accumulated, we need to utilization guidelines with standards
- Need better operations for pathogen management

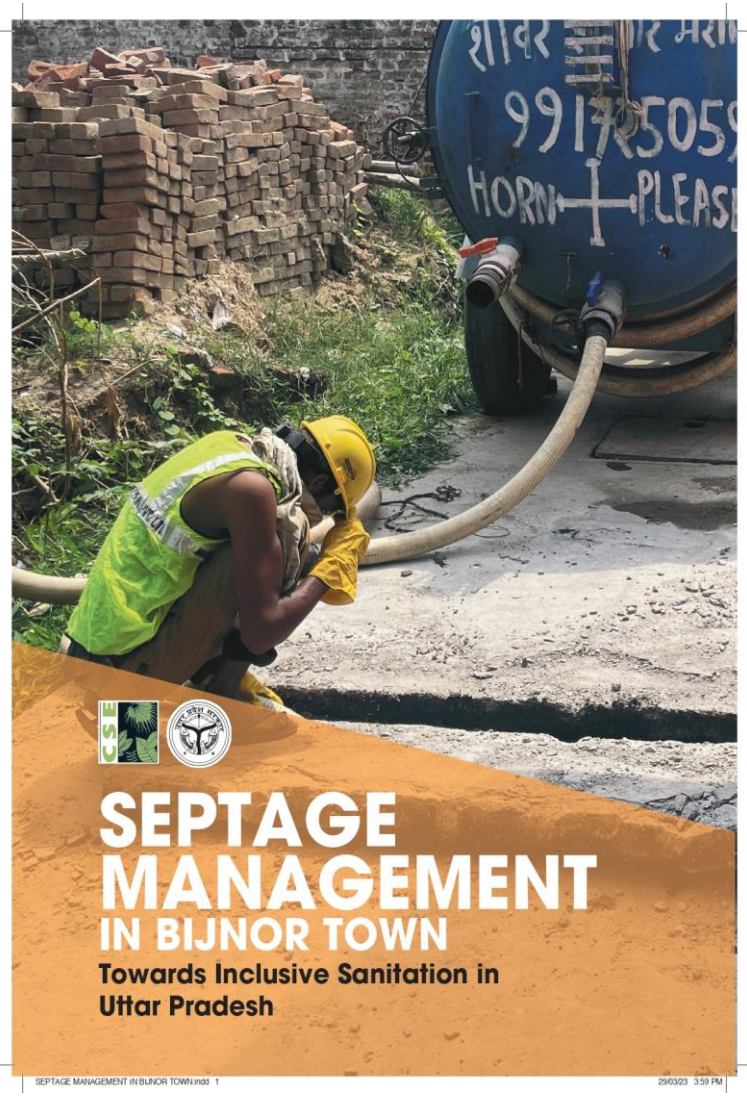
TOOLS FOR MONITORING SUSTAINABILITY AND PROGRESS TOWARDS INCLUSION



- ESM is a tool to assess the performance of cities on septage management service delivery towards achieving CWIS
- The assessment covers –
  - Infrastructure creation
  - Functionality and
  - Sustainability
- ESM tool is a mechanism of three star-raking of cities
- Done in 56 cities of Uttar Pradesh

FSSM IN UP – THE STORY OF BIJNOR, CHUNAR AND JHANSI





Research & Technical Feasibility Support

Action Research

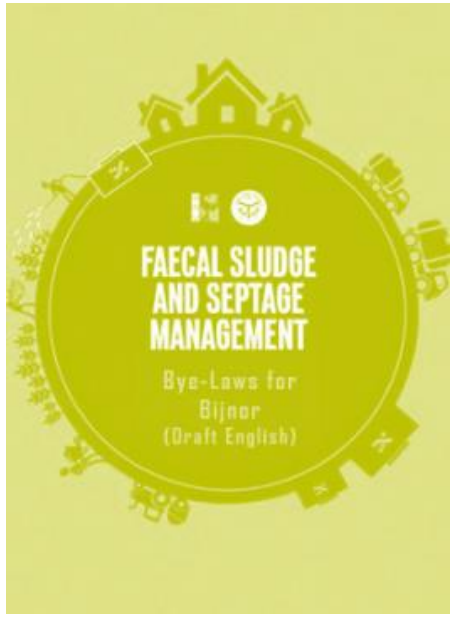

SFD Report

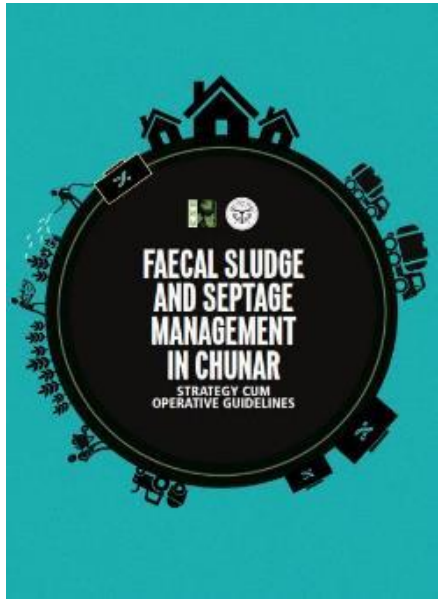
Bijnor
India

Final Report

This SFD Report - Comprehensive level - was prepared by Centre for Science and Environment (CSE)

