उत्तराखण्ड शासन

National Institute of Urban Affairs

Sanitation Capacity Building Platform

स्वच्छ भारत
एक कदम स्वच्छता की ओर

FAECAL SLUDGE AND SEPTAGE MANAGEMENT IN UTTARAKHAND

STRATEGY AND INVESTMENT PLAN

SEPTEMBER 2022

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DISCLAIMER

The document has been created for the Government of Uttarakhand by National Instituite of Urban Affairs (NIUA). This document has been finalised after several rounds of consultations and discussions with Urban Development Directorate (UDD), Uttarakhand Urban Sector Development Agency (UUSDA), Peyjal Nigam and Jal Sansthan.

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GLOSSARY

AFD	:	French Development Agency
AMRUT	:	Atal Mission for Rejuvenation and Urban Transformation
CWIS	:	Citywide Inclusive Sanitation
DPR	:	Detailed Project Report
DSMC	:	District Level Septage Monitoring Committee
E&T	:	Emptying & Transportation
FSS	:	Faecal Sludge and Septage
FSSM	:	Faecal Sludge and Septage Management
FSTP	:	Faecal Sludge Treatment Plant
FC-XV	:	15th Finance Commission
HRT	:	Hydraulic Retention Time
IEC	:	Information, Education and Communication
IHHL	:	Individual Household Latrine
IS code	:	Indian standard code
KL	:	Kilo Litre
KLD	:	Kilo Litre per Day
MoHUA	:	Ministry of Housing and Urban Affairs
NIUA	:	National Institute of Urban Affairs
NMCG	:	National Mission for Clean Ganga
ODF	:	Open Defecation Free
O&M	:	Operation and Maintenance
OSS	:	On-Site Sanitation
SBM	:	Swachh Bharat Mission
SBCC	:	Social Behavior Change Communication
SDG	:	Sustainable Development Goal
SMC	:	Septage Management Cell
SSMC	:	State-level Septage Management Committee
STP	:	Sewage Treatment Plant
The Bank	:	Asian Development Bank
UDD	:	Urban Development Department
ULB	:	Urban Local Body
UUSDA	:	Uttarakhand Urban Sector Development Agency
UUSDIP	:	Uttarakhand Urban Sector Development Investment Program

EXECUTIVE SUMMARY

WHY A STATE FSSM STRATEGY AND INVESTMENT PLAN?

The pristine natural beauty and cultural-religious tourism of Uttarakhand state require urgent action to address the septage management challenge, given that about 80% of the urban population is dependent on On-Site Sanitation (OSS) systems.

The state has shown commendable initiative in this direction by launching the Septage Management Protocol 2017, achieving ODF status for the state in 2018, and prioritizing all the Ganga Towns to treat their faecal waste under National Mission for Clean Ganga (NMCG). The state has also committed to moving towards Citywide Inclusive Sanitation (CWIS) by integrating co-treatment of septage with sewage in all its Sewage Treatment Plants (STPs). The first Faecal Sludge Treatment Plant (FSTP) for a cluster of towns is coming up at Rudrapur town, Udham Singh Nagar district.

The document provides a strategy for addressing the faecal sludge and septage management (FSSM) challenge in the state, given its peculiar urban and rural mountain demography and existing sanitation infrastructure. The strategy includes:

- Priority interventions for septage management, with cluster-level approach
- Phase-wise plan for septage management in three different phases
- Requirement of budget for septage management for all the cities.

Priority interventions of septage management include:

- Enabling co-treatment of septage with sewage in all existing and upcoming STPs as the priority, as a CWIS priority to cater to 100% sanitation coverage
- Setting up of STP-cum-FSTP where sewerage is not likely to come up in a short time and also for towns where these are needed in addition to existing STPs to ensure CWIS
- Meanwhile, land application of Faecal Sludge and Septage as an interim measure for small and medium-sized towns with very little sludge collection.

State Investment Plan- Implementation phases are:

- First Phase: **Proof-of-concept phase in** larger towns and cities with existing or proposed STPs/FSTPs. Adopting a cluster approach of clubbing towns within a 25km radius from a treatment facility
- Second Phase: **Upscaling phase;** more towns with existing and proposed STPs and FSTPs. Priority to cultural and religious tourism towns as well
- Third phase: **Closure phase;** for 100% FSSM for the state. All towns that are remaining. Primarily covers very small towns and expanding peri-urban areas of large towns.

Considerations for budgeting:

- Co-treatment: per KL cost, fixed cost, centages cost
- FSTP: per KL cost, fixed cost, centages cost
- Land Application: DRE CAPEX and OPEX costs

State Investment Plan for Faecal Sludge and Septage Management

Phase	Timeline	No. of Co-Treatment facilities	No. of FSTPs	Total Costing (in lakhs)	No. of Host/ Standalone ULBs	No. of cluster ULBs
I	1-2 Year	07	01	2016	Host ULBs: 7 Standalone ULBs: 1	25
II	2-3 Year	14	10	11556	Host ULBs: 10 Standalone ULBs: 14	22
III	3-4 Year	0	16	6105	Host ULBs: 7 Standalone ULBs: 09	08

Phase	Investment [crore]	Septage Managed [MLD]	Cost per KLD [lakh INR]
I	Rs. 18.32	0.74	Rs. 2.48
II	Rs. 105.05	1.51	Rs. 6.98
III	Rs. 55.50	0.33	Rs. 16.82

The first phase has the lowest per KLD cost for treatment, proving that co-treatment is the most viable treatment solution for the state. The state's second-best option is the integration of co-treatment and FSTP, which is in the second phase. The final phase has the highest per KLD cost with only FSTPs as the treatment option.

Risks and challenges:
Given the mountain topography and the Terai region, the sludge and septage management technology options have to consider cold weather and challenges in desludging from difficult slopes. Necessitating hybrid mechanical solutions for treatment and more expensive desludging operations covering longer distances.

