SEPTAGE MANAGEMENT IN UTTAR PRADESH

SCALING UP AND SUSTAINABILITY LESSONS

SEPTAGE MANAGEMENT IN UTTAR PRADESH

SCALING UP AND SUSTAINABILITY LESSONS

Research direction: Depinder Singh Kapur

Authors: Subrata Chakraborty, Hari Prakash Haihyvanshi and Sarim

Research support: Alka Kumari, Manish Mishra and Harsh Yadava

Review and comments: Susmita Sengupta, Sumita Singhal, Jyoti Parsad Dadhich, Faraz Ahmed and Swati Bhatia

Editor: Akshat Jain

Cover and design: Ajit Bajaj

Production: Rakesh Shrivastava and Gundhar Das

BILL & MELINDA GATES *foundation*

This report is based on research funded by the Bill & Melinda Gates Foundation. The findings and conclusions are those of the authors and do not necessarily reflect positions or policies of the foundation.

We would like to thank Dr Nitin Bansal, Director, Urban Local Bodies & State Mission Director, SBM (U), Govt. of UP and P K Srivastava, Additional Mission Director, AMRUT, Govt. of UP for providing comments to improve this document and overall support to the promotion of faecal sludge and septage management in the state.

Citation: Subrata Chakraborty, Hari Prakash Haihyvanshi and Sarim 2024. *Septage Management in Uttar Pradesh: Scaling up and sustainability lessons,* Centre for Science and Environment, New Delhi

Published by
Centre for Science and Environment
41, Tughlakabad Institutional Area
New Delhi 110 062
Phones: 91-11-40616000
Fax: 91-11-29955879
E-mail: sales@cseindia.org
Website: www.cseindia.org

Contents

Executive summary

Affordable and inclusive faecal sludge and septage management (FSSM) is a priority for Uttar Pradesh (UP) as 86 per cent of urban households are dependent on on-site sanitation systems.[1] UP has a total of 59 treatment plants across 56 cities—39 faecal sludge treatment plants (FSTPs) and 20 co-treatment facilities. The focus of the state has shifted from completion of construction work during 2022–23 to operationalization of the plants during 2023–24. A new set of challenges has come up while scaling up FSSM in the state, including policy issues, operation and maintenance (O&M), capacity building, technology, and finance.

The purpose of this report is to present learnings from interventions made by the state and cities in 2023–24, and to highlight emerging priorities while offering affordable and sustainable FSSM services to citizens.

This report captures four areas—1) Initiatives taken by the state and cities to operationalize the plants; 2) Results of interventions taken as reflected in the city-wise progress of 18 cities and overall progress in 56 cities; 3) Overall learnings and key challenges; and 4) Way forward.

The Department of Urban Development (DoUD) has taken these steps to create a conducive environment for cities to operationalize septage treatment plants during the last one year:

- Three critical communications were made to the cities to address policy gaps: Guidance Note on O&M of FSSM Projects, State Model FSSM Bye-laws, and Model Contract for Engagement of Contractor for O&M of FSSM plants.
- Training programmes were organized for city-officers on O&M of plants and FSSM bye-laws, and an IEC campaign was launched.

Policy and capacity-building support from the state level has led to city-level improvements:

- As of March 2024, 33 plants are operating with more than 10 per cent plant-capacity utilization, compared to only four in March 2023.
- As of March 2024, O&M of 32 plants is being managed by either contractors, self-help groups (SHGs) or urban local bodies (ULBs), compared to only four in March 2023.

- As of March 2024, 27 cities have passed their city-level FSSM bye-laws. Six of them are gazette notified. In 2023, only three cities had passed city-level FSSM bye-laws with only one gazette notified.

The Centre for Science and Environment (CSE) has been supporting DoUD for sustainable FSSM since 2017. CSE has closely worked with a set of 18 cities and helped them overcome operational challenges. CSE played a critical role in issuing state-level guidelines, conducting training programmes and information, education, communication (IEC) campaigns, and providing overall support to all 56 cities.

Ensuring affordable and sustainable FSSM services to citizens is currently a governance issue in UP. With critical advisories already issued by the UP government, it is now the turn of cities to take more responsibility to run the plants. The department has to ensure handover of pending plants followed by O&M arrangement in all the plants. Following state guidelines, cities should engage contractors for O&M at economical prices. To ensure adequate sludge reaches the plants, cities should regularize all private desludgers through registration, licensing and incentives.

Implementation of scheduled desludging of all government institutions and demand-based desludging from households will increase sludge load in the plants. The state and cities should put in place effective monitoring systems to ensure sludge reaches treatment plants. State-level support on capacity building and IEC drives, along with direction to the cities regarding reuse of treated sludge and treated water, will be crucial in 2024–25.

1. Introduction

The first plant in UP was the 6 KLD FSTP constructed in Jhansi in 2018. Subsequently, DoUD tendered on the design, built, operate and transfer (DBOT) mode for 31 FSTPs and 21 co-treatment plants at existing STPs under the Atal Mission for Rejuvenating Urban Transformation (AMRUT) programme. CSE has captured the challenges associated with the construction phase in 'Septage Management for City Wide Inclusive Sanitation in Uttar Pradesh'. The crucial problem of not involving ULBs during the planning and implementation process impacts plant operations even today—the delay in taking over the plant, ensuring O&M arrangement, etc. Further, the absence of pre-feasibility studies during the planning and designing phase resulted in the construction of 32 KLD FSTPs in 35 ULBs and now the plants are facing sludge problems.

UP has a total of 59 treatment plants—39 FSTPs and 20 cotreatment facilities—across 56 cities, of which 58 have been built and one is under construction.[2] Out of these, 54 plants have been built under AMRUT, three have been constructed out of ULB funds and two have been constructed under the National Mission for Clean Ganga (NMCG). The state has invested Rs 156.59 crore from AMRUT, Rs 6.09 crore from ULB funding and Rs 2.7 crore from NMCG, totalling Rs 165.38 crore for the creation of 59 septage management plants across 56 cities.[3]

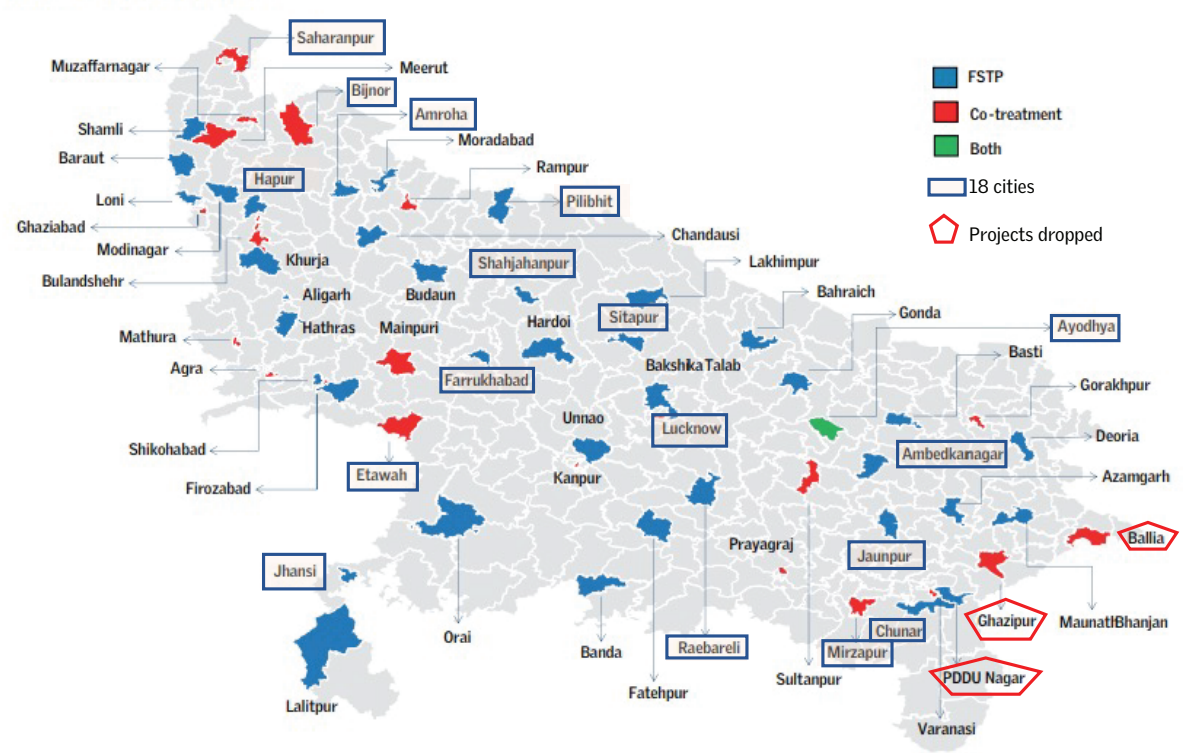
As of March 2023, a total of 40 FSTPs and co-treatment plants were ready for the treatment of faecal sludge and septage (FSS). But only the plants in Bijnor, Chunar and Jhansi (6 KLD and 12 KLD) were operational. The rest of the plants were expected to become operational soon.

At the beginning of FY 2023–24, UP started tackling new challenges to operationalize the plants. CSE continued its support to the DoUD and the cities in policy, strategy, capacity building and monitoring. The state government was also keen to ensure that the plants become functional.

1.1 Methodology

CSE designed a plan to engage at the state-level for policy and oversight intervention, while supporting all 56 cities and 59 plants through visits for technical support. A set of 18 cities with 21 plants were identified for in-depth research, culminating in designing and planning intervention at the state-level (*see Annexure I*).

Map 1: 56 cities with types of FSSM plants



Selection of the 18 cities: The cities were selected (a) to cover the entire state geographically—cities from west, east, central and Bundelkhand areas; (b) to cover technology spread—both FSTPs and co-treatment plants; (c) having infrastructure readiness—so that faecal sludge and septage can be treated immediately; and (d) having a set of responsive city officials, who are the authorities to run the plants.

1.2 Nature of CSE's support

CSE's team made more than 100 visits to the 56 cities, gathered information on the field level regarding issues and challenges, shared it with the DoUD and supported the state in drafting all policy and advisory documents. Alongside that, CSE's team also planned and conducted training programmes, besides supporting the department in regular monitoring of the progress on-ground.

Support to the 18 cities: The steps of the process are intensive and intertwined. CSE's team did the following two broad set of activities to understand and overcome ground-level challenges:

A. Data collection and understanding city-level FSSM status
   - Status of plant, management and functionality: Concerns related to the quality of treatment technologies and modules.

- Status of desludging services: Number and operation of government and private desludgers, availability of vehicles, access to septic tanks in congested and narrow lanes, desludging potential, etc.
- Economics of plant operation and desludging services: Desludging cost and its implication, ability of the city to finance O&M of the plants, etc.