Date of production: 21/04/2017
Last update: 23/04/2018





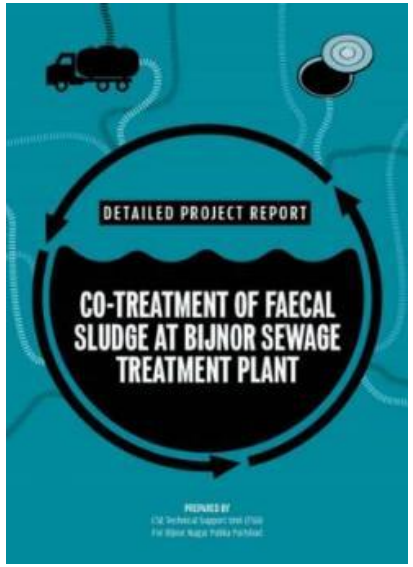
Detailed Project Report

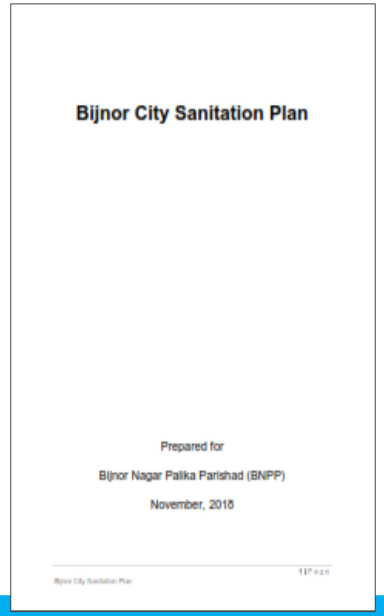
Model project on Decentralized Wastewater Treatment System (DWWTs) including Local Reuse, BNPP office, Bijnor

December, 2020

Prepared For
Bijnor Nagar Palika Parishad (BNPP)
Bijnor, Uttar Pradesh

Prepared By
Centre for Science and Environment (CSE), New Delhi




Bijnor City Sanitation Plan

Prepared for

Bijnor Nagar Palika Parishad (BNPP)

November, 2018


PROJECT REPORT

FOR PROPOSED TRENCHING FOR

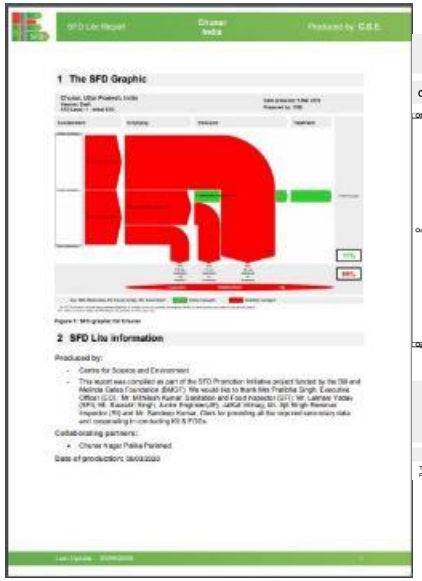
SAFE MANAGEMENT OF FAECAL SLUDGE AND SEPTAGE

PREPARED FOR

Nagar Palika Parishad Chunar, Mirzapur, UP

TRENCHING SITE

APPROACH ROAD


1 The SFD Graphic

2 SFD Lite information

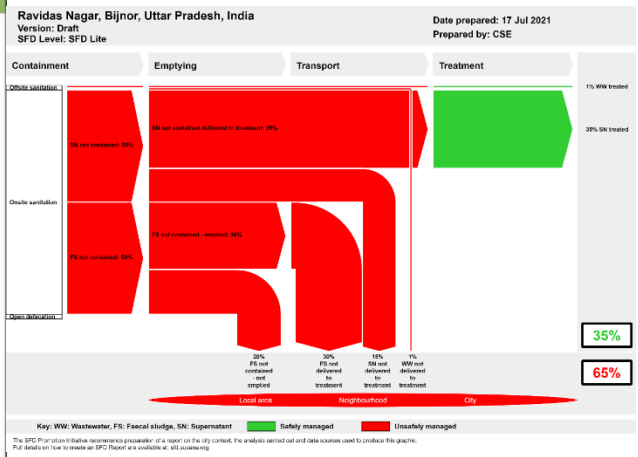
Produced by:

- Centre for Science and Environment

Collaborating partners:

- Chunar Nagar Palika Parishad

Date of production: 28/02/2020



Action Research

Factsheets and analysis of Sanitation chain in 30 cities of Uttar Pradesh
150 Hard Copies
3000 Downloads

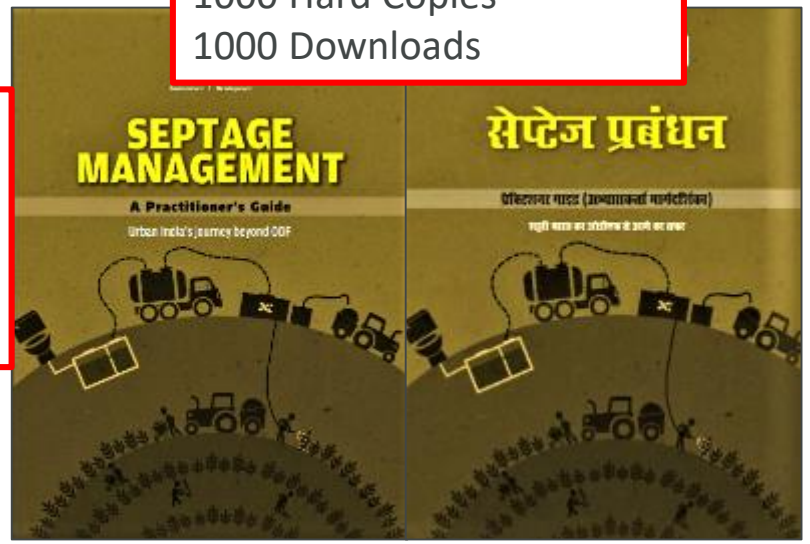
Factsheets and analysis of Sanitation chain in 66 cities of Uttar Pradesh
125 Hard Copies
1500 Downloads

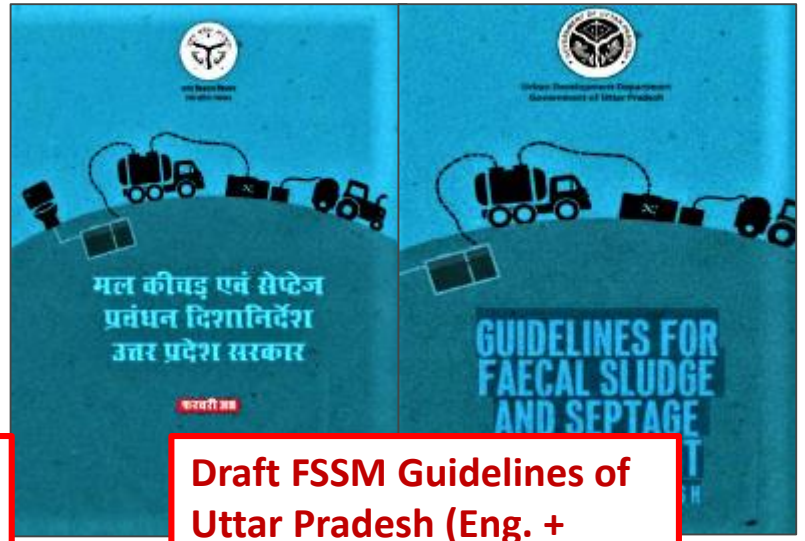
Mainstreaming Cotreatment of faecal sludge….
Hard Copies
Downloads

Factsheets, reports, Guidelines prepared by CSE for FSSM
1500 Hard Copies
7500 Downloads