This strategy document also explores various Emptying and Transportation (E&T) financial models from experiences across the country and proposes options appropriate for Uttarakhand context.

For successful implementation of FSSM, an effective Information, Education and Communication (IEC) campaign has to be rolled out in cities across the state. The IEC campaign should raise public awareness of the FSSM sanitation service chain beyond the construction of toilets and ODF. The campaign should motivate households to construct properly designed OSS and ensure it is properly maintained and emptied regularly by authorized operators.

1. BACKGROUND

1.1 WHY FAECAL SLUDGE AND SEPTAGE MANAGEMENT (FSSM) IS IMPORTANT?

India was declared open defecation free on October 2019 with close to 100 million toilets constructed under the Swachh Bharat Mission (SBM). Majority of these toilets do not have access to a sewerage network and are dependent upon onsite sanitation systems.

The Faecal Sludge and Septage generated by these onsite systems are significantly more concentrated than sewage and has to be periodically emptied and treated before discharging into the environment. A safe FSSM value chain involves safe containment, emptying, transportation, and treatment of faecal sludge and septage. City-level sanitation studies conducted by the National Institute of Urban Affairs (NIUA, 2019) show that the majority of the septic tanks are not designed as per Indian standard code (IS Code 2470- Part 2 1985) of practice for installation of septic tanks. The septic tanks are not regularly emptied and majority of the cities lack safe disposal/treatment facilities. Regular desludging of septic tanks helps maintain their treatment efficiency; the accumulated sludge occupies volume in the tank, thereby decreasing the Hydraulic Retention time (HRT). This lack of safe FSSM leads to contamination of water bodies and deteriorates the public health situation of the city.

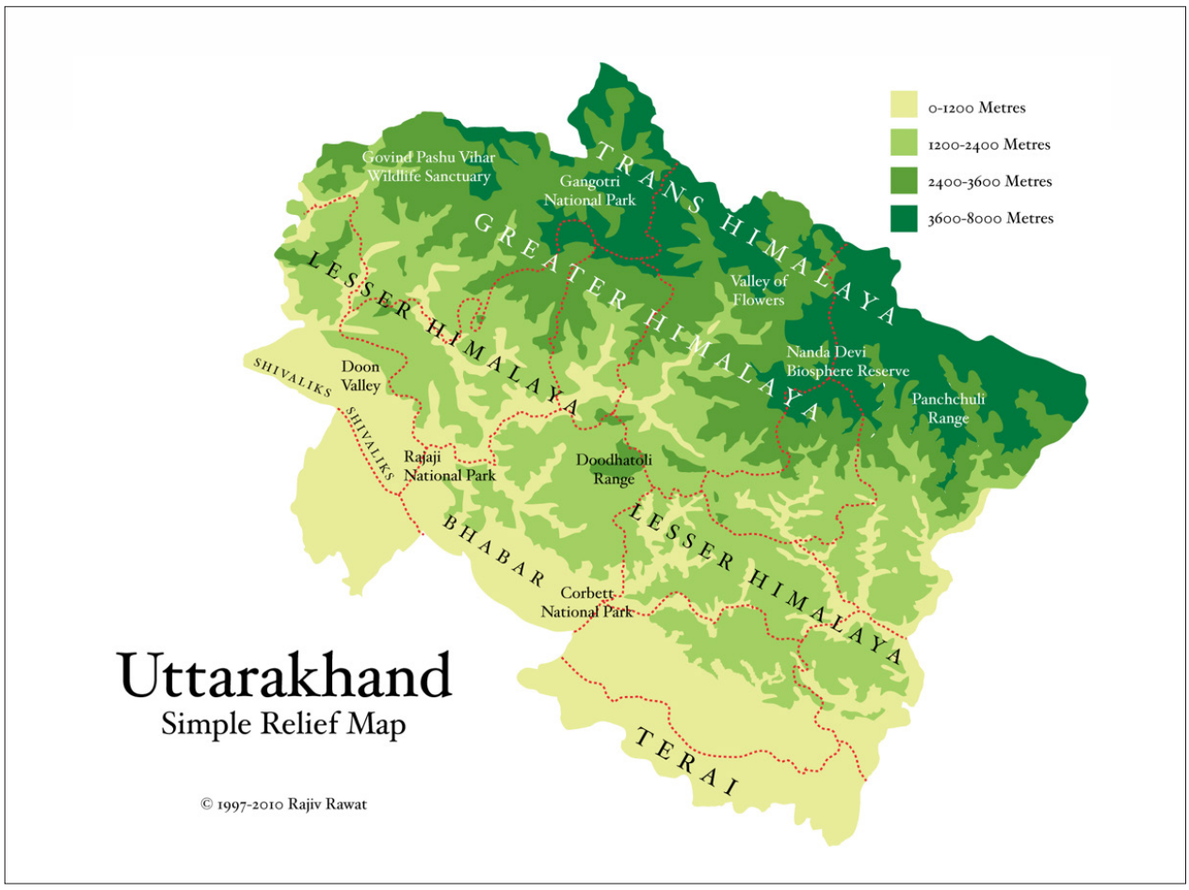
The Ministry of Housing and Urban Affairs (MoHUA) released the National FSSM Policy in 2017. The key objective of the policy is to set the context priorities and direction for states and cities in implementing effective FSSM interventions across the value chain. Even through the AMRUT mission and Swachh Survekshan, the Ministry has given regular push for implementing FSSM for city-wide sanitation. The announcements of SBM 2.0, AMRUT 2.0, 15th Finance Commission has also given a special emphasis on implementing effective FSSM in cities across the country. It is imperative now for the state and cities to strategize and scale-up interventions in FSSM.