B. Visits to cities, project sites, habitations and meetings with various stakeholders
   - Engagement with city level stakeholders: ULB executive officers, Jal Kal officers, Uttar Pradesh Jal Nigam (UPJN) officers and private desludgers
   - Integration of private desludgers with ULBs
   - O&M of plant, engagement of contractors and maximization of capacity utilization
   - Preparation of FSSM bye-laws
   - Addressing technological challenges in the plant

Support to all 56 cities through engagement at the state level: CSE's team utilized the learning from the selected 18 cities to influence policy, guidelines and capacity building programmes at the state level to impact FSSM in all 56 cities and 59 plants:

C. Engagement with the DoUD—AMRUT, Swachh Bharat Mission (SBM), UPJN, Directorate of Local Bodies (DLB) and State Mission for Clean Ganga (SMCG)
   - Issuing government communication—order and advisories
     i. Plant handover and contracting arrangement for O&M
     ii. Economics of plant sustainability and desludging
     iii. City-level FSSM regulatory framework
   - State-level training and IEC
     i. Trainings of city officials on O&M of plants and preparation of FSSM bye-laws
     ii. Run IEC campaigns in cities with tools and templates
   - State-level monitoring and review
     i. Assessment of cities through regular meetings
     ii. Ranking of city performance on providing septage management services using the ease of septage management (ESM) tool

Stakeholder engagement: CSE engaged with various stakeholders at the state and city levels. The major stakeholders at the state level are the office bearers and other officials of AMRUT, SBM-U, DLB, UPJN and SMCG. The city-level stakeholders are office bearers of the ULBs, sanitation inspectors, engineers of ULBs and the Jal Kal department (*see Annexure 2*).

2. Interventions undertaken

Both the state-level offices under DoUD—SBM and AMRUT—supported the cities in operationalizing the plants. With support from CSE, the department issued guidelines and directions to the cities, organized capacity building programmes for the city officials, implemented IEC drives to generate awareness in the cities and conducted review meetings to check the progress of the cities over time.

2.1 Plant functionality

The existing contracts between the UPJN and the contractors responsible for construction of the plants indicated a heavy amount for O&M—to the tune of Rs 1.25 crore per year for O&M of a 32 KLD plant. This generated a misconception among the ULBs that O&M was to be done only by those contractors. This has discouraged the ULBs from running the plants on their own due to lack of funds. Therefore, it was crucial for the DoUD to guide the cities on the costing of the plants and allowing flexibility to the ULBs to run the plants.

1. **O&M cost of FSTPs and cotreatment plants:** Cities required guidance from the state government on the O&M costing of the plants. Therefore, CSE did a study on the costing of plant operations in the UP context.[4] The state government, based on the findings of the CSE study, issued a letter (No. SMMU/438/1073/2023 dated 24 November 2023) mentioning the cost figures for the O&M of plants.[5] Cities were suggested to delink O&M costing of plant operation from the costing of desludging services.

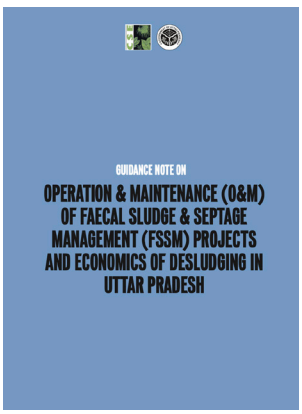


Figure 1: Guidance note on costing of O&M of plants and desludging (including the government order)

2. **Desludging cost calculator:** It is unclear how ULBs fix the desludging fee, popularly known as fee for cesspool vehicle. A recent study done by CSE in selected cities of Uttar Pradesh shows that it varies from Rs 500 to Rs 3,500.[6] Unless the desludging fee is affordable, provision of inclusive sanitation service is not possible. CSE developed a simple desludging cost/fee calculator to help the cities in fixing city-specific desludging fee. The two key cost components are distance travelled by the vehicle per trip and number of trips made per day.

Table 1: Desludging cost calculator

Do not change | User input cell

Desludging Cost Calculator			
Cost Component	**Default Value**	**User Input**	
No. of trips (Per annum)	1000	0	
Avg Dist covered per desludging (KM)	18	0	
Avg Distance covered Per Year	18000	0	
Fuel cost per year	₹ 4,05,000	₹ 0	Fuel cost/litre ₹ 0
Driver's Sal per year	₹ 1,82,500	₹ 0	
Helper1 Sal per year	₹ 1,46,000	₹ 0	
Maintanence per year	₹ 35,000	₹ 0	
Registration/license per year	₹ 5,000	₹ 0	
Insurance of vehicle per year	₹ 10,000	₹ 0	
PPE per year	₹ 5,000	₹ 0	
Other exp per year	₹ 15,000	₹ 0	
Interest Charges on Vehicle Per Annum	₹ 26,300	₹ 0	Consider interest charges: No
Office Cost (yearly)	₹ 1,20,000	₹ 0	
Admin & General (yearly)	₹47,490.00	₹ 0	Admin cost % 0.0
Profit per annum	₹ 0	₹ 0	
Total Desludging Cost Per Annum	₹ 9,97,290		
Desludging cost Per trip	₹ 997		
Desludging fee per trip	₹ 1,200		
Profit per trip	₹ 203		
Government subsidy	₹ 0		

The government issued a letter[7] to the cities to use the desludging cost calculator while fixing the fees.

3. **Contracting:** To ensure speedy engagement of contractors for the O&M of plants, the state government of UP issued the model contract document (No. 422/01/ *Nagariya Prashikshan*/2023 dated 7 November 2023), as drafted by CSE.[8] However, cities are given the freedom to manage the plants either by themselves or by engaging any contractor or SHG. Accordingly, 14 cities are managing the plants themselves, 13 plants have contractors and four cities have engaged SHGs.

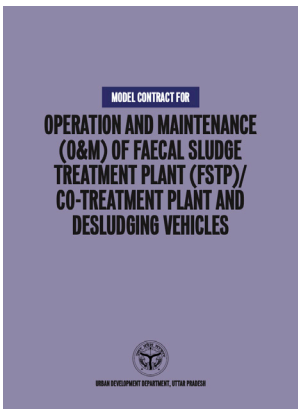


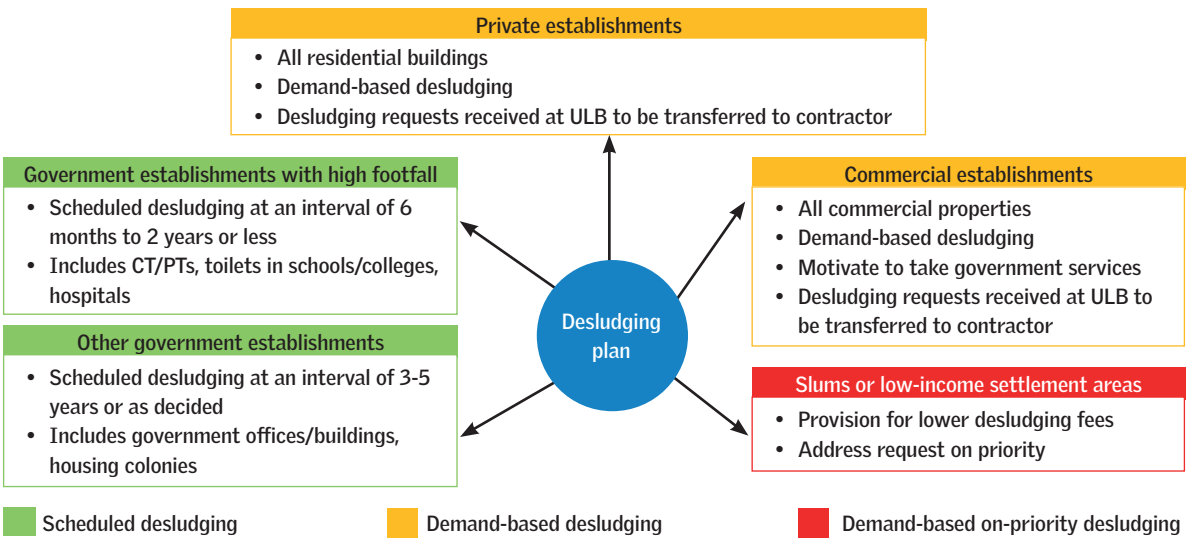
Figure 2: Model Contract for engagement of Contractor for O&M of FSSM plant (including the government order)

2.2 Plant capacity utilization

Total capacity of FSTPs and cotreatment plants installed in UP is 1,986 KLD (including under-construction Maunath Bhanjan 32 KLD FSTP). Ensuring sludge in the treatment plants is critical for the operations and sustainability of plants. With CSE's input, DoUD took two immediate steps:

1. Integrating private desludging operators: Even though private desludgers are playing an instrumental role in providing desludging services, they are not regularized. It is crucial to regularize them for (a) safety of sanitation workers, and (b) safe desludging and disposal. The government issued direction (*see Annexure 3*) to the cities detailing all the steps to ensure private desludgers are registered and licensed. CSE provided city-level handholding support.
2. Maximizing desludging in the cities: CSE categorized the sources of sludge in the cities into five areas. Accordingly, in the state-level workshops three types of desludging practices were discussed-
    - Scheduled desludging of septic tanks of all government-owned or managed establishments including, but not limited to, community toilets/public toilets (with high footfall), government offices/buildings, government housing colonies, Awas Vikas, educational institutions, hostels, government hospitals/healthcare units and community halls.
    - Demand-based desludging of septic tanks in residential areas and commercial establishments.
    - Demand-based on-priority desludging of households in slums or low-income settlement with no or low fees.

Figure 3: Components of city-level desludging plan



2.3 Regulatory framework

Private operators dominate the desludging business in most of the 59 cities. Ensuring regular desludging and conveyance of sludge to the treatment plants requires the legal positioning of the ULBs. CSE's earlier experience showed that ensuring bye-laws at the level of individual cities takes time. Therefore, framing of state-level model bye-laws followed by a training programme had the potential to substantially reduce the time taken.

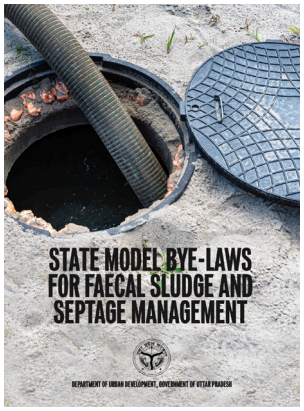


Figure 4: State model FSSM bye-laws (including the government order)

1. The state government issued model FSSM bye-laws for all the ULBs of Uttar Pradesh (No. 423/01/ Nagariya Prashikshan/2023 dated 7 November 2023).[9] The bye-laws outlined the roles and responsibilities of ULBs, private desludgers and citizens. They also indicated the amount of desludging fees and fines for indiscriminate dumping of faecal sludge. The gazette publication is a lengthy process involving city-level approvals and newspaper publication for public views.
2. A state-level training to handhold city officials on the drafting and the entire process helped the cities to issue gazette notifications of the bye-laws. The number of gazetted bye-laws in the state increased from one in 2023 to six in 2024. Seven cities have published them in newspapers and seven cities have passed the bye-laws in their board meetings.

2.4 Capacity building and community awareness programme

Capacity building on the operational, management and technical areas is crucial especially when the plants are handed over to the ULBs to operate but ULB officials are largely unaware of FSSM.

1. **Training:** CSE organized online and onsite training programmes, workshops and exposure visits for AMRUT, SBM, UPJN officials and other city-level officers for overall capacity building on sanitation, especially FSSM. Two important trainings in regard of operationalization of plants are trainings on O&M of plants and model bye-laws organized for city officials including executive officers, engineers of the ULBs and Jal Kal departments. A total of two online trainings and seven classroom trainings were conducted besides state-level workshops and exposure visits (*see Annexure 4*).