Managing Septage in Ganga Cities
Hard Copies
Downloads

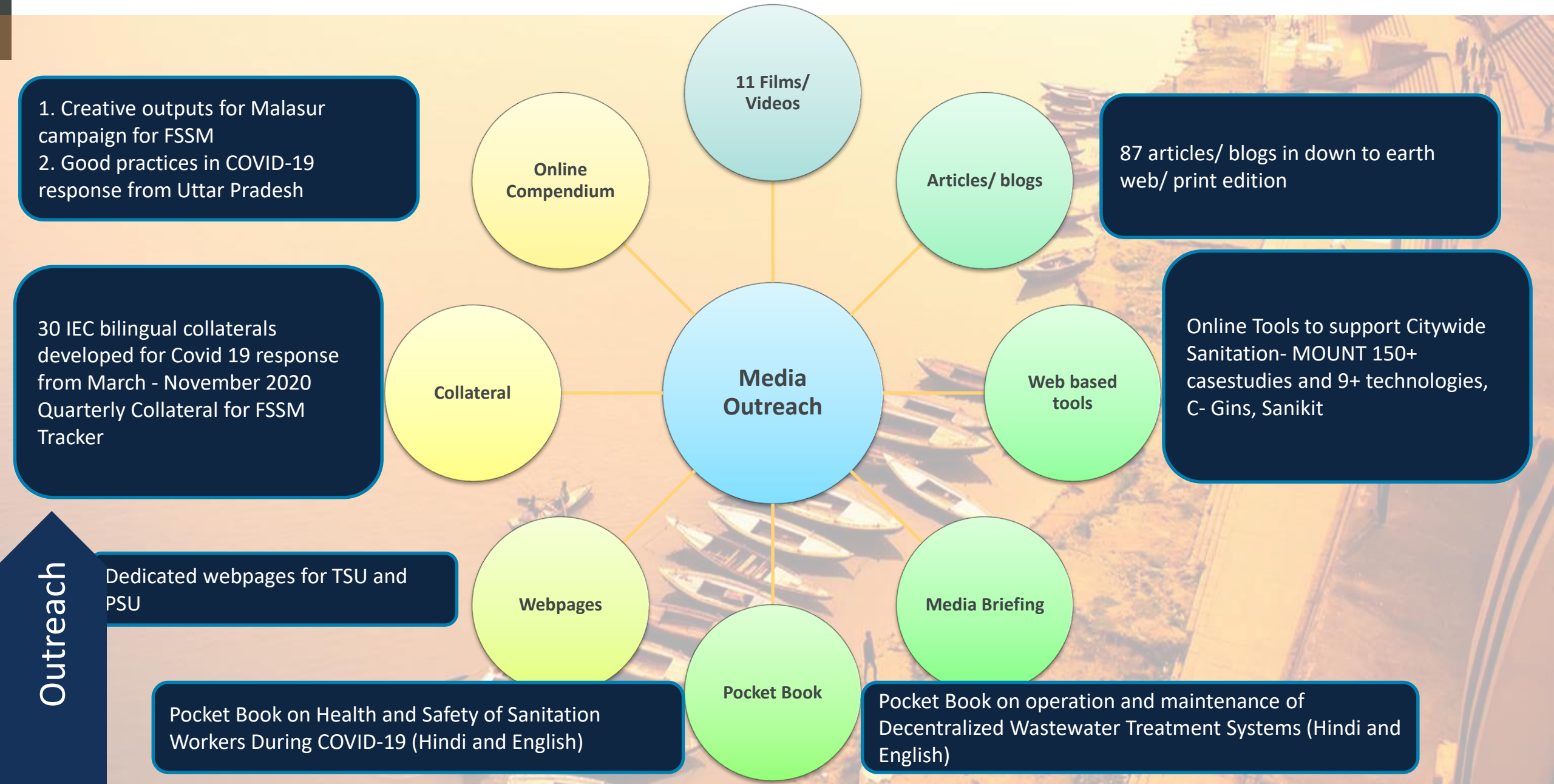
Practitioner's Guide for FSSM (Eng. + Hindi)
1000 Hard Copies
1000 Downloads





Draft FSSM Guidelines of Uttar Pradesh (Eng. + Hindi)
150 Hard Copies
2000 Downloads

Media Outreach and Communications- 2018-till date



Media Outreach and Communications

Outreach

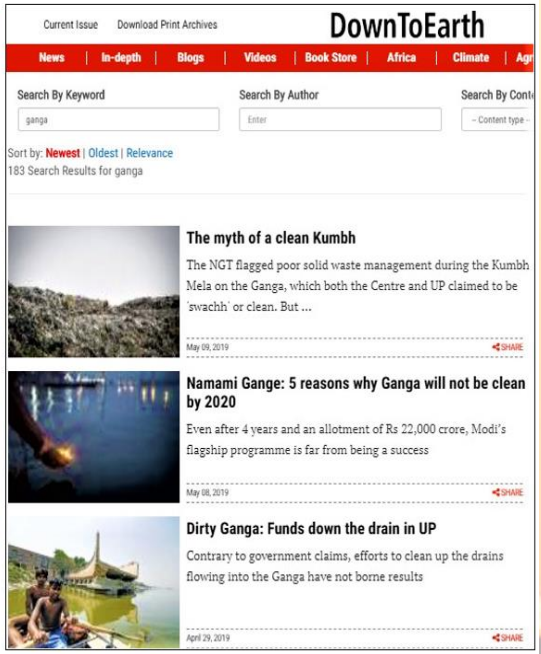
Blind Spot in Namami Ganga
(22.5K Reads)

Unholy Chaie (Marghat mein Ganga)
(20K Reads)

Urban Shit: Where does it all go
(38K Reads)

(6.5K copies)

(3.5K copies)



Around 50 articles/cartoon strips/interviews on Ganga uploaded on DTE web (>1 Lakh Views)