1.2 STATE PROFILE

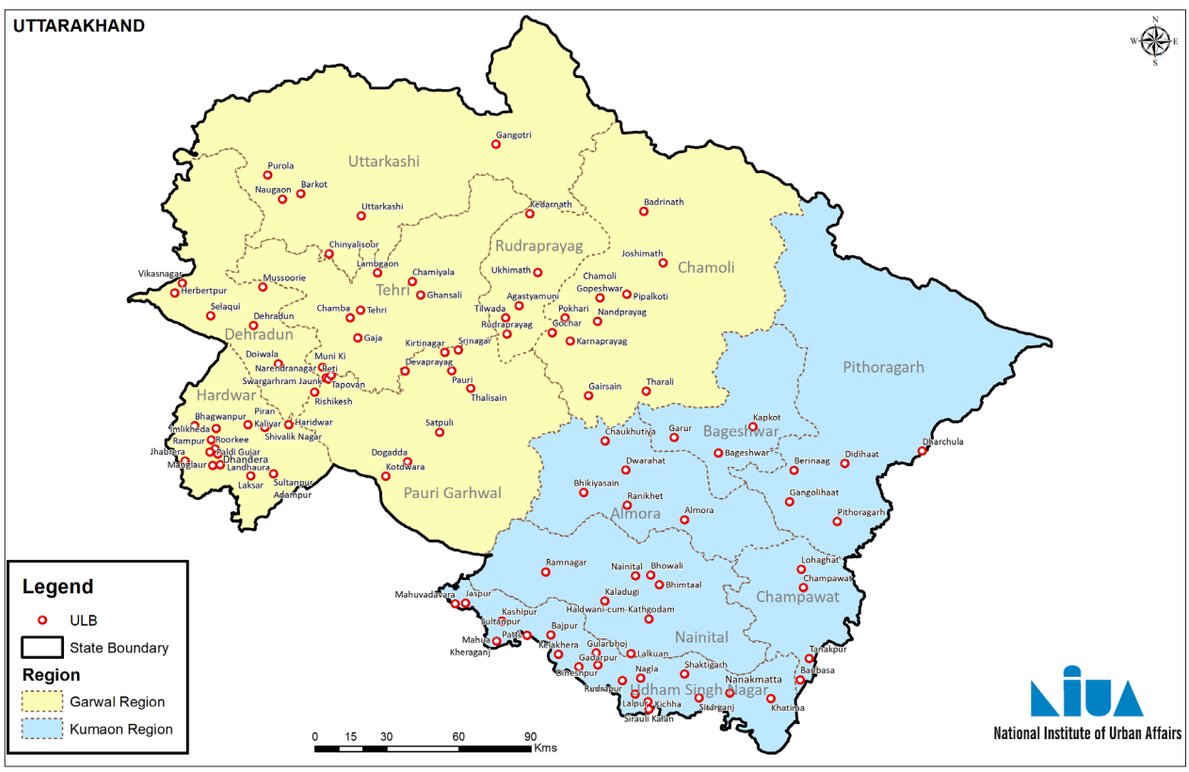
Uttarakhand is largely a hilly state located in northern India with rich natural resources including many glaciers, snow-clad mountain peaks, rivers, and dense forests. Dehradun is the winter capital of the state and Gairsain is the summer capital with most of the administrative offices located in the former.

Geographically, Uttarakhand can be divided into 5 zones: the Terai, the Doons, the Lesser Himalayas, the Greater Himalayas, and the Trans Himalayas *(Refer map 1.1)*. Accessibility becomes a concern in the state as most of the roads are steep and narrow. Administratively, the state comprises of 2 regions and 13 districts with the Garhwal Region consisting of 7 districts and Kumaon Region with 6 districts. *(Refer map 1.2)*

Map: 1.1 Topography Map of Uttarakhand



Map 1.2 Administrative Map of Uttarakhand



Uttarakhand has a total urban population of 36.6 Lakhs with around 80% dependent upon OSS systems.[1]

Table 1.1 Status of Urban Local Bodies, Uttarakhand

Total Urban Local Bodies (ULB)	103
Nagar Nigam	09
Nagar Palika Parishad	41
Nagar Panchayat	53

**Source: Official website of Urban Development Directorate, Uttarakhand (Refer annexure 1)*

The state witnesses a large floating population because of the religious tourism due to the presence of pilgrimage sites at Badrinath, Kedarnath, Gangotri and Yamunotri as well as in Haridwar, due to the presence of the holy river Ganga. Other tourist cities like Mussoorie, Nainital, Rishikesh, etc add to the tourist attraction in the state.

2. AIM & OBJECTIVES

- To achieve Citywide Inclusive Sanitation (CWIS), an approach that promotes planning & implementing urban sanitation systems to achieve outcomes of SDG 6: Ensure availability and sustainable management of water and sanitation for all

- To develop a strategy for hundred percent safe management of septage and faecal sludge across all ULBs of Uttarakhand in line with new missions and their guidelines.

1 *(Urban Local Bodies, 2020)*

3. STATUS OF SANITATION IN THE STATE, UTTARKHAND

3.1 ONSITE/OFFSITE SANITATION STATUS IN THE STATE

According to Census 2011, more than 94% of the households in urban Uttarakhand have access to Individual Household Latrine (IHHL) and less than 5% are dependent on community toilets or public toilets. As per data from state officials, 22 out of the 103 ULBs in the state have access to a sewerage network, but only 6 ULBs have a sewerage network coverage which is more than 50%. However, the hilly topography of the state poses technical and economic challenges in retrofitting an entire city for laying a sewerage network, achieving 100% access to sewerage network is very difficult. This highlights the need for implementing faecal sludge and septage management, whether city-wide or gap filling, and is necessary to ensure safe sanitation in cities across the state.

As per a study conducted by NIUA (2020) for situational assessment of sanitation in nine cities in the state of Uttarakhand, the following observations were reported regarding management of septage:

- Majority of the septic tanks do not conform to the design prescribed by IS code 2470 for installation of septic tank systems; therefore, for the purposes of this report, rudimentary designed septic tank, fully lined tanks and other systems are hereafter referred as septic tank only
- The emptying period of septic tanks is in the range of 5 to 10 years which is not as per the SBM guidelines of ODF++ Protocol 2020
- Most cities lack treatment facilities and safe septage disposal provisions.