2. **IEC**: In January 2024, State Mission Director – SBM (U) launched an IEC campaign on FSSM at the Directorate Office in Lucknow. CSE supported the department in planning the implementation of the IEC programme, designing the IEC content and monitoring the progress on ground. All 56 cities were instructed to carry out IEC activities out of the SBM funds. The main aim of the IEC campaign was to operationalize the FSSM plants through awareness generation among community members regarding:
   - Construction of septic tank with proper design
   - Regular desludging
   - The evil of Malasur and its impact on health
   - Strengthening desludging operations by registering private operators
   - Popularizing helpline numbers for raising requests for desludging
   - Scientific treatment of sludge at the plants

Cities participated in the IEC campaign using various communication methods during implementation phase—including wall paintings, hoardings, animations, community meetings, posters and auto-branding—to disseminate information about Malasur to a wider audience.

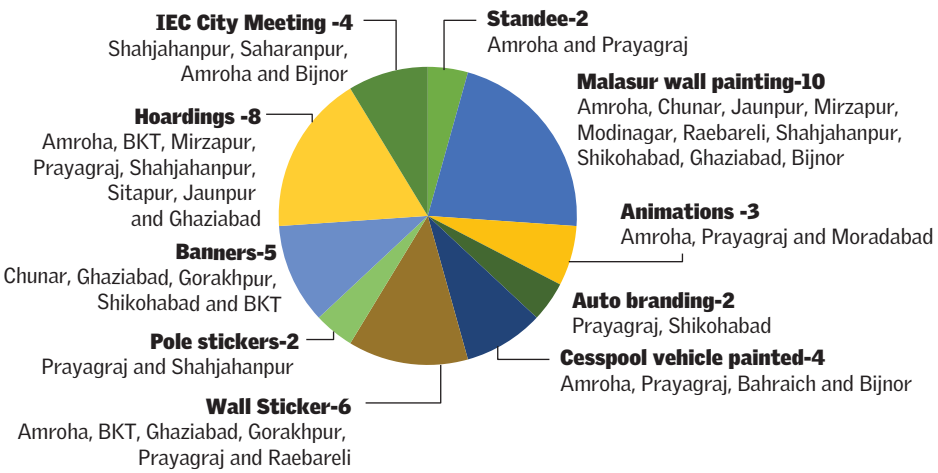
2.5 Review and monitoring

State-level officers from SBM and AMRUT regularly reviewed progress on the ground through physical meetings held in Lucknow and over online meetings.

Launch of reports and state guidelines on the occasion of World Toilet Day

The performance of 56 cities in delivering septage management services was assessed in October 2023 using the ESM tool, a star-rating tool developed by DoUD, UP for a friendly competitive ranking of towns and cities.[10]

Graph 1: IEC tools implemented in various cities



The ESM tool, containing 34 same-weighted indicators, was applied in 56 cities for assessing the following:

- Functionality of infrastructure (in terms of sludge load received and some other indicators)
- Sustainability (infrastructural and operations of plant)
- Inclusivity (only a few aspects of inclusion—affordability, gender and workers safety)

The findings of the report, as shared in a state-level workshop, indicated that only seven towns/cities managed to secure 1-star rating and no city achieved 2- or 3-star rating. Other emerging challenges of septage management in UP were also highlighted.[11]

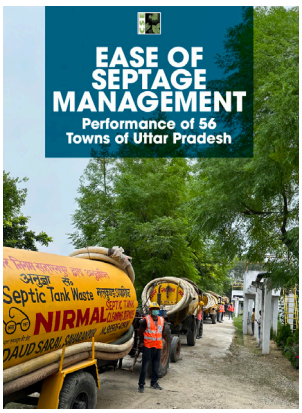


Figure 5: Ease of Septage Management Report

Photo gallery: IEC campaigns in various cities of Uttar Pradesh

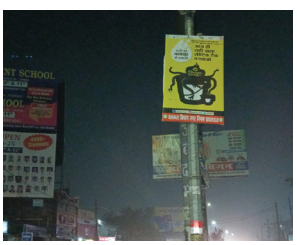
Banner used in Shikohabad

Branding cesspool vehicles in Prayagraj

Exposure visit to treatment plant in Prayagraj

Hoarding in Jaunpur

Standee for community-level meeting in Ghaziabad



Pole sticker in Prayagraj

Wall painting in Shahjahanpur

Nukkad natak in Amroha

Meeting with journalists at Bijnor co-treatment plant

O&M training of ULB officials in Bijnor

State-level workshop to operationalize FSSM plants and launching of FSSM-IEC campaign

Training of sanitation workers in Prayagraj

Treatment chain on the plant-wall in Amroha

Uttar Pradesh state-level inauguration of FSSM IEC campaign

3. Overall status of the 59 plants across 56 cities as of March 2024

1. Handover status

UP witnessed improvement in the status of FSSM during 2023–24. The number of plants handed over to and run by the ULBs was four in March 2023. An additional 44 plants were handed over to the respective ULBs by March 2024. Chunar plant is supposed to be handed over to the ULB after four years and Maunath Bhanjan plant is under construction and will be handed over after construction.

Status of handover of plants			
Not applicable	Not done	Done	Grand total
2	9	48	59

Source: CSE assessment of plants and cities as on 13 March 2024

2. Arrangement for O&M at the plants

The number of plants with O&M arrangement increased from four plants in March 2023 to 33 in March 2024. Women SHG members are managing four plants, while new contractors hired by ULBs are managing ten plants.

Status of O&M arrangement of plants: Who is managing the plant								
Not applicable	Not operational	Trial & run	Old contractor - who constructed the plant	New Contractor	SHG	ULB	Under dispute with O&M contractor	Grand total
1	25	1	3	10	4	14	1	59

Source: CSE assessment of plants and cities as on 13 March 2024

3. Plant functionality: Percentage of plant capacity utilization

Number of operational plants increased from four in March 2023 to 44 in March 2024. Thirty plants are running with more than 10 per cent plant capacity utilization and 16 plants are operating with more than 20 per cent capacity utilization.

Status of plant functionality: % utilization of the plant capacity								
00-00	01 to 09	10 to 19	20 to 29	30 to 39	40 to 49	80 to 89	90 to 100	Grand total
15	11	17	9	1	2	2	2	59

Source: CSE assessment of plants and cities as on 13 March 2024

4. Status of FSSM bye-laws

In March 2023, only one city had gazette notified bye-laws and two more cities had passed bye-laws in board meetings and were awaiting gazette notification. As of March 2024, 27 cities have passed bye-laws, out of which six are gazette notified.

Status of city-level FSSM bye-laws					
Not drafted	Drafted	Passed by council	Published for objections	Gazette notified	Grand Total
11	18	11	10	6	56

Source: CSE assessment of plants and cities as on 13 March 2024

The overall status of each of the selected 18 cities is available in Annexure 5.

4. Key challenges and learnings

The challenges in operationalizing FSSM plants in UP are more of governance and administration, and less of engineering. The state government took a couple of measures to create a conducive environment, and cities which are quick and responsive took over the plants, rectified faulty modules in the plant, started O&M and promoted desludging. Since the process is not over, the state government and city authorities need to learn from the experience.

4.1 Construction quality and handover of plants

- Time taken for handover of plants is anything between one month to more than one year. For most cities, the average time for handover is 4–6 months, but cities like Lucknow and Varanasi are yet to take over. Delayed handover of plants to ULBs is a crucial factor adversely affecting the operation of plants.
- Technical problems in the modules created suspicion about their functionality and deterred the handover process. For example, faulty construction of wetland in Baraut which causes regular leaking, Inappropriate plumbing work in Meerut, and improper design of screen chamber and sludge drying beds in co-treatment plants like Varanasi, Etawah, Mirzapur caused delay in handover. Deficiency on part of the UPJN to ensure contractors deliver quality construction in some of the plants is one of the crucial factors in untimely handover. Delay in the handover process caused extended stay in the plants for the contractors.
- Delay in issue of guidance from the government on financing plant O&M caused a pause to the handover process. Handover process entails passing of all the relevant papers related to the modules and vehicles procured to the ULBs. However, even though plants become ready for handover, unavailability of papers delay the process. Moreover, ULBs were also reluctant to take charge of plants. More than two-third of the plants were built by March 2023. There are still nine plants which are awaiting handover, but they are ready for operation, as per UPJN report (*see Annexure 6*).

4.2 Plant functionality

1. Contracting for O&M of the plants

Cities are taking longer for the engagement of an entity for the O&M of the plant—be it contractor or SHG or the ULB itself. The plants are allowed to be left inoperative, without anyone entrusted with the O&M responsibilities, until it is done. Till March 2024, there were 25 such plants. In some cases, tendering process got stuck due to administrative reasons and inadequate financial resources. The response of the city officials widely varied—cities like Shahjahanpur engaged a contractor within one month of taking over of the plant, whereas cities like Raebareli, Sitapur and Amroha took more than a year to arrange for O&M (*see Annexure 6*).

2. O&M contract models adopted by ULBs in Uttar Pradesh

UP government advisory indicated the O&M costs of plants and suggested that O&M of plant is to be delinked from desludging operations. As of March 2024, new contractors had been engaged for O&M of 10 plants.

Cities are adopting different O&M models for the plants and desludging services. At least for some cities—Ayodhya and Akbarpur—the contract values are considerably higher than the government indicated rates. It potentially makes the sanitation services costly, unaffordable and unsustainable. SHGs are engaged in four FSTPs (Jaunpur, Raebareli, Khurja and Sitapur). They are financed through the AMRUT programme and concerned ULBs will have to bear any additional amount over and above Rs 8.5 lakh for O&M of the plant. More understanding of the costing models is required to comment on their possible impact on affordability. Cities need to create a budget line to maintain books of accounts.

Table 2: Cost of O&M of plants managed by private contractors or SHGs in selected 18 cities

Name of cities	Yearly contract value	Contract details (Only O&M of plants/O&M of plants and desludging services)	Fund source
Run by private contractors			
Chunar (FSTP, 10 KLD)	Rs 5.00 lakh	Only O&M of plant	SMCG
Amroha (FSTP, 32 KLD)	Rs 17.76 lakh	Only O&M of plant	Board funds and SFC
Saharanpur (Co-treatment, 25 KLD)	Rs 14.58 lakh	Only O&M of plant	15th Finance Commission (FC)
Ayodhya (FSTP, 32 KLD)	Rs 38.16 lakh	Only O&M of plant	SFC
Akbarpur (FSTP, 32 KLD)	Rs 30.00 lakh	O&M of plant and desludging services	Board funds
Shahjahanpur (FSTP, 32 KLD)	Rs 15.00 lakh	O&M of plant and desludging services	Board funds
Jhansi (FSTP, 32 KLD)	Rs 24.00 lakh (Tendered for)	Tendered for O&M of plant and desludging services	Board funds
Jhansi (FSTP, 6 & 12 KLD)	Rs 4.62 lakh per month	O&M of plants and desludging services	Board funds
Run by SHG			
Jaunpur, Raebareli and Sitapur (All are FSTPs, 32 KLD)	Rs 8.5 lakh/city	Only O&M of plant	AMRUT Mitra (Rs 8.5 lakh)
Run by ULB			
Bijnor (co-treatment, 20 KLD), Pilibhit (FSTP, 32 KLD), Mirzapur (co-treatment, 25 KLD) Farrukhabad (FSTP, 32 KLD), Modinagar (FSTP, 32 KLD)			
No arrangement			
Ayodhya (co-treatment, 25 KLD), Lucknow (co-treatment, 100 KLD), Etawah (co-treatment, 25 KLD), Hapur (FSTP, 32 KLD),			

Source: CSE assessment of plants and cities as on 13 March 2024

3. Capital expenditure (CAPEX) and operational expenditure (OPEX) in Uttar Pradesh

The faecal sludge treatment systems of UP can be grouped into two categories—hybrid and nature-based. There are two variations within nature-based systems: Planted drying beds (PDBs) and tiger bio-filter (TBF involves treatment through tiger worms). The capital cost of hybrid and TBF systems fall within the same range, approximately Rs 13 lakh per KLD. However, the capital cost per KLD of PDB-type nature-based treatment systems is considerably higher at Rs 27.5 lakh per KLD. This is primarily due to the smaller size of PDB-type FSTPs (6–10 KLD), restricting the benefit of economies of scale.