Type of Content	Number		Views
	Completed	Ongoing	
Films/Videos	6	3	18000
DTE Articles	4		80500
Articles in Annual Publications	2		10000
Articles / interviews / blogs on DTE Web	50		100000
Web – based tools	2		1000
Media - briefing	1		Sensitization of 25 hindi speaking journalists
Total	65	3	>2 Lakh Views

Media Coverage

FSM in Delhi – A case study
(14K Views)

Can faecal sludge be used as an organic soil conditioner
(1.8K Views)

Faecal Sludge Management in Jhansi
(14K Views)

How to prepare a Shit Flow Diagram
(2.1K Views)

Centre for Science and Environment's capacity building initiative in the Ganga Basin
(308 Views)

How Neela Hauz, south Delhi's biggest water body was restored using natural process
(46K Views)

Covid Awareness Drive

in Bijnor, Chunar and Lucknow

Launch of campaign

Over 2500 kids participated in **Painting and Slogan writing competition**

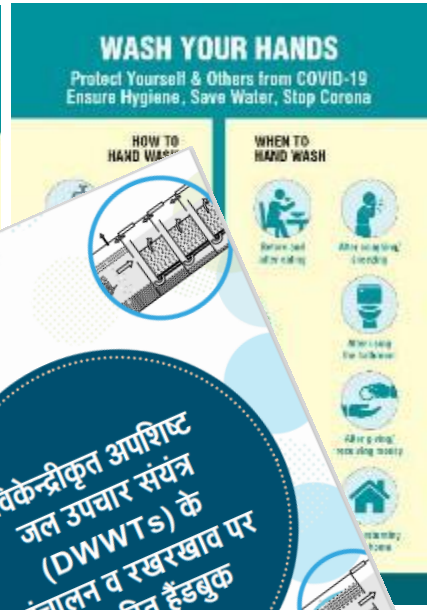
Wall paintings in low income settlements

Outreach

Awareness generation around COVID-19 among women by CSTF members

Audio recording played every morning through mobile vans

Multilingual IEC collaterals for supporting COVID-19 response



Outreach

Ganga Utsav 2021




Chunar: Ganga Yatra / Run, Signature and Yoga / Meditation Camp
Bijnor: Poetry Competition and Signature Campaign
Lucknow: Street Play / Nukkad Natak



Outreach


World Toilet Day 2021

Ward wise IEC campaign led by EO, Chunar

REPOSITORY OF COVID-19: ONLINE RESOURCES

- Advisories and Guidelines Issued
- Best Management Practices during COVID-19
- Communication Collaterals
- COVID-19 Blogs

- https://www.cseindia.org/reorganizing-the-repository-of-covid-19-resources-10103

MAL-ASUR: 'DEMON OF DEFECA' CAMPAIGN

Creating awareness regarding need for proper Faecal Sludge and Septage Management

Launched by MoHUA on 4th June 2020 and by NMCG on 19th June 2020

Odisha and Telangana has already started this campaign

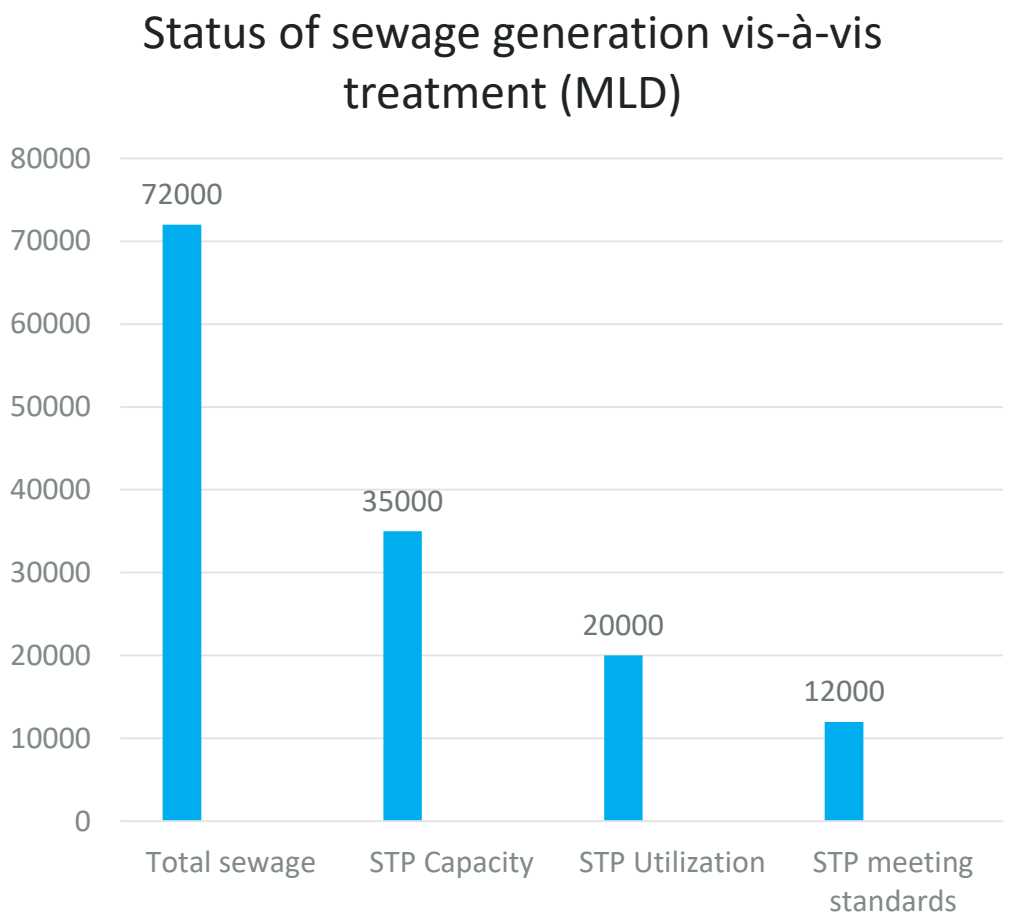
Pilot proposed in Chunar (U.P.) – NMCG priority town