Many urban habitation in the State discharge wastewater i.e. greywater and septic effluent into open drain 'nullahs', which is designed to convey stormwater to the river or any water body. **National Mission for Clean Ganga (NMCG)** has recognized this problem as a source of river pollution and are implementing interception and treatment of open drains (nullahs) before disposal of wastewater into the river.

3.2 TREATMENT FACILITY

Table 3.1 Status of treatment facilities, Uttarakhand[2]

Sl. No.	Status of Facility	No. of facilities	No. of ULBs served	Treatment Capacity (MLD)	Utilised Capacity (MLD)
1	Operational	66	25	397.5	244
2	Under Construction	06	06	52.27	-
3	Tendering Stage	02	02	20.5	-
4	DPR prepared/ Proposed	13	10	157.8	-
	Total	**87**	**34**	**628.07**	**244**

(Refer annexure 2)

3.3 SEPTAGE MANAGEMENT PROTOCOL IN UTTARAKHAND[3]

The 'Protocol for Septage Management' was issued by Urban Development Department (UDD), Government of Uttarakhand in 2017. This protocol provides a framework for effective Septage Management in Uttarakhand. The purpose and scope of this protocol are:

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2 (Urban Local Bodies, 2020)

[3] (Uttarakhand, 2017)

- To provide a regulatory framework for construction, routine maintenance of septic tanks & bio digesters, transportation, treatment & safe disposal of septage
- To prescribe the actions to be taken by the owners of the premises connected to septic tanks/bio-digesters & septage transporters to ensure compliance with their obligations
- To provide for appropriate inspection & enforcement mechanisms
- To ensure cost recovery on a sustainable basis for proper septage management
- To facilitate participation of private & non-government sector in septage management
- The protocol prescribes the formations of the following committees for effective planning, implementation and monitoring of Septage Management in a city:
    - Monitoring Committee to be set-up under the chairmanship of District Magistrate i.e. District Level Septage Monitoring Committee (DSMC).
    - Septage Management Cell (SMC) at city-level under the Chairmanship of Municipal Commissioner / Sub-Divisional Magistrate (SDM).

A State-level Septage Management Committee (SSMC) has already been established to help guide ULBs in mainstreaming effective Septage Management. Out of 103 ULBs, 93 ULBs have formed an SMC in their respective cities as of July 2022. After the creation of the respective committees, the Protocol prescribes the following actions to be taken in the cities for effective Septage Management:

1. Preparation of Septage Management Bye-laws by individual ULBs and getting them notified
2. Identification of septic tanks in the city
3. Developing infrastructure for effective septage management:
    a. Regular emptying of septic tanks
    b. Safe emptying and transportation of septage
    c. Treatment and safe disposal/reuse of septage
4. IEC And Capacity Building for effective septage management.

3.4 UPCOMING & ONGOING INITIATIVES IN THE STATE

Various important agencies/programs work in collaboration with the state government to upscale safe sanitation in the state. The important ongoing initiatives are detailed out below:

A. **National Mission for Clean Ganga (NMCG)**[4] a flagship program by the Union Government launched in June 2014, constituted for effective abatement of pollution and rejuvenation, protection and management of the River Ganga and its tributaries. Under this mission, no untreated municipal sewage and industrial effluent is to be discharged into the River Ganga.

Major ongoing projects and number of towns covered under each project are:

1. Interception & Diversion, Creation of STP, Laying of Sewer Lines: **16 towns**
2. Upgradation of STP, Restoration, and Reconstruction of Sewerage Schemes: **8 towns**
3. Co-treatment (Sludge Management Plant): **1 town**

These projects are spread across the following towns of Uttarakhand: Badrinath, Chamoli- Gopeshwar, Dehradun, Devprayag, Gangotri, Haridwar, Joshimath, Karnaprayag, Kirtinagar, Muni Ki Reti, Nandaprayag, Ramnagar, Rishikesh, Rudraprayag, Srinagar, Swargashram, Tapovan, Uttarkashi & Udham Singh Nagar.

[4] *(NMCG, 2021)*

The detailed project status and project cost as of July 2022 for the state is mentioned in the tables that follow:

Table 3.2 Status of Projects under NMCG, Uttarakhand

Name of State	No. of works taken up	Completed	Under Progress	STP Capacity to be created (in MLD)	STP Capacity created (in MLD)	Sewer network to be laid (in Km)	Sewer network laid (in Km)
Uttarakhand	39	33	06	195.34	161.80	184.33	169.61

Table 3.3 Project Cost as of July 2022 NMCG, Uttarakhand

Name of State	Approved Project Cost (Rs. in Cr)	Awarded Cost (Rs. in Cr)	Funds Released by GoI & State Share (Rs. in Cr)	Total Expenditure Incurred GoI & State Share (Rs. in Cr)
Uttarakhand	1406.03	1031.61	683.85	683.85

B. **Atal Mission for Rejuvenation and Urban Transformation (AMRUT)**[5] aims at providing basic services i.e., water supply, sewerage, storm water drainage, urban transport & green spaces/parks and build amenities in cities which will improve the quality of life for all. The priority zone of the Mission is water supply, followed by sewerage.

There are 7 mission cities of AMRUT in Uttarakhand, which are Dehradun, Haldwani, Haridwar, Kashipur, Nainital, Roorkee, and Rudrapur. The ongoing sanitation/ sewerage related projects under AMRUT being implemented in the state include:

1. A **3MLD wastewater treatment plant**, proposed at Kaulagarh Dehradun
2. A **28MLD wastewater treatment plant**, proposed at Haldwani
3. **Laying of sewer lines**, completed at Haridwar
4. An **18MLD wastewater treatment plant** with co-treatment facility for septage, under-construction in Kashipur
5. A **0.45MLD wastewater treatment plant**, proposed at Nainital
6. A **125KLD FSTP**, under-construction at Rudrapur.