Table 3: CAPEX (tender cost) and OPEX (without profit margin) of treatment systems in UP

FSTP				
Sr. no.	Capacity (KLD)	Technology	Capex per KLD (in lakh)	O&M cost per KLD per year (in lakh)*
1	6 and 10	Planted drying beds type system	27.52	0.52
2	32	Tiger bio-filter based system	13.31	0.7
3	32	Hybrid system	13.23	0.58

Co-treatment			
Sr. no.	Capacity (KLD)	Capex per KLD (in lakh)	O&M cost per KLD per year (in lakh)*
1	25	3.02	0.45
2	50	3.14	0.26
3	75	3.15	0.21
4	100	2.68	0.2

* O&M cost as per the advisory issued by the Govt. of UP

Source: CSE assessment of plants and cities as on 13 March 2024

a. In UP, the minimum per KLD capital cost for FSTPs is Rs 13 lakh. This is much higher than the per KLD cost of Rs 1–2 lakh recommended in the draft "Advisory on Faecal Sludge Management in Small and Medium Towns" by CPHEEO, which took reference from Maharashtra, Chhattisgarh and Madhya Pradesh. This variation is primarily attributed to the location selected for the plants. For example, in the case of Maharashtra, FSTPs are located within Solid Waste Management (SWM) plants, eliminating the additional cost of site development, roads, security/guard room, boundary wall, landscaping, etc. In UP on the other hand, SWM and FSTP are standalone plants, resulting in higher per KLD costs. Analysis also indicates that the PDB-type FSTPs have lowest O&M requirements and costs.

   Out of a total 39 FSTPs in UP, 31 are based on a hybrid treatment system. Hybrid treatment systems have comparatively higher requirements for O&M and skilled manpower. If the availability of land, local climate and other essential factors permit, then priority should be given to nature-based treatment systems, aiming to minimize operational and maintenance expenses and requirements.

b. In UP, capital cost of co-treatment is around Rs 3 lakh per KLD. However, this cost can be further substantially reduced if the plant is designed properly. Co-treatment plants in UP are over-designed by adding secondary treatment units. Removal of secondary treatment units will reduce the requirement of capital expenditure. The co-treatment plants are also very cost-effective in terms of operation—as low as Rs 0.2 lakh per KLD per year (without profit margin). With the upcoming STPs and also within the existing ones, UP should prioritize maximizing the co-treatment potential for septage.

4. **Defining roles and responsibilities**: Septage management is not confined to plant-level activities. It involves activities across all the steps of the sanitation value chain—receiving desludging requests and payment, creating awareness among citizens, managing desludging business, plant management, monitoring and reuse of treated water and bio-solids. In general, the Jal Kal department in the ULB is responsible for O&M of plants. But, the role of the Sanitary and Food Inspector (SFI) and other officers should also be specified to bring accountability and avoid any confusion. SHGs are engaged for O&M in four cities. There the roles of City Mission Managers and District Urban Development Agency (DUDA) officers require to be earmarked. Further, the problem intensifies when a responsible officer is transferred to other cities, as it creates a void. The cities are required to nominate a nodal officer for FSSM work and also to define the roles and responsibilities of ULB staff in the FSSM bye-laws.

4.3 Treatment technology

As mentioned earlier, co-treatment plants in UP are overdesigned with additional secondary treatment units resulting in increased O&M requirements for the plants.

1. There were few other challenges like absence of filter media in the sludge drying beds of all the co-treatment plants and improper design of screen chamber and sludge drying beds. Few of the co-treatment plants in Agra, Varanasi, Prayagraj, Ghaziabad and Meerut faced a challenge of non-compatible inlet point at the plant. In these plants, design of inlet was not compatible with outlet pipe of desludging vehicles, making it difficult to empty the septage at the plant. It would have been more effective to construct a collection chamber and screening chamber instead of directly pumping the septage. To overcome this challenge, few ULBs (Agra, Ghaziabad and Meerut) have constructed a screening chamber before pumping the septage for dewatering, as suggested by CSE.
2. A few FSTPs faced technical issues like very small screening chambers and septage discharging points (Mirzapur, Farrukhabad and Jhansi) and the absence of or improper construction of a ramp near sludge drying beds, posing a challenge in discharging the dewatered sludge (Khurja, Amroha, Baraut and Shamli).

Figure 6: Case of Agra co-treatment plant

Directly pumping the septage

Pumps removed from the place, screen chamber constructed followed by pumping of septage

4.4 Desludging

1. **Poor sludge load in the plants**: Only 16 plants, out of the 58 plants ready for treating sludge, are utilizing more than 20 per cent capacity. Twenty-six plants are running with less than 10 per cent capacity utilization, indicating poor sludge load in the plants. According to UP FSSM policy, 86 per cent of urban households are dependent on onsite sanitation systems. Therefore, the cities are posed with a two-pronged challenge—ensuring adequate desludging and ensuring the emptied sludge reaches the treatment plants.

2. **Presence of private operators and regularization:** Till date, the desludging market is heavily dependent on private operators, especially in medium and big cities. Regulation on the functioning of private desludgers is crucial to ensure safe desludging practice and safe disposal. As of February 2024, 31 cities have initiated the process for registration of private desludgers. However, CSE's findings show that not all private desludgers have yet been registered and regularized (*see Annexure 7*).

3. **Availability of desludging vehicles:** Currently, with AMRUT funding, all the cities have a minimum of two and maximum of 12 government-owned desludging vehicles with capacities ranging from 500–5,000 litres (*see Annexure 7*). Additionally, many of the cities have their own vehicles as well. Under AMRUT, all 18 towns together now have 94 government-owned vacuum tanker vehicles, which is almost three times the earlier number of 34. Adding to this, there are 116 privately operated vehicles as well in these towns. The increased number is now sufficient to make plants operate at full capacity.

4. **Narrow lanes:** Small and medium towns of UP are facing challenges in providing desludging services in narrow lanes (road width less than 7–8 feet). One of the main hurdles in desludging was the challenge of reaching septic tanks in narrow lanes, especially in old parts of towns and in unplanned settlements. About 20–30 per cent of narrow-lane areas in towns are inaccessible to the available desludging vehicles. CSE conducted a study in four towns to understand the desludging challenges in narrow lanes and recommend solutions.[12] The study suggests that each class 4 and above town should have two sizes of vehicles and a double boosting pump set to

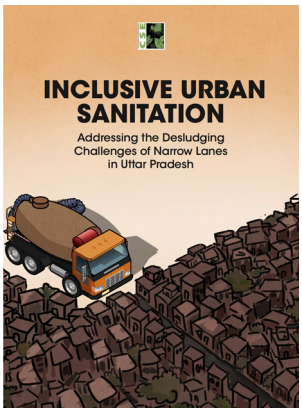


Figure 5: Report on desludging challenges in narrow lanes

CASE OF CHUNAR: ACCESSIBILITY OF HOUSEHOLDS

An internal CSE study of Chunar in 2021–22 revealed that 67 per cent of households can be easily accessed by desludging trucks. Only 19 per cent of the households are at a distance of 100 feet and more where accessibility with desludging vehicle is an issue.

Width of the connecting road is crucial for movement of the desludging vehicle. In Chunar, 47 per cent households are connected by roads with more than 8 feet width while 18 per cent households are connected by roads with less than 4 feet width.

Table 4: Distance of the containment structure from the location of the desludging vehicle

Household distance from accessible desludging vehicle (Feet)	Percentage of households
Greater than 250	10%
200–250	3%
100–200	6%
50–100 feet	14%
Less than 50	67%

Source: CSE – Chunar Household Survey, conducted during December 2021 to February 2022

maximize the desludging reach. However, this should not be prescribed as a norm, rather it should be guided by a state-level plan for procuring desludging vehicles and allied equipment to determine the specific vehicle requirements for each ULB.

5. **Distance of the plants**: Distance of the treatment plant from the city acts as a deterrence for desludgers to take the sludge to the plant. In UP, 23 FSTPs and 11 co-treatment plants are located at distances of 10–15 km. Similarly, five FSTPs and three co-treatment plants are located at distances of 15–20 kms (*see Annexure 8*). The greater distance reduces profit margins given the prevailing market price for desludging and increases time involved in one complete trip—ultimately making the desludging business unviable. This rationale is further consolidated based on the interviews done with private operators in towns, especially in Lucknow.

Table 5: Desludging fee matrix with distance of the plant and number of trips

Distance (km) per trip	Number of trips per day			
	1	2	3	4
Below 10	Rs 2,200	Rs 1,200	Rs 800	Rs 700
10–15	Rs 2,300	Rs 1,300	Rs 1,000	Rs 800
15–20	Rs 2,400	Rs 1,400	Rs 1,100	Rs 900
20 and above	Rs 2,600	Rs 1,600	Rs 1,200	Rs 1,100

Source: CSE study on Economics of Desludging, conducted in 11 towns of UP in 2022

6. **Desludging fee**: A recent study done by CSE during 2022–23 in selected cities of Uttar Pradesh shows that the fee varies from Rs 500–3,500. A recent government order (SMMU/438/1073/2023 dated 24 November 2023) advises cities to fix desludging fee based on distance of the plants and likely number of trips of the vehicles. Fixing desludging fee is crucial for finalization of city-level FSSM bye-laws. Currently, more than 20 cities in UP have finalized their bye-laws and fixed desludging fees. In Sitapur, where the FSTP is at a distance of around 10 km from the core of the city, the fee has been revised from Rs 2,500 to Rs 1,000. Similarly, fee corrections have also taken place in Pilibhit and Moradabad, which earlier had a fee of up to Rs 3,000. In Pilibhit, the fee has now been revised to Rs 2,000, and it now stands at Rs 1,500 in Moradabad. Meanwhile, cities like Raebareli have fixed a fee for the first time. Modinagar has set differential desludging fee, Rs 750 for poor households and Rs 1,500 for non-poor households. Kanpur is currently in the process of fixing its desludging fee and it is using the calculator. All the recently approved FSSM