Campaign suitable for towns with FS disposal sites available: Unnao, Kanpur, Lucknow, Prayagraj, Jhansi etc

LEARNING AND WAY FORWARD

FSM LEARNING POINTS

- **Affordable sanitation is critical for sustainability**. If we cannot intercept the excreta of all, we cannot clean our rivers – our **cities are growing**
- **Conventional systems of sewage management are capital-intensive and resource-intensive**; the speed is too slow and burden is too high - Don't get into cost justification of FSM vs STPs.



(70% untreated)

Source: CPCB, 2021

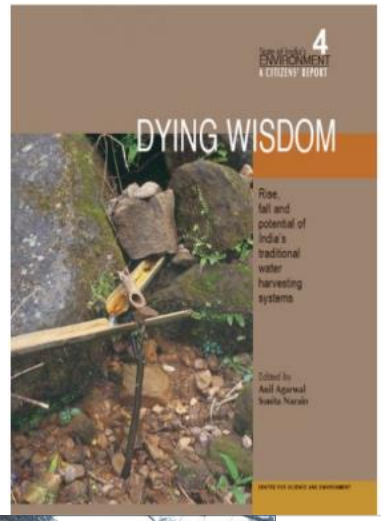
FSM EXPERIENCE POINTS

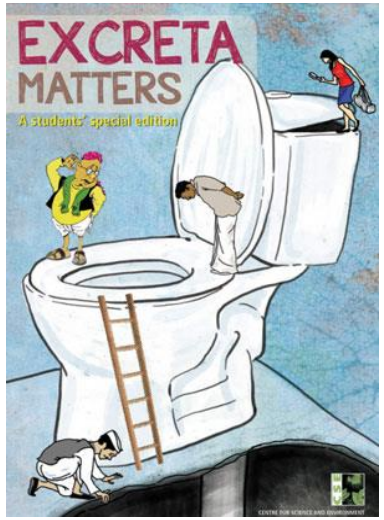
- There is **no universal technology**.
- **Underperformance of FSTPs**
- **Value of a National FSM Alliance**
- **Capacity – We have funds and functions**. However, the availability of **functionaries** with the required capacity is a challenge**Reuse** of treated water and treated sludge is a challenge
- **Knowledge Sharing** – What is working and what is not?
- **Safety and dignity of sanitation workers**