Fund availability for sewerage & septage under AMRUT is mentioned in the table below:

Table 3.4 Availability of funds under AMRUT, Uttarakhand

Total Funds in AMRUT for the State Uttarakhand 593.02 Cr (100%)				
Services	**Water Supply**	**Sewerage & Septage**	**Drainage**	**Green Spaces/Parks**
Funds Awarded	314.3 Cr	225.34 cr	38.54 Cr	14.82 cr
Share (%) of Total	53%	38%	6.5%	2.5%

All ongoing projects under AMRUT are due for completion by the year 2022.

[5] *(AMRUT Cell, 2021)*

C. **Uttarakhand Urban Sector Development Agency (UUSDA)**[6] aims to make significant contributions to the urban infrastructure development of the state. Uttarakhand Urban Sector Development Investment Program (UUSDIP) is an Asian Development Bank (the Bank) assisted program of UUSDA, under Multi Tranche Financing Facility (MFF) concieved to support the Government of India (GoI) and Government of Uttarakhand.

1. Under the Bank assisted UUSDIP, the following projects are being implemented: Laying sewer lines and construction of 68MLD wastewater treatment plant, completed in Dehradun
2. An 11MLD wastewater treatment plant, proposed at Banjarawala, Dehradun
3. An 18MLD wastewater treatment plant with co-treatment facility for septage, planned in Raipur Dehradun
4. Restoration and reconstruction of sewerage lines and a 17.5MLD wastewater treatment plant, proposed at Nainital
5. Two wastewater treatment plants with capacities 33.5MLD and 15MLD, proposed at Roorkee. The former has been executed and is operational at present
6. Two wastewater treatment plants with capacities 18MLD and 14MLD, proposed at Kotdwar
7. A 38MLD wastewater treatment plant, proposed at Haldwani
8. A 7MLD wastewater treatment plant, operational at Ramnagar.

Investment from the Bank to UUSDA is planned in phases. The financing plan for UUSDIP in Phase 1 is summarised below:

Table 3.5 Finance by the Bank for UUSDIP in Phase 1, Uttarakhand

Financing Source	Total ($million)	Share (%) of Total	Waste Water Management Share
India	150	30	77.2 $million out of the total 500 $million (15.4% Share)
The Bank	350	70	
Total	500	100	

**Source: Official website of Uttarakhand Urban Sector Development Agency, Uttarakhand*

Three cities are covered in the first phase in terms of wastewater management namely, Dehradun, Nainital and Roorkee. Tendering for $150million fund from the Bank in the second phase is under process and the remaining cities shall be covered in the second phase.

Additionally, funding of three cities **Doiwala, Vikasnagar & Pithoragarh** are being considered through funding from French Development Agency (AFD), the proposal for which is under preparation by UUSDA.

D. **Swachh Bharat Mission-Urban 2.0**[7] SBM- U was launched on 2nd October 2014 aimed at making urban India free from open defecation. Funding provided under this mission was for providing access to toilets. As per the SBM statistics, around 95% urban Uttarakhand has reached ODF status. The toilets constructed under SBM are mostly connected to septic tanks, even bio digesters are installed instead of septic tanks to cater to black water. The mission encouraged onsite sanitation systems but did not have any provision for its treatment.

In the **SBM-U 2.0** launched on October 2021, the government is trying to address all aspects under SBM including safe containment, transportation, disposal of faecal sludge, and septage from toilets. This

[6] *(UUSDA, 2021)*

[7] *(MoHUA, 2021)*

will be a continuation of SBM-U with a new component added for funding and implementation, i.e., wastewater treatment, including faecal sludge management in all ULBs with less than 1 lakh population. It will be implemented over five years, from 2021 to 2026, with an outlay of Rs. 1,41,600 crore. The fund sharing pattern between the Centre and State will be 90:10 for Uttarakhand as it is a Himalayan State.

Investments for septage management for cities with less than 1 lakh population not falling in any other scheme/programme can be done through SBM 2.0.

E. **15th Finance Commission (2021-22 to 2025-26)**[8] Finance Commission is a constitutionally mandated body that is at the centre of fiscal federalism. The 15th Finance Commission (FC-XV) was constituted on 27th Nov 2017. For the period of 2021-22 to 2025-26, the Commission has considered proposing measurable performance-based incentives for states at appropriate levels of government. This includes progress to be made in solid waste management and sanitation to attain star rating as developed by MoHUA. Uttarakhand is to receive Rs. 1600 crore over a period of 5 years, of which 60% of the grant are tied grants, and 40% are untied grants Out of the 60% of the tied grants, 30% to be disbursed to urban local bodies shall be earmarked for management of household waste, in particular human excreta and faecal sludge. The table below shows year-wise distribution of state-specific grant:

Table 3.6 Year-wise distribution of State-specific Grant, Uttarakhand

State	2021-22	2022-23	2023-24	2024-25	2025-26	Total
Uttarakhand	0	320 cr.	320 cr.	480 cr.	480 cr.	1600 cr.

No grant is to be issued in the first year. Investments for FSSM for cities with less than 10 lakh population not falling in any other scheme/programme can be done through FC-XV.

F. **AMRUT 2.0:** Government of India is launching the AMRUT 2.0 with the aim of universal water supply, as well as 100% treatment of sewage and faecal sludge/septage in 500 AMRUT cities to be implemented over 5 years, with an outlay of Rs. 2,87,000 crores. Under this project, the union government will provide 90% share (owing to the hilly state status of Uttarakhand) for the projects of wastewater management, including FSSM in 7 AMRUT towns of the state.