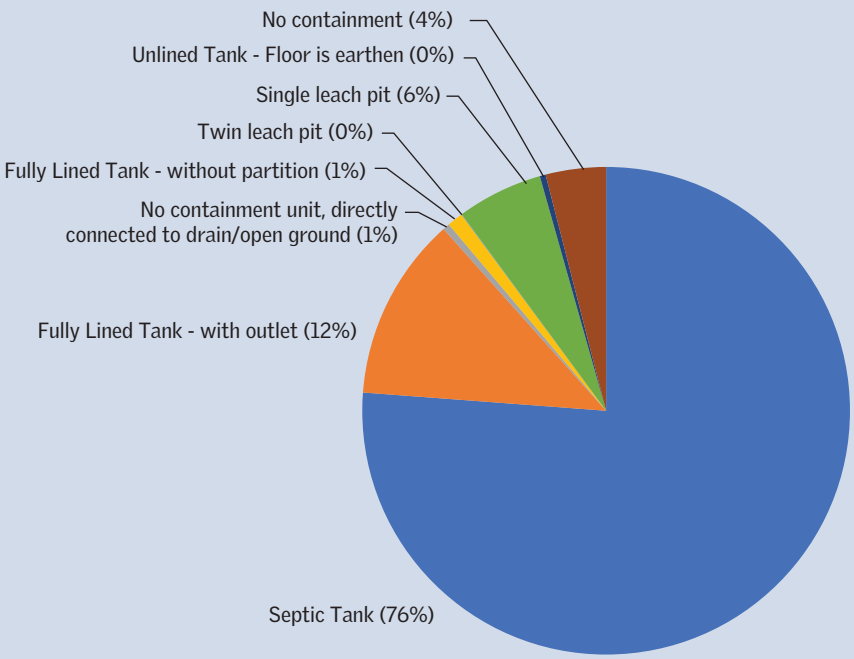
bye-laws of cities show that desludging fee has reduced compared to earlier rates.

7. **Containment structure and accessibility**: Cities have large-sized containments for which desludging may not be required for 10–20 years. Many households have not desludged their septic tanks for years, indicating the structure could be unlined or honeycombed. CSE does not have exact estimation of the problem for all the cities.

CASE OF CHUNAR: TOILET STRUCTURE AND ACCESSIBILITY

During 2021–22, the CSE survey in Chunar city revealed that 95 per cent of the households had access to individual household toilets. The rest 5 per cent households were either practising open defecation or were using community toilet or shared toilet. There were no sewer lines in Chunar. About 76 per cent had septic tanks and 13 per cent had fully lined tanks with or without partition. About 1 per cent of the households did not have a containment structure as such, the toilet was directly connected to either a drain or open ground. Out of the total toilets constructed, almost 50 per cent of the toilets were built after 2014. The toilet outlets were linked to open drains (88 per cent), soak pits (11 per cent) and open ground (1 per cent). In 99 per cent of the households, the on-site systems are located around (in front, behind or on the side) of the household premises. About 9 per cent of households had their toilet outside their property boundary. In just about 12 per cent of the households, the onsite systems were accessible without breaking the top. While in the remaining cases, the top has to be broken to access the systems.

Graph 2: Containment structure in Chunar



Source: CSE – Chunar Household Survey conducted during December 2021 to February 2022

CASE OF LUCKNOW: NO SLUDGE IN THE 100 KLD CO-TREATMENT PLANT

Lucknow is a partially sewered city with a 100 KLD co-treatment plant located at 345 MLD STP at Bharwara. In Lucknow, there is an association of around 50 private desludging operators registered with the Jalkal Vibhag, under Lucknow Corporation. As per convenience, the operators, after emptying a septic tank, decant the sludge at the nearest sewage pumping station located at various places in the city, instead of decanting in the co-treatment plant. This allows the operators to decant with minimum distance travelled and ensures maximum profit.

Jalkal Vibhag is engaging with the operator's association to ensure at least a minimum sludge load at the plant and at the same time recouping expenses incurred in O&M of the plant by imposing a tipping fee at all pumping stations barring the plant. While the operator's association is fine with the tipping fees up to a certain extent, their demand also includes removing traffic barriers for plying in certain routes. So far, the intended model has not seen the light of the day as the exact tipping fee is yet to be agreed upon by both parties. This has resulted in no sludge load at the treatment plant till date.

CASE OF AYODHYA: DISTANCE RESULTING IN CO-TREATMENT PLANT RECEIVING SLUDGE AND NOT THE FSTP

Ayodhya corporation has two plants—one 32 KLD FSTP which is around 15–20 km away and one 25 KLD co-treatment plant which is around 10 km away. Ayodhya is also a partially sewered city. Recently, Ayodhya has become a point of tourist attraction and therefore requirement of desludging has increased. The co-treatment plant is getting more sludge than its treatment capacity, especially in festive seasons, while the FSTP is not receiving sludge due to distance from the city. Due to the distance, FSTP is not receiving sludge but due to comparative closeness of the co-treatment plant, it is getting sludge more than its treatment capacity, especially in the festive seasons. On the other hand, open discharge of sludge is also being reported as all the private desludgers are not registered with the Ayodhya Nagar Nigam and the corporation staff is poor at monitoring. Therefore, regularizing all the private desludgers and ensuring both the treatment plants are utilized are the challenges in front of Ayodhya city.

4.4.1 Study on desludging potential of the 18 cities

CSE conducted an assessment of sludge potential in selected 18 cities, collecting data through discussion with the ULB officials and the desludgers. Information related to government properties has been taken from the ULB officials whereas information related to current demand of desludging has been gathered through discussion with ULB officials and private desludgers. Estimation of desludging potential, calculated for each of the 18 cities, shows availability of sludge up to a certain extent, even at the current rate of desludging. However, the estimation is based on standard assumptions regarding the septic tank sizes of various establishments, based on samples observed.

The potential is calculated based on the combination of scheduled desludging and demand-based desludging:

- o Scheduled desludging from all government establishments including community toilets/public toilets, government housing colonies, government educational institutions and health facilities
- o Demand-driven desludging at the current rate from households and private properties.

The results show that such a combination of desludging mechanism can potentially run the plants at a minimum of 40 per cent capacity (Farrukhabad) to 100 per cent capacity (Raebareli, Lucknow and Saharanpur). The overall sludge potential of all these cities is 719.8 KLD against the total capacity of 632 KLD. The current sludge load is only 125 KLD whereas the vehicles de-sludge 569.6 KLD. This implies that these 18 cities can ensure (569.6 - 125) 444.6 KLD of additional sludge to the treatment plants every day.

Lucknow presents a special case out of the 18 cities as it has high level of desludging frequency and volume of septage, but the plant is not operational. The sludge is reported to be decanted at the sewage pumping stations and treated in the Bharwara STP.

Excluding the Lucknow data, 339 KLD sludge is coming out on demand basis from the households and commercial establishments, which is around 41 per cent of that entire plant capacity (532 KLD). The scheduled desludging of government institutions/establishments can contribute an additional 23 per cent, amounting to around 64 per cent potential utilization of the plant capacity. However, the current overall utilization is 24 per cent, leaving a space for 40 per cent capacity utilization.

Study findings:

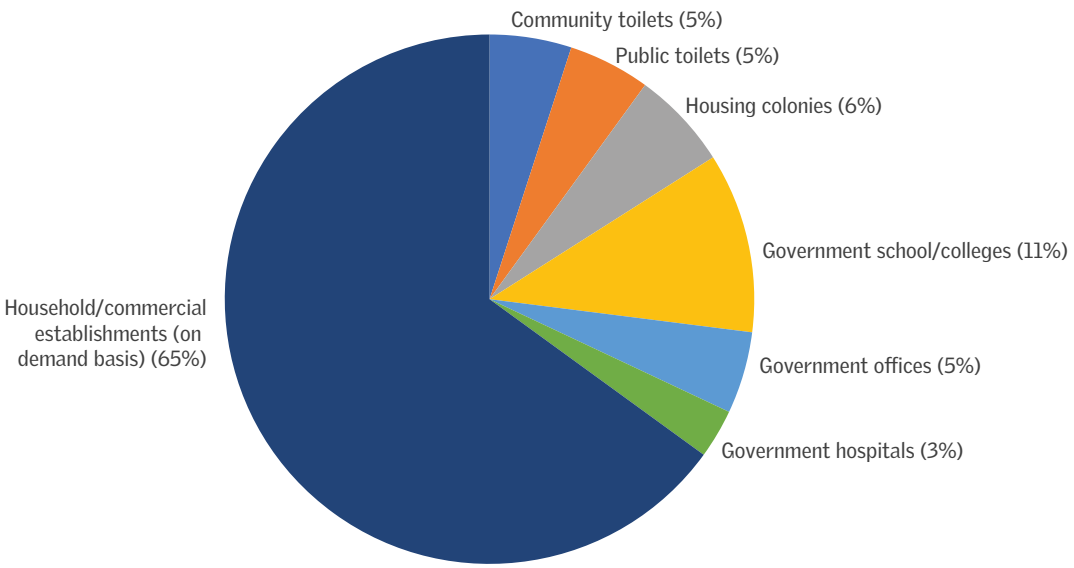
- The actual capacity utilization of the plant is low: 24% (excluding Lucknow data) and 20% (including Lucknow data)
- The current demand-based desludging can contribute to around (219.6/532 * 100) 40% capacity utilization (excluding Lucknow data). If Lucknow data is considered, the utilization rate becomes around (569.6/632 * 100) 90%.
- Combining both household level demand-based desludging and institutional scheduled desludging of government properties, the total desludging potential is around (339.03/532 * 100) 64% (excluding Lucknow data) and (719.8/632 * 100) 114% including the Lucknow data.
- The gap between actual plant capacity utilization and demand-based desludging figures, which are reported as currently happening in the cities, implies that (40 - 24) 16% is not reaching the plants.

Action points for the state and cities based on the study

- The state needs to ensure that cities estimate their desludging potential and prepare desludging plans.
- To ensure that the sludge potential is actualized, cities need to promote scheduled desludging for CT, PTs, Awas, etc. and encourage households to regularly desludge septic tanks.
- State and cities to ensure that all private desludging service providers are registered and incentivized for decanting only in the plants.

The following charts depicts the total plant capacity available for treating faecal sludge, the immediate scope available to ensure sludge load in the plants, which is around 60 per cent of the plant capacity (using the combination of institutional scheduled desludging and demand-based household/private desludging) and the current usage (the analysis excludes Lucknow data).