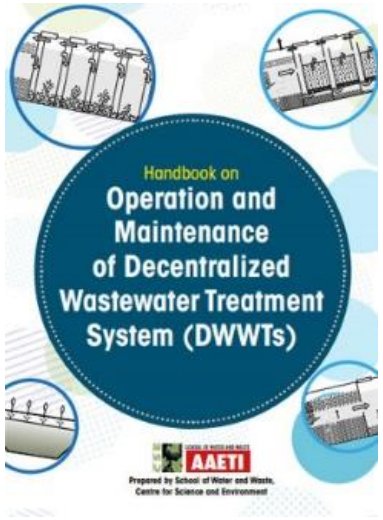
FSM EXPERIENCE – WHAT NEXT

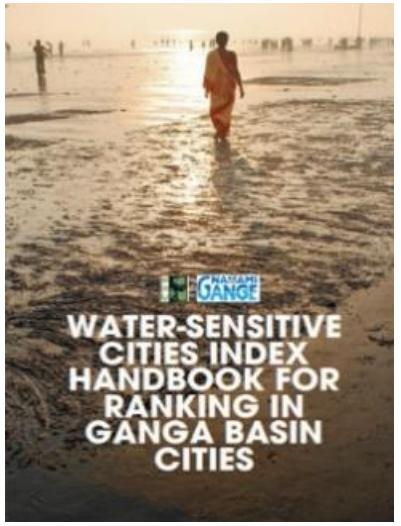
- **Cities of global south are growing cities**. We have not only diverse physical typologies of our towns and rural areas, but also great inequity in incomes, housing and access to basic services of water and sanitation.
  - **Advocacy for FSM Policy** – **revisit the same** if already issued – the ground situation is changing regularly
    - Continue working on the research and national and state-level guidelines – advisories and manuals
- **One standard sanitation system** will not apply to the whole of a city or for all cities in all states of India: DWWTs/FSTP/Cotreatment - more guidance on contextual standardization will be helpful