[8] *(Commission, 2021-26)*

4. STRATEGY FOR SCALING UP FSSM IN THE STATE

4.1 APPROACH AND METHODOLOGY FOR PHASE-WISE IMPLEMENTATION OF FSS TREATMENT FACILITIES

In order to scale up safe disposal and reuse of septage, a cluster-based approach is proposed. This approach ensures optimal utilization of resources. Clusters are formed considering a road distance of 25km as recommended by the Uttarakhand Septage Management Protocol.

In order to cover all 103 cities in the state, phasing has been considered based on the following approaches:

- The base year considered here is 2025 and the design year considered is 2040 (Acc. to SBM 2.0 guidelines)
- Septage collection method* is the rationale for arriving at the capacities required in each cluster *(Refer annexure 3 for details of criteria considered for arriving at per KLD septage collection)*
- Desludging frequency considered is 3 years, according to ODF++ protocol
- Priority has been given for co-treatment of FSS in STPs
- Priority is to cover major urban agglomerations and important towns with high onsite dependency
- Faecal Sludge Treatment Plant (FSTP) / Septage Treatment Plant (SeTP) proposed for cities where there are no existing STPs or the existing STPs lack capacity to treat FSS
- For smaller cities or clusters with less than 10KLD septage collection, land application to be explored (*Refer State Advisory on Operationalising Septage Management Protocol*).

For designs related to co-treatment of FSS in STP and standalone FSTP, the following guidebooks may be followed:

- Co-treatment of septage at STP GuidebooK VOL I - VOL II
- Co-treatment Feasibility Report
- FSTP Design Modules: 3A, 3B, 3C

4.2 DETAILS OF PHASING FOR IMPLEMENTATION OF STATE-WIDE FSSM

PHASE I: This phase includes cities where proposal for treatment of FSS have been initiated as of January 2021. The target date of operationalizing facility for treatment of FSS is up to 1-2 years.

Total Cities covered in Phase I: 33

- Host cities where facilities are being created for treatment of FSS: 08
- Cities within 25km road distance for host cities covered through clustering: 25

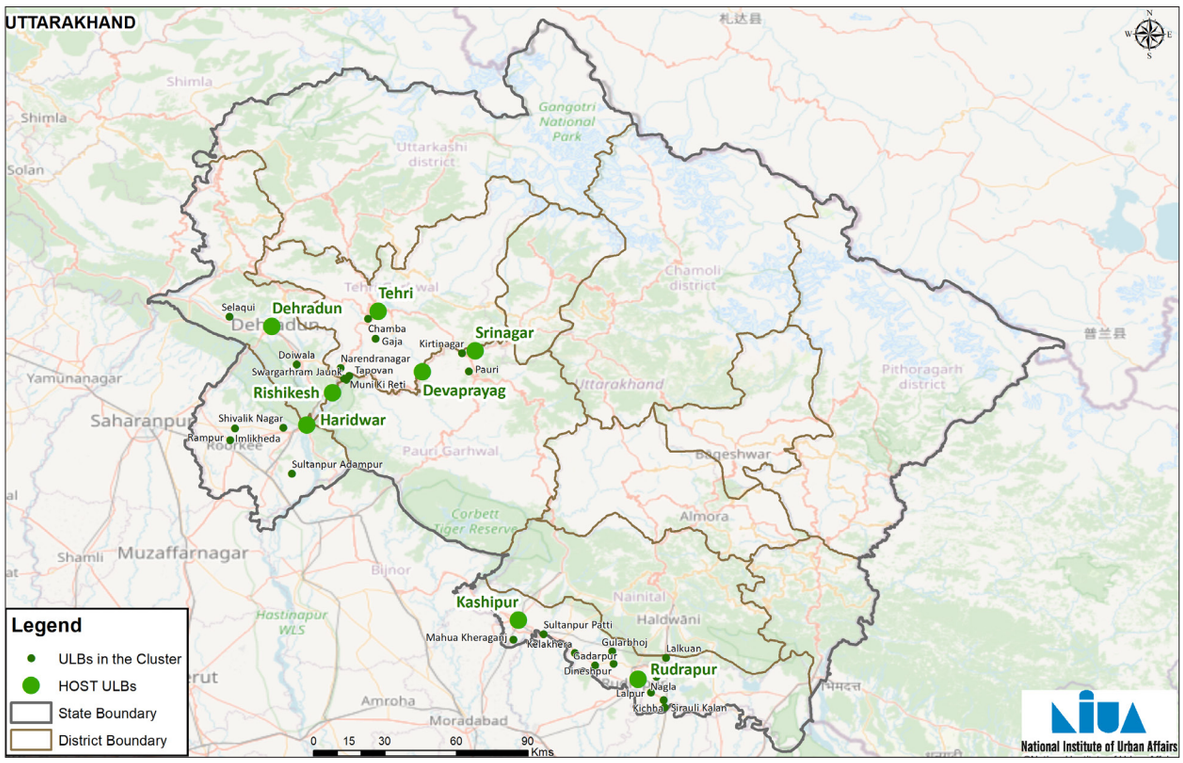
Facilities proposed for implementation in Phase I:

- Faecal Sludge Treatment Plants (FSTP) – 01
- Facility for Co-Treatment of Faecal Sludge in STPs – 07

Co-treatment of FSS in operational/under-construction STPs proposed in **Dehradun, Devprayag, Haridwar, Kashipur, Rishikesh, Srinagar and Tehri. An FSTP cluster is proposed in the under-construction Rudrapur FSTP.** *(Refer annexure 4 for details of cities covered in this phase)*

**For clusters with high design capacities based on Septage collection at Design year, septage efficiency is considered to arrive at a realistic design capacity*

Map 4.1 ULBs Covered in Phase I



PHASE II: This phase includes cities where STPs are either operational, under-construction or at proposal stage. The focus shall be to include co-treatment of faecal sludge in these STPs.