Graph 3: Desludging potential from various sources



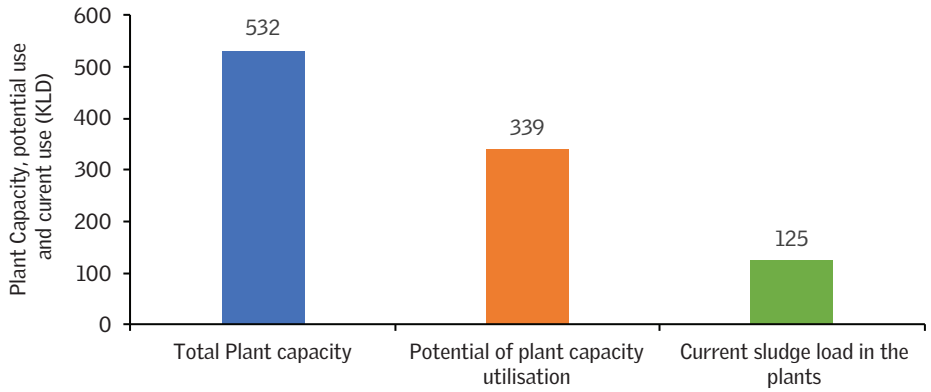
Source: CSE internal assessment of Desludging potential in 18 cities conducted during February-March 2024

Table 6: Desludging potential of the cities

City name	Type of establishment and desludging potential (KLD)								Total values			
	Plant capa-city (KLD)	Commu-nity toilets	Public toilets	Housing colonies	Govern-ment Schools/ Colleges	Govern-ment offices	Govern-ment hospi-tals	House-holds/ Comm-ercials establi-shments (On demand basis)	Total (consider demand driven HH deslud-ging	Potential Plant capacity Utilisation (%)	Current sludge load in the plants (KLD)	Current Plant capa-city utili-sation (%)
Etawah	25	1.07	0.8	3.33	1.41	0.27	0.75	6	13.63	54.52	5	20
Farrukhabad	32	0.67	0.57	2.48	1.55	0.57	0.96	6	12.8	40	4.8	15
Jhansi	50	3.53	2.13	2.48	2.12	2.83	1.07	16	30.16	60.32	10	20
Shahjahanpur	32	1	1.73	2.48	1.37	0.12	1.07	10	17.77	55.53	6.4	20
Sitapur	32	0.27	2.35	2.4	3.6	1.58	2.24	6	18.44	57.62	3.2	10
Raebareli	32	0.27	1.55	2.4	4.13	3.2	1.6	24	37.15	116.09	4.8	15
Akbarpur	32	3.3	0.8	1.6	5.9	0.42	1.6	12	25.62	80.06	4.8	15
Lucknow	100	0.7	5.4	NA	10.57	12.5	1.6	350	380.77	380.77	0	0
Chunar	10	0.88	0.16	1.6	1.36	0.43	0.28	2	6.71	67.1	10	100
Mirzapur	25	1.4	0.6	0.26	0.49	1.3	0.42	16	20.47	81.88	4	16
Jaunpur	32	0.43	0.05	0	3.36	1.3	0.08	20	25.22	78.81	3.2	10
Pilibhit	32	0.32	1.6	0.48	3	0.93	0.3	20.6	27.23	85.09	1.6	5
Ayodhya	57	1.2	0.48							0	7.41	13
Saharanpur	25	1.07	2.4	0.43	2.33	0.5	0.6	25	32.33	129.32	22.5	90
Bijnor	20	0.4	0.73	0.43	2.13	1	0.4	10	15.09	75.45	7	35
Hapur	32	0.67	0.33	0	2.57	0.67	0.1	14	17.97	56.16	8	25
Modinagar	32	0.67	0.47	0.11	0.97	0.27	0.08	16	19.24	60.12	8	25
Amroha	32	0.2	0.23	0.53	1.03	0.67	0.08	16	19.2	60	14.4	45
Total	**632**	**18.05**	**22.38**	**21.01**	**47.89**	**28.56**	**13.23**	**569.6**	**719.8**	**113.89**	**125.11**	**19.79**
Total excluding Lucknow	**532**	**17.35**	**16.98**	**21.01**	**37.32**	**16.06**	**11.63**	**219.6**	**339.03**	**63.73**	**125.11**	**23.52**

Source: CSE internal assessment of Desludging potential in 18 cities conducted during February-March 2024

Graph 4: Current plant capacity, current sludge load and potential sludge load following schedule institutional desludging and demand-based household desludging, excluding Lucknow data



Source: CSE internal assessment of desludging potential in 18 cities conducted during February–March 2024

4.5 Reuse of treated water and bio-solids

Considering all the 59 plants, the capacities of FSTPs and co-treatment plants are 1,141 KLD and 845 KLD respectively.

The fully operational plants in UP have a potential to generate 17 million metric tonnes (MMTs) of bio-solids per year, considering standard estimates of 3 per cent solid portions in faecal sludge and septage. Cities like Bijnor and Jhansi have already reused approximately 10 MT and Amroha has reused about 6.9 MT for mainly agricultural purposes. Other cities like Sitapur have also started generating biosolids.

CSE study of biosolids[13] suggests that composting could be an efficient technology as a resource recovery option as it reduces microbial load. However, there is an urgent requirement of a national guideline on the use and standards of bio-solids for the plant operators to take a conscious decision.

In the case of co-treatment plants, treatment of water part of the faecal sludge is taken care of by the STP. The potential quantity of treated water to be reused is approximately 17 KLD/plant and approximately 28 KLD if the FSTPs are operational at 60 per cent and 100 per cent capacity. This water could be used for agriculture, washing vehicles, gardening, etc. following the existing government regulation.

4.6 Gazette notification of FSSM bye-laws

CSE support and state-level model bye-laws have been useful for the cities to process gazette notification of the FSSM bye-laws. Despite all the state-level effort, fixing a date for board meeting is a challenge. Due to irregular board meetings, it delays approval of the bye-laws at the city level. Fixing of desludging fees, in spite of the government order issued and availability of the desludging cost calculator, is a political issue and agreement in the board meeting is challenging. However, a few cities like Saharanpur, Hapur and Prayagraj are following the desludging fees as mentioned in the model bye-laws document. A gazette notification on FSSM bye-laws strengthened the position of ULBs, like Amroha, to promote desludging as a city-priority, imposing fines for improper dumping of sludge.

5. Conclusion

In its FSSM journey, UP is transitioning from the construction phase to the operationalization phase. During 2023–24, the state issued a few crucial advisories to aid cities to operationalize their plants. The onus to sustain FSSM efforts lies with the ULBs. The progress of 56 cities is at different levels—with some cities yet to take over the plant and some utilizing more than 80 per cent of plant capacity. With 25 plants pending handover, 23 plants operating below 10 per cent capacity utilization and 15 ULBs not even having drafted their FSSM bye-laws, the state has to continue its effort to make FSSM functional in the 56 cities.

As the state reaches a new level, it has to face a new set of challenges and the biggest one is to ensure the availability of sludge in the plants. The current plant utilization figures in 18 selected cities show that around 20 per cent of the plant capacity is being utilized. However, the study to understand desludging potential of the 18 cities shows that if the cities pursue demand-driven desludging along with institutional scheduled desludging, there is a possibility to utilize 60 per cent plant capacity. Even then, sludge reaching the plant remains an area of concern.

Therefore, the top priority of the cities should be to ensure that a viable desludging business model as well as a monitoring system is put in place to ensure the entire sludge is subjected to the treatment system. Around 35 cities are yet to fix their desludging fee, which has to be made affordable so that even poor households are encouraged to clean their septic tanks and the plants get more sludge. The state has to continue monitoring the performance of the cities and plants and provide incentives to the cities for better performance. Capacity building of ULB functionaries and plant operators will be an important area given that women SHGs are also engaged in plant O&M.

The success of the UP scale-up journey will largely depend upon how the government institutionalizes its efforts at various levels to make sanitation services safe, equitable, affordable and inclusive—the milestones for 2024–25.

5.1 Recommendations

A. Ensure adequate quantity of sludge at the plants

i. The immediate challenge for the state and cities is to ensure adequate sludge in the treatment plants. As per CSE estimation of desludging potential, cities

can utilize around 60 per cent plant capacity through scheduled institutional desludging of government establishments like CTs/PTs, government awas, etc. and demand-based desludging of households and private properties. A state directive to the cities is necessary to prepare and implement a desludging plan to ensure regular and adequate sludge to the plants.

ii. While government authorities are required to register and license all private desludgers, it is necessary to incentivize sanitation workers and private desludgers to promote desludging and to take penal action for indiscriminate dumping of sludge.

B. Conduct performance monitoring

iii. Development of a state-level monitoring system and regular review to track the performance of cities in delivering affordable and inclusive sanitation services is critical for sustaining the efforts.

iv. The first ever implementation of the ESM tool in 2023 shows that there are seven cities qualifying for the 1-star ranking and none qualifying for the 2-star and 3-star ranks. Subsequent implementation of the ESM tool will help the state to monitor the progress of the cities over time in delivering city-wide inclusive sanitation services.

C. Enable smooth handover of the plants from UPJN to the ULBs

v. Despite the state's regular follow up, all the plants have not been handed over. ULBs and UPJN should list down their points of difference affecting the handover process and resolve them within a definite timeframe following a handover protocol.

vi. Ensure a third-party verification of the quality of construction of plants before they are handed over as the quality of construction is a significant deterrence in the handover process.

vii. To ensure appropriate site selection, ownership and accountability of ULBs, cities need to be engaged during the planning and execution process of FSSM projects.

D. Ensure O&M of the plants

viii. State to ensure that cities follow the state advisory on O&M cost during engagement of contractors for O&M of plants and fixing desludging fee. While majority of the cities are grossly following the guideline, two cities have settled at a higher rate for plant O&M as the higher investment will make the service costly and unaffordable.

ix. The plants are in a transition while O&M arrangements are taking shape. ULB staff, contractors and SHGs are to manage the functioning of the plants. Variety of technology and treatment chains are in use. Therefore, to sustain plant functionality, the state government has to issue a standard operating procedure (SOP) for the O&M of plants and ensure that the capacity of the operators and city officials is built to run the plants.

E. Reuse of treated bio-solids and treated water

x. UP government should frame a state policy on the reuse of treated bio-solids and treated water and issue guidelines to the ULBs for proper utilization of the by-products generated from the treatment process.

Annexures

Annexure 1: List of selected 18 cities

Sr. no.	City name	State region	Plant type	Total capacity (KLD)
1	Jhansi	Bundelkhand	3 FSTPs (6 + 12 + 32 KLD)	50
2	Sitapur	Central	FSTP	32
3	Raebareli	Central	FSTP	32
4	Lucknow	Central	Co-treatment	100
5	Farrukhabad	Central	FSTP	32
6	Etawah	Central	Co-treatment	25
7	Mirzapur	Eastern	Co-treatment	25
8	Jaunpur	Eastern	FSTP	32
9	Chunar	Eastern	FSTP	10
10	Ayodhya	Eastern	FSTP (32 KLD) and co-treatment (25 KLD)	57
11	Akbarpur	Eastern	FSTP	32
12	Pilibhit	Western	FSTP	32
13	Shahjahanpur	Western	FSTP	32
14	Bijnor	Western	Co-treatment	20
15	Saharanpur	Western	FSTP	32
16	Amroha	Western	FSTP	32
17	Modi Nagar	Western	FSTP	32
18	Hapur	Western	FSTP	32
				639

Annexure 2: Stakeholders in Uttar Pradesh for implementation of FSSM

Name	Role
State	
1. Department of Urban Development (DoUD)	
AMRUT	54 out of the 59 plants are funded by AMRUT. AMRUT State Mission Office has specific interest and power to issue guidelines, conduct capacity building of ULB officials, and monitor the status and progress of the plants and cities.
Swachh Bharat Mission-Urban (SBM-U)	SBM-U has jurisdiction over all the cities in UP to ensure ODF++ and Water+ status. The performance of FSSM plants is linked to the overall used water management of the cities and annual Swachh Sarvekshan.
Directorate of Local Bodies (DLB)	DLB has the power to instruct the cities on issues related to administration, law and staffing. DLB can ensure city-level FSSM-related regulatory provisions.
UP Jal Nigam (UPJN)	The UPJN is entrusted with the responsibility for construction of FSSM plants. Any quality related issues in the plants are to be resolved by the UPJN.
2. Department of Jal Shakti	
State Mission for Clean Ganga	Bijnor and Chunar plants are constructed by SMCG and NMCG. SMCG manages the O&M of Chunar plants. A few co-treatment plants built out of the AMRUT funds are located within the STP compound built out of Namami Gange.
City	
Urban Local Body and Jal Kal	ULBs are to take over the plant from the UPJN and ensure O&M of the plants. This involves registration/licensing of private desludgers; regular and safe desludging, transport and treatment; engagement of personnel for O&M of plants; citizen awareness; and gazette notification of FSSM bye-laws.
Private	
Private desludgers	In many cities they are the main service providers. Therefore, to ensure safe desludging and treatment of sludge, involving them in the city sanitation value chain is critical.
Households and properties with sludge potential	Households, government awas, private business, etc. are the key sources of sludge. Engagement with them is critical to ensure minimum sludge to the plants and overall public health.