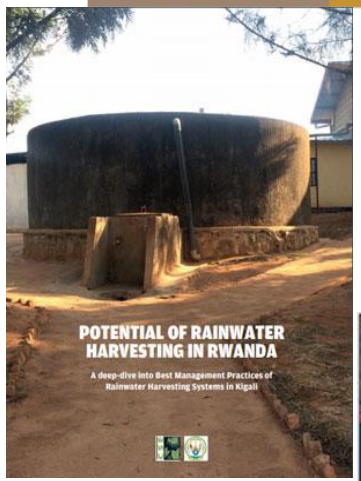
Publications and Web- Compendiums

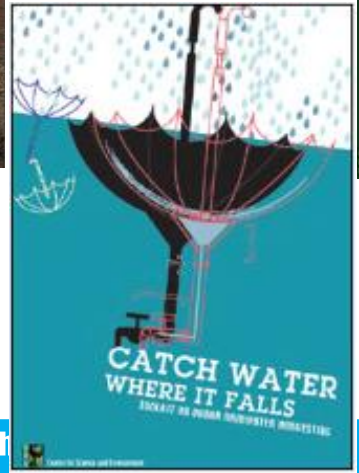


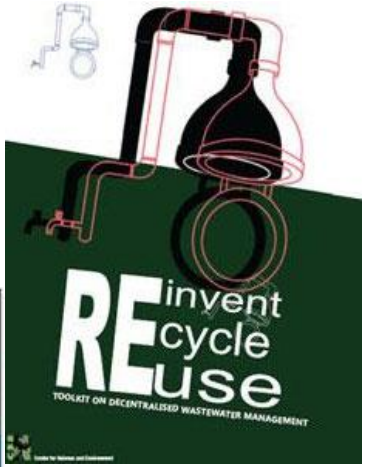


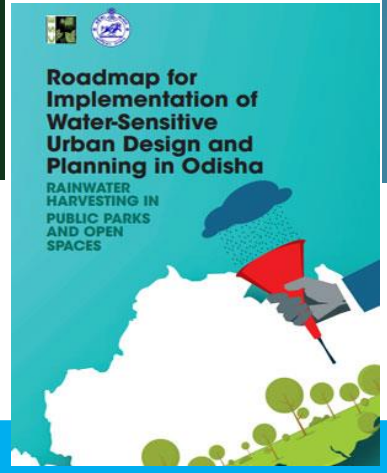


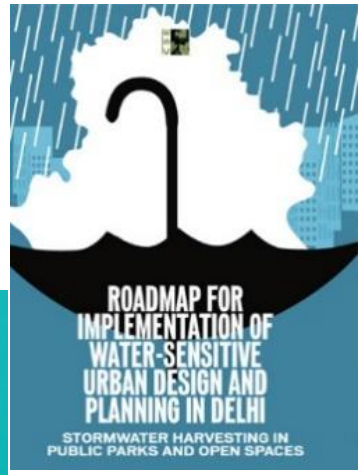


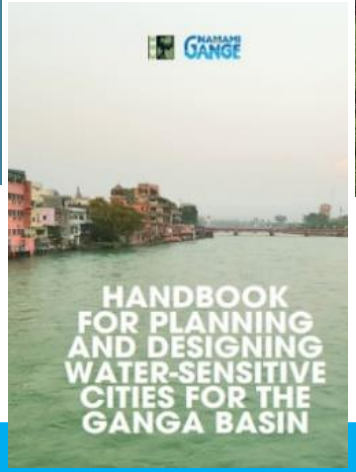


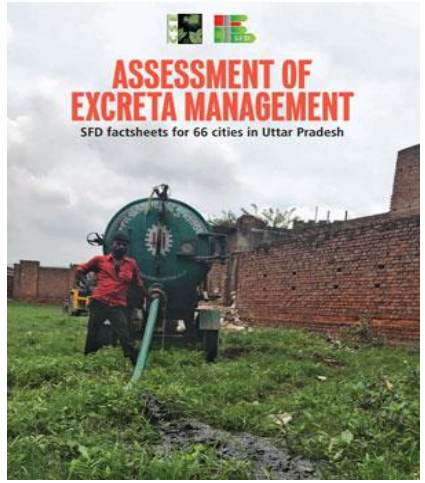




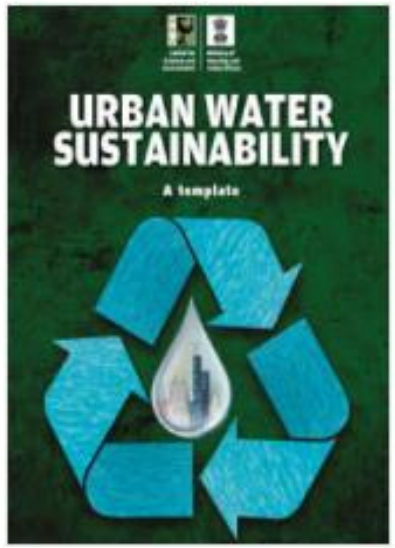


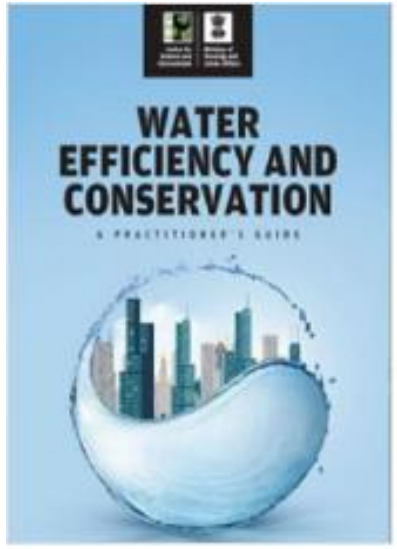


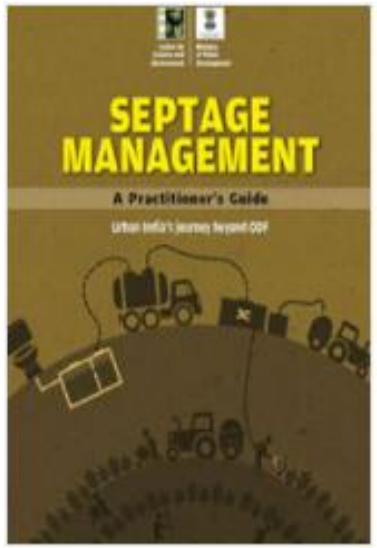




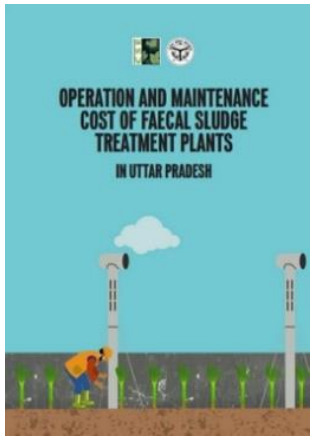
Publications and Web- Compendiums

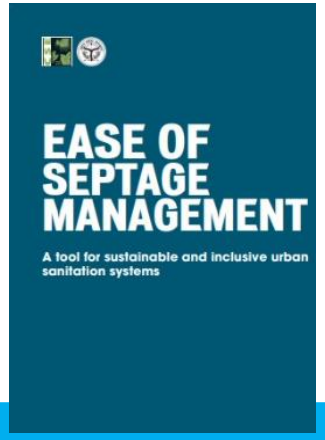


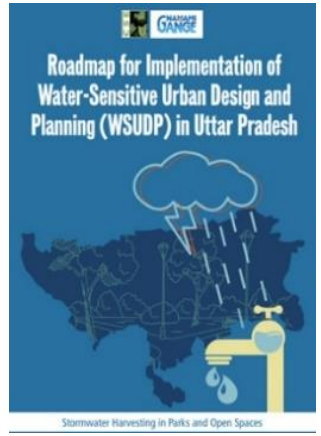


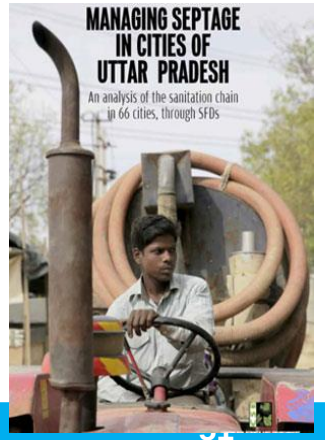


UTTAR PRADESH









THANK YOU

Centre for Science and Environment
41, Tughlakabad Institutional Area New Delhi-110062, India
Phone: (91) (11) 40616000, 29955124
Fax: (91) (11) 29955879
Email: sww-aaeti@cseindia.org