This phase shall also include cities without STPs which include:

- Major urban agglomerations with high dependence upon OSS systems
- Important cities with respect to tourism or administration like Kedarnath, Ukhimath and Gairsain.

The target date for operationalization of treatment facilities in Phase II is 2-3 years.

Total Cities covered in Phase II: 46

- Host cities where facilities are being created for treatment of FSS: 24
- Cities within 25km road distance for host cities covered through clustering: 22

Facilities proposed for implementation in Phase II:

- Faecal Sludge Treatment Plants (FSTP) – 10
- Facility for Co-Treatment of Faecal Sludge in STPs – 14

(Refer annexure 5 for details of cities covered in this phase)

Map 4.2 ULBs Covered in Phase II

PHASE III: Under this phase, it is proposed that septage generated by ULBs will be treated at ULBs without existing/ proposed treatment facility. These cities are mostly stand-alone cities that don't fall in any clusters formed in Phases I and II because they do not fall in the 25km road distance criteria. Therefore, clusters are developed around non-STP cities. For a cluster the larger city is considered as host.

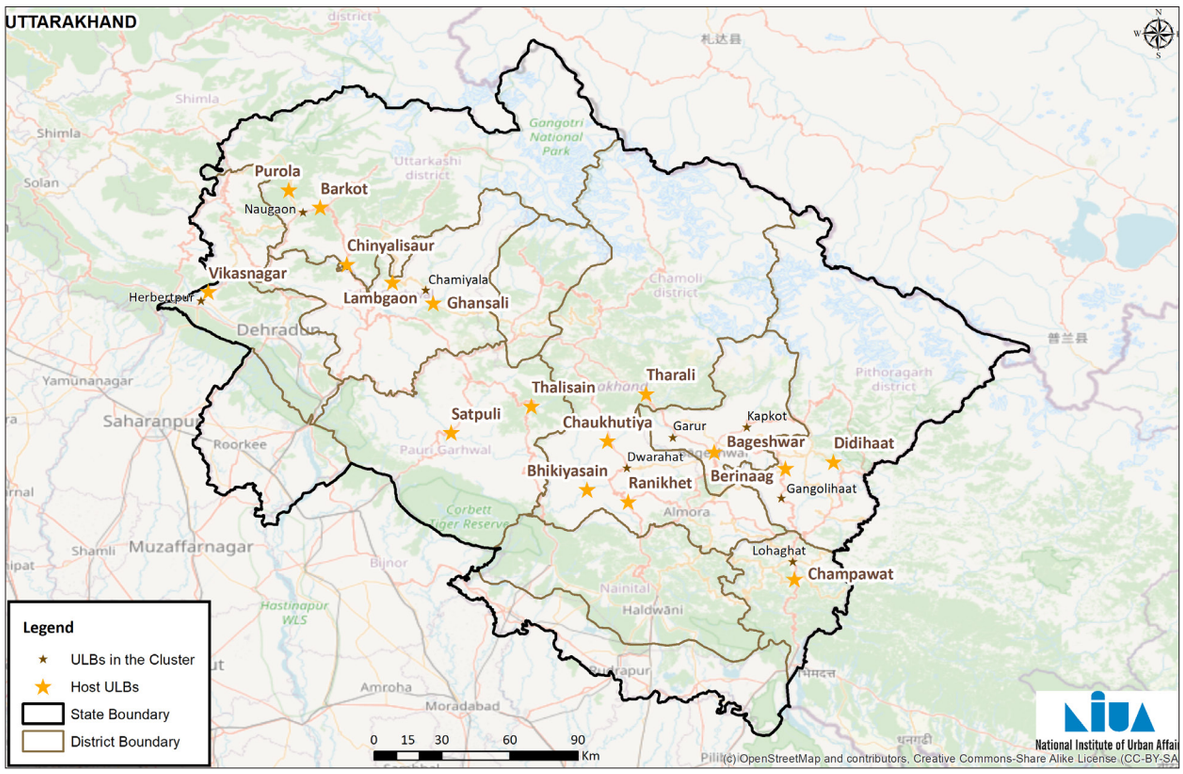
This phase would include smaller ULBs which do not have any existing or proposed STP or FSTP within 25km road distance.

The target date for operationalization of treatment facilities in Phase III is 3-4 years

Total ULBs covered in Phase III: 24

- Host ULBs for FSTP is 16 (including 09 standalone FSTPs)
  Cities within 25km road distance for host cities covered through clustering: 08
  This phase would include standalone as well as cluster FSTPs. Alternative treatment solution including land application to be explored as an interim solution for ULBs or clusters with septage collection less than 10KLD *(Refer annexure 6 for details of cities covered in this phase)*

Map 4.3 ULBs Covered in Phase III



4.3 SUMMARY OF THE PHASES

Table 4.1 Summary of Phases, Uttarakhand State

Phase	% of ULBs covered	Cities Covered	Treatment Facilities*	Timeline	Remarks
I	32%	Host: 08 Cluster: 25	FSTP: 01 Co-Treatment: 07	1-2 years	Proposals for 04 cities- Devprayag, Haridwar, Rishikeah & Srinagar approved by NMCG and plants at Kashipur and Rudrapur are under-construction- as of June 2022.
II	45%	Host: 24 Cluster: 22	FSTP: 10 Co-Treatment: 14	2-3 years	Cities with existing STPs and under-construction FSTPs. Major urban agglomerations and important cities are also covered .
II	23%	Host: 16 Cluster: 08	FSTP: 16 Co-Treatment: 0	3-4 years	Smaller ULBs with no STPs to explore land application as an interim solution

**Requirement of treatment facilities assessed based on population of design year 2040. Field assessment would be needed before finalizing the proposals.*

- 21 cities are covered through co-treatment and additional 27 cities are covered through clustering around the co-treatment facilities
- 27 cities are covered through FSTPs and additional 28 cities are covered through clustering around these FSTPs.