Annexure 3: Government letter to operationalize the plants

प्रेषक,

राज्य मिशन निदेशक (अमृत)
नगरीय प्रशिक्षण एवं शोध केंद्र व स्थानीय निकाय निदेशालय
चौथा तल, गोमती नगर विस्तार सेक्टर - 7
लखनऊ ।

सेवा में,

1- नगर आयुक्त, नगर निगम: लखनऊ, झाँसी, मुरादाबाद, सहारनपुर, शाहजहाँपुर एवं अयोध्या उ0 प्र0 ।
2- अधिशासी अधिकारी, नगर पालिका परिषद: जौनपुर, पीलीभीत, मिर्जापुर, रायबरेली, सीतापुर, अकबरपुर, अमरोहा, बड़ौत, फर्रुखाबाद एवं इटावा उ0 प्र0 ।

पत्रांक: एसएमएमयू/ 65 **/1073/2023** **दिनांक: 2 जून, 2023**

विषय: अमृत योजना तथा अन्य योजनाओं के अंतर्गत निर्मित FSTPs/ Co-Treatment Plants के समुचित संचालन के संबंध में।

महोदय,

कृपया उपर्युक्त विषयक संदर्भ में अवगत कराना है की आपकी निकाय में अमृत योजना तथा अन्य योजनाओं के अंतर्गत FSTPs/Co-treatment plants का निर्माण कार्य पूर्ण हो गया है। इसी क्रम में अगला मुख्य कार्य इन plants का सुदृढ़ संचालन और रखरखाव (O&M) एवं plants की sustainability को बनाए रखना है। इस योजना को पूर्ण करने के लिए सभी निकायों को निम्नलिखित कार्य प्राथमिकता पर करने होंगे:

- **Registration of desludging operators:** यद्यपि Private desludging operators शहरी क्षेत्र में महत्वपूर्ण सेवा प्रदान करते हैं, तथापि उनके संचालन पर नियंत्रण होना आवश्यक है, विशेष रूप से यह सुनिश्चित करने के लिए कि वे FSTPs/Co-treatment plants में ही फ़ीकल स्लज/सेप्टेज को डालें। इसलिए यह महत्वपूर्ण है कि निकाय में कार्यरत सभी desludging operators की पहचान एवं उनका registration (संलग्नक 1) किया जाए, साथ ही निकाय क्षेत्र में सेप्टिक टैंक खाली करने के कार्य के लिए license देना (संलग्नक 2) और Treatment plant के बारे में जानकारी देना।
- **City level desludging plan and cost:** वर्तमान में, फ़ीकल स्लज/सेप्टेज की आवश्यक मात्रा में अभाव के कारण treatment plants सुचारू रूप से नहीं चल पा रहें है। Plants के अधिकतम उपयोग (utilization) के लिए desludging plan बनाया जाए, जिसमें residential buildings के साथ-साथ institutional buildings, CTs/PTs, Government Housing Colonies etc. से प्राथमिकता पर regular desludging करना सुनिश्चित किया जाए।
- **City FSSM Bye-Laws**: FSSM सेवा को सुदृढ़ करने के लिए नगर विकास विभाग के द्वारा 'State Model FSSM Bye-Laws' का प्रारूप तैयार किया जा रहा है। सभी निकायों को इस प्रारूप के आधार पर City FSSM Bye-Laws तैयार करके Gazette Notification कराना होगा।

  करने के लिए निकाय में नियमित रूप से जागरूकता अभियान का आयोजन करना।
- **Monitoring and Technical aspects**: यह सुनिश्चित करना कि सेप्टिक टैंक से निकलने वाला फ़ीकल स्लज/सेप्टेज Treatment plant के अलावा किसी अन्य स्थान में ना डाला जाए, desludging service एवं plant मे आने वाले फ़ीकल स्लज/सेप्टेज से संबंधित सूचनाओं की record keeping एवं treatment plant का उचित संचालन और रखरखाव (O&M)।

साथ मे यह भी अवगत कराना है की उक्त विषयों में Centre for Science and Environment (CSE) निकायों को handholding support प्रदान करेगा। इसके लिए CSE के प्रतिनिधि (संलग्नक 3) सभी निकायों मे multiple visits करेंगे। अतः इस पत्र के साथ Registration form for Private Desludging Operator एवं License for Private Desludging Operator संलग्न करके, इस आशय के साथ प्रेषित किया जा रहा है कि कृपया इस संबंध प्रभावी कार्यवाही करते हुए कृत कार्यवाही से अवगत कराने का कष्ट करें।

भवदीय,

2/6/23

(पी० के० श्रीवास्तव)
अपर मिशन निदेशक (अमृत)

Annexure 4: Training and exposure visits done in 2023–24

Sr. no.	Name of the training	Online/ onsite	No. of participants	Trainees
Online trainings				
1	Webinar on learnings from Chunar, Bijnor and Jhansi	Online	58	UP government officials, national and international sector experts, NGOs and academia
2	Deep Row Entrenchment in Towns with <20,000 Population in Uttar Pradesh	Online	200	ULB officials, Executive Officers and Engineers from Jalkal and Jal Nigams
Onsite trainings				
3	State-level training on Integrated Wastewater Septage Management in Lucknow	Onsite	93	ULB officials, Executive Officers, Assistant Engineers, Junior Engineers, Sanitation and Food Inspectors Jalkal officials, DPMs/DCs of SBM
5	State-level training on Operation & maintenance for Co-treatment & FSTP's in Varanasi	Onsite	30	ULB officials, Executive Officers, Jalkal officials, DPMs/DCs of SBM, Urban planners, Sanitary Inspectors
6	State-level training on preparation of FSSM Byelaws for city level officers in Lucknow	Onsite	73	Executive Officers, Assistant/Junior Engineers, sanitary and Food Inspectors, District Project Manager of SBM
7	State-level training on Operation & maintenance for Co-treatment & FSTP's	Onsite	13	ULB officials, Executive Officers, Engineers from Jalkal officials and Jal Nigams
8	State-level training on O&M for co-treatment & FSTP's in Bijnor	Onsite	23	ULB officials, Executive Officers, Jalkal officials, DPMs/DCs of SBM
9	Training of SHGs for Operation and Maintenance of FSTPs under AMRUT MITRA initiative - Jaunpur, Sitapur, Raebareli and Khurja.	Onsite	99	Self-help Groups and ULB Officials, Chairperson, Executive Officers and other officers, SUDA Officials, CMMs, contractors
Workshops				
10	Workshop on World Toilet Day on mechanical desludging for low-income and congested settlements in Lucknow	Onsite	78	ULB officials, Executive Officers and Engineers from Jalkal, Jal Nigams and other organizations
11	One day workshop on O&M of FSSM plants and lake rejuvenation	Onsite	30	Executive officers, engineers from ULBs and contractors
12	State-level workshop to overcome the bottlenecks in operationalizing the FSSM plants, and launching of FSSM-IEC campaign	Onsite	44	ULB officials, Executive Officers and engineers from Jalkal and Jal Nigams
Exposure visits				
13	Exposure visit to Chunar FSTP	Onsite	26	ULB officials, Executive Officers, Jalkal officials, DPMs/DCs of SBM, urban planners, sanitary inspectors
14	Exposure visit to Bijnor co-treatment plant	Onsite	36	Junior Engineers from adjacent ULBs and UNICEF officials
15	National learning cum exposure visit to Bengaluru	Onsite	15	Govt officials from public health departments, urban planners, Executive Officers from ULBs
		Total	**818**	

Annexure 5: Status of the 21 plants across 18 cities

Sr. no.	City name	Registration of private desludgers (Newspaper notice, registration) done? (Yes/No)	Status of handover of plants (Done / Not done / Other)	O&M arrangement of the plant (Who is running the plant?)	Plant functional or not? If functional, mention % utilization	FSSM bye-laws	Desludging fee as fixed in the council approved bye-laws (Rs)	IEC done (Yes/no)
1	Shahjahanpur (FSTP 32 KLD)	Yes	Done	Contractor	20	Sent for Gazette notification	1,000	Yes
2	Raebareli (FSTP 32 KLD)	Yes	Done	SHG	15	Passed by council	1,500	Yes
3	Sitapur (FSTP 32 KLD)	Yes	Done	SHG	10	Passed by council	1,000	Yes
4	Ayodhya (Co-Treatment 25 KLD)	Yes	Done	Old contractor	20	Drafted	NA	No
5	Ayodhya (FSTP 32 KLD)	Yes	Done	Contractor	8	Drafted	NA	No
6	Jaunpur (FSTP 32 KLD)	Yes	Conditional handover done	SHG	10	Passed by council	1,000 and 3,000 (commercial)	Yes
7	Mirzapur (Co-treatment 25 KLD)	Yes	Done	ULB	16	Drafted	NA	Yes
8	Pilibhit (FSTP 32 KLD)	Yes	Done	ULB	5	Passed by council	2,000	No
9	Chunar (FSTP 10 KLD)	Yes	NA for next 4 year	Contractor	100	Gazette notified	500	Yes
10	Jhansi (FSTP 6 KLD)	Yes	Done	Contractor	80	Gazette notified	1,000-0.7KL vehicle, 1,500-2KL vehicle, 3,000-6KL vehicle	No
11	Jhansi (FSTP 12 KLD)	Yes	Done	Contractor	80	Gazette notified	1,000-0.7KL vehicle, 1,500-2KL vehicle, 3,000-6KL vehicle	No
12	Jhansi (FSTP 32 KLD)	Yes	Done	No	Not functional	Gazette notified	1,000-0.7KL vehicle, 1,500-2KL vehicle, 3,000-6KL vehicle	No

Sr. no.	City name	Registration of private desludgers (Newspaper notice, registration) done? (Yes/No)	Status of handover of plants (Done / Not done / Other)	O&M arrangement of the plant (Who is running the plant?)	Plant functional or not? If functional, mention % utilization	FSSM bye-laws	Desludging fee as fixed in the council approved bye-laws (Rs)	IEC done (Yes/no)
13	Amroha (FSTP 32 KLD)	Yes	Done	Contractor	45	Gazette notified	1,500	Yes
14	Saharanpur (Co-treatment, 25 KLD)	Yes	Done	Contractor	90	Published for objections	1,200 for pakka ghar. Various rates for others.	Yes
15	Modinagar (FSTP 32 KLD)	Yes	Done	ULB	25	Published for objections	750 for poor (LIC) and 1,500 for non-poor	Yes
16	Bijnor (Co-treatment 20 KLD)	Yes	Done	ULB	35	Gazette notified	1,500	No
17	Akbarpur (FSTP 32 KLD)	Yes	Done	Contractor	15	Gazette notified	2,000-1,500	No
18	Hapur (FSTP 32 KLD)	Yes	Done	No	25	Passed by council	Various rates	No
19	Farrukhabad (FSTP 32 KLD)	Yes	Done	ULB	15	Drafted	NA	No
20	Etawah (Co-treatment 25 KLD)	Yes	Not done	No	20	Passed by council	3,000	No
21	Lucknow (Co-treatment 100 KLD)	Yes	Not done	No	0	Not drafted	NA	No

Annexure 6: Handover dates and time taken for arrangement of O&M of plants

Sr. no.	City name	Handover date	Date of appointment of responsible authority for O&M
1	Jhansi (32 KLD)	July 2023	Still in process. 1st tender issued in January. Retendering done in first week of March
2	Sitapur	28.03.23	March 2024 - SHG
3	Raebareli	19.10.22	March 2024 - SHG
4	Akbarpur	15.09.23	01.03.24
5	Lucknow	Not done	Not known
6	Farrukhabad	June 2023	June 2023 - ULB
7	Etawah	Not done	NA
8	Mirzapur	26.02.2024	26.02.2024
9	Jaunpur	27.02.2024	March 2024 - SHG
10	Chunar	As per contract, plant is being managed by the UPJN-SMCG	Till 2026
12	Ayodhya 32 kld	2023	January 2024 - Contractor
13	Ayodhya 25 kld	2023	No
14	Pilibhit	30.11.2023	ULB
15	Shahjahanpur	July 2023	July 2023 - Contractor
16	Bijnor	29.08.2022	August 2022
17	Saharanpur	10.8.2023	December 2023 - Contractor
18	Amroha	24.11.2022	November, 2023 - Contractor
19	Modi Nagar	20.12.2022	December 2022 - ULB
20	Hapur	14.06.2023	September 2023 - ULB

Annexure 7: Status of desludging vehicles and registration of private desludgers

ULB name	No. of private operators in the city	No. of registered private operators in the city	No. of privately owned vacuum tankers with capacity	No. of government (ULB) owned vacuum tankers with capacity	No. of government (newly purchased through AMRUT) owned vacuum tankers with capacity
Mirzapur	3	1	5 (3x3KL and 2x5KL)	1 (1x5 KL)	4 (2x4 KL, 2x0.5KL)
Jaunpur	2	1	2 (2x5 KL)	1 (1x3KL)	3 (2x4KL, 1x3KL)
Chunar	0	0	0	1 (1x3.5KL)	0 (not 'AMRUT city')
Pilibhit	2	1	2 (2x5KL)	1 (1x5KL)	3 (2x4KL, 1x3KL)
Ayodhya	7	1	10 (10x4KL)	1 (1x5KL)	3 (2x4KL, 1x3KL)
Farrukhabad	1	1	1 (1x3KL)	2 (2x3KL)	3 (2x4KL, 1x1KL)
Jhansi	1	1	1 (1x 0.7KL)	2 (1x6KL, 1x2KL)	3 (2x4KL, 1x1KL)
Etawah	0	0	0	1 (1x4 KL)	4 (1x1.5KL, 1x2KL, 1x2.5KL, 1x3.5KL)
Shahjahanpur	0	0	0	6 (2x3KL, 2x2KL, 2x1KL)	3 (2x4KL, 1x1.2KL)
Sitapur	0	0	0	1 (1x4KL)	3 (2x4KL, 1x1KL)
Akbarpur	2-3	1	3 (3x5KL)	1 (1x4KL)	3 (2x4KL, 1x1KL)
Raebareli	7	7	7 (7x5KL)	1 (1x4KL)	2 (2x4KL)
Lucknow	60-70	46	56 (56x5KL)	2 (2x5KL)	12 (2x5KL, 5x4KL, 5x0.5KL)
Bijnor	5	5	6 (6x5KL)	2 (1x4KL, 1x2KL)	0 (not 'AMRUT city')
Saharanpur	10	10	10 (10x4KL)	4 (1x3KL, 1x2KL,1x4KL, 1x1KL)	4 (1x4KL, 1x3KL, 2x1KL)
Amroha	2	2	4 (4x4KL)	2 (1x3KL, 1x1KL)	3 (2x4KL, 1x1KL)
Hapur	4	4	6 (6x4KL)	None	3 (2x4KL, 1x1KL)
Modinagar	3	3	3 (3x 4.5 KL)	5 (1x3KL, 1x4KL, 2x0.5KL, 1x4.5KL)	3 (2x4KL, 1x1KL)
Total	**109-120**	**84**	**116**	**34 (2x0.5 KL, 4x1KL, 5x2KL, 8x3KL, 1x3.5KL, 7x4KL, 1x4.5KL, 5x5KL, 1x6KL)**	**60 (7x0.5 KL, 9x1KL, 1x1.2KL,1x1.5KL, 1x2KL, 1x2.5KL, 4x3KL, 1x3.5KL, 32x4KL, 2x5KL)**

Annexure 8: Distance of plants from the cities

Distance	FSTP		Co-treatment plant	
	No.	Name of the plants	No.	Name of the plants
Less than 10 km	11	Chunar, Banda, Farrukhabad, Loni, Modinagar, Raebareli, Bakshi ka talab, Shikohabad, Orai, Moradabad, Amroha, Aligarh, Sitapur, Pilibhit, Fatehpur.	6	Gorakhpur, Prayagraj, Rampur, Muzzafarnagar, Mainpuri.
10–15 kms	23	Jhansi (12 KLD, 6KLD), Unnao, Shahjahanpur, Jaunpur, Hathras, Akbarpur, Baraut, Hapur, Khurja, Shamli, Jhansi (32 KLD), Chandausi, Deoria, Basti, Maunath Bhanjan, Azamgarh, Gonda, Lakhimpur	11	Bulandshahr, Ayodhya, Etawah, Mirzapur, Mathura, Meerut, Varanasi, Lucknow, Kanpur, Sultanpur, Saharanpur, Firozabad
15–20 kms	5	Ayodhya, Bahraich, Hardoi, Lalitpur, Badaun	3	Bijnor, Agra, Ghaziabad
Total	**39**		**20**	

Endnotes and references

1. Anon 2019. *Uttar Pradesh State Septage Management Policy*, Urban Development Department, Government of Uttar Pradesh. Accessed at https://cdn.cseindia.org/attachments/0.35632400_1572954351_Septage-Management-Policy---English.pdf on 27 May 2024

2. Uttar Pradesh initially planned to install 40 FSTPs and 22 co-treatment plants across 59 cities. However, two co-treatment plants and one FSTP were dropped from the plan due to legal and technical reasons. Therefore, currently there is total 59 plants across 56 cities.

3. Sarim Ansari, Pavan Kumar and Jyoti Parsad 2022. *Septage Management for City-Wide Inclusive Sanitation in Uttar Pradesh*, Centre for Science and Environment, New Delhi. Accessed at https://www.cseindia.org/septage-management-for-city-wide-inclusive-sanitation-in-uttar-pradesh-11364 on 24 May 2027

4. Depinder Singh Kapur, Pavan Kumar and Jyoti Parsad 2023. *Operation and Maintenance Cost of Faecal Sludge Treatment Plants in Uttar Pradesh*, Centre for Science and Environment, New Delhi. Accessed at https://www.cseindia.org/operation-maintenance-cost-of-faecal-sludge-treatment-plants-in-uttar-pradesh-11679 on 27 May 2024

5. Anon 2023. *Guidance note on Operation & Maintenance (O&M) of Faecal Sludge Septage Management (FSSM) Projects and Economics of Desludging in UP*, Centre for Science and Environment, New Delhi. Accessed at https://www.cseindia.org/guidance-note-on-operation-maintenance-o-m-of-faecal-sludge-septage-management-fssm-projects-and-economics-of-desludging-in-up-12002 on 27 May 2024

6. Subrata Chakraborty 2024. *Fair price: UP now uses a calculator to scientifically fix fee for transporting faecal sludge to treatment plants*, Down To Earth. Accessed at https://www.downtoearth.org.in/news/water/fair-price-up-now-uses-a-calculator-to-scientifically-fix-fee-for-transporting-faecal-sludge-to-treatment-plants-95615 on 27 May 2024

7. No. SMMU/438/1073/2023 dated 24 November 2023

8. Anon 2023. *Model Contract For Operation and Maintenance of Faecal Sludge Treatment Plants (FSTPs)/Co-treatment Plant and Desludging Vehicles*, Centre for Science and Environment, New Delhi. Accessed at https://www.cseindia.org/model-contract-for-operation-and-maintenance-o-m--11958 on 27 May 2024

9. Anon 2023. *State Model Bye-Laws for Faecal Sludge and Septage Management*, Centre for Science and Environment, New Delhi. Accessed at https://www.cseindia.org/state-model-bye-laws-for-faecal-sludge-and-septage-management-fssm--11956 on 27 May 2024

10. Anon 2023. *Ease of Septage Management*, Centre for Science and Environment, New Delhi. Accessed at https://www.cseindia.org/-esm--11993 on 27 May 2024

11. Depinder Singh Kapur, Subrata Chakraborty and Sarim 2023. *Ease of Septage Management: Performance of 56 towns of Uttar Pradesh*, Centre for Science and Environment, New Delhi. Accessed at https://www.cseindia.org/ease-of-septage-management-11972 on 27 May 2024

12. Depinder Singh Kapur and Hari Prakash Haihyvanshi 2024. *Inclusive Urban Sanitation: Addressing the Desludging Challenges of Naarrow Lanes in Uttar Pradesh*, Centre for Science and Environment, New Delhi. Accessed at https://www.cseindia.org/inclusive-urban-sanitation-addressing-the-desludging-challenges-of-narrow-lanes-in-uttar-pradesh-12063 on 24 May 2024

13. Sunita Narain, Vinod Vijayan et al 2023. *Biosolids: A Report*, Centre for Science and Environment, New Delhi. Accessed at https://www.cseindia.org/biosolids-11713 on 24 May 2024

The report provides a comprehensive overview of the faecal sludge and septage management (FSSM) in Uttar Pradesh. It covers the interventions undertaken by the state, the progress made, and the challenges faced.

The report highlights the shift in focus from construction to operationalization of 59 FSSM plants across 56 cities, emphasizing the importance of policy support, capacity building and community awareness.

The document provides valuable insights and recommendations for sustaining and scaling FSSM services, ensuring they remain affordable and inclusive for households in Uttar Pradesh.

Centre for Science and Environment
41, Tughlakabad Institutional Area, New Delhi 110 062
Phones: 91-11-40616000 Fax: 91-11-29955879
E-mail: cseindia@cseindia.org Website: www.cseindia.org