Map 4.4 ULBs Covered through all three Phases

5. FINANCIAL MODELS FOR FSSM

5.1 EMPTYING AND TRANSPORTATION OF FAECAL SLUDGE IN UTTARAKHAND

As discussed in section 3.1, majority of the ULBs in Uttarakhand are dependent on OSS systems. Out of 103 ULBs, 81 ULBs have no sewerage network and 22 ULBs are only partially covered with sewerage network. This makes E&T part of FSSM value chain very crucial and cost intensive in the state.

As mentioned in section 1.1, the average interval between successive desludging for an OSS is years apart across the state and this adds another challenging aspect to marketing the service. While promoting the business is difficult, there is no settled client base, and actual operations are even more challenging due to physical risks during emptying, lack of a designated disposal location, unstructured working hours, and small profit margins. Since the state has become ODF as a result of SBM, the need for mechanical emptying of pits has grown severalfold across Uttarakhand. City-level sanitation studies conducted by NIUA (2019) shows that the affordability and ability to empty an OSS is a key concern for households, and it influences their toilet-use behaviours.

5.2 EXISTING E&T PRACTICES IN UTTARAKHAND

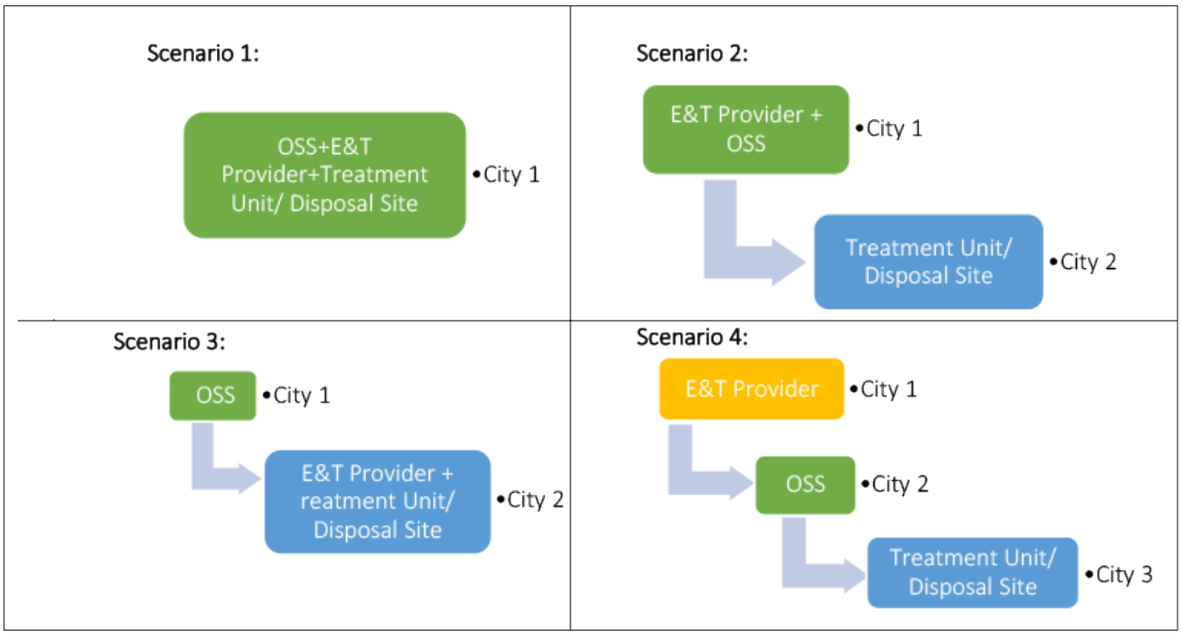
At present, E&T is completely demand-driven in all the ULBs of the state including 09 municipal corporations. The table below shows the dependency on private sector for E&T within state is very high as 18 ULBs are completely dependent on private desludging operators and there are 55 ULBs which are dependent on desludging vehicles from other ULBs as there are no public owned or private E&T providers in these ULBs. Also, there are no desludging vehicles in any of the ULBs of Bageshwar and Rudraprayag districts as of date.

Table 5.1 Types of E&T Providers, Uttarakhand

S. No.	Districts	No. of ULBs with STVs				Total No. of ULBs
		Public Only	Private only	Both	None	
1	Almora	2	0	0	3	5
2	Bageshwar	0	0	0	3	3
3	Chamoli- Gopeshwar	2	1	0	7	10
4	Champawat	3	1	0	0	4
5	Dehradun	2	1	4	0	7
6	Garhwal	2	2	0	3	7
7	Haridwar	0	4	1	9	14
8	Nainital	2	1	0	4	7
9	Pithoragarh	1	1	0	3	5
10	Rudraprayag	0	0	0	5	5
11	Tehri	4	1	1	5	11
12	Udham Singh Nagar	5	3	0	11	19
13	Uttarkashi	1	3	0	2	6
Total		24	18	6	55	103

In many cases it has been found that these private E&T service provider operate in manners explained in the figure below:

Figure 5.1 Existing E&T Practices, Uttarakhand



The above situations result in increased to and fro trip length for E&T providers and thus result in higher desludging charges. In FSSM, the household is willing to pay for E&T services only during an emergency situation (toilet blockage, tank overflow, odour, etc.).

Another challenge added to the entire situation is informal operation of private E&T providers and irregular market. Until Septage Management Protocol was issued by Uttarakhand government in 2017, all the private E&T providers were functioning without any licence/registration by the ULB. Now, many ULBs have made it compulsory for private E&T providers to register themselves with the ULB, but the gap still remains significant *(Refer State Advisory on Operationalising Septage Management Protocol)*.

Lack of treatment facilities created a practice of illegal and unsafe disposal of faecal sludge in open fields, drains, water bodies, etc.

5.3 EMPTYING AND TRANSPORTATION FINANCIAL MODEL-TYPES

Discussed below are some of the most common financial models focussing mainly on E&T having different business propositions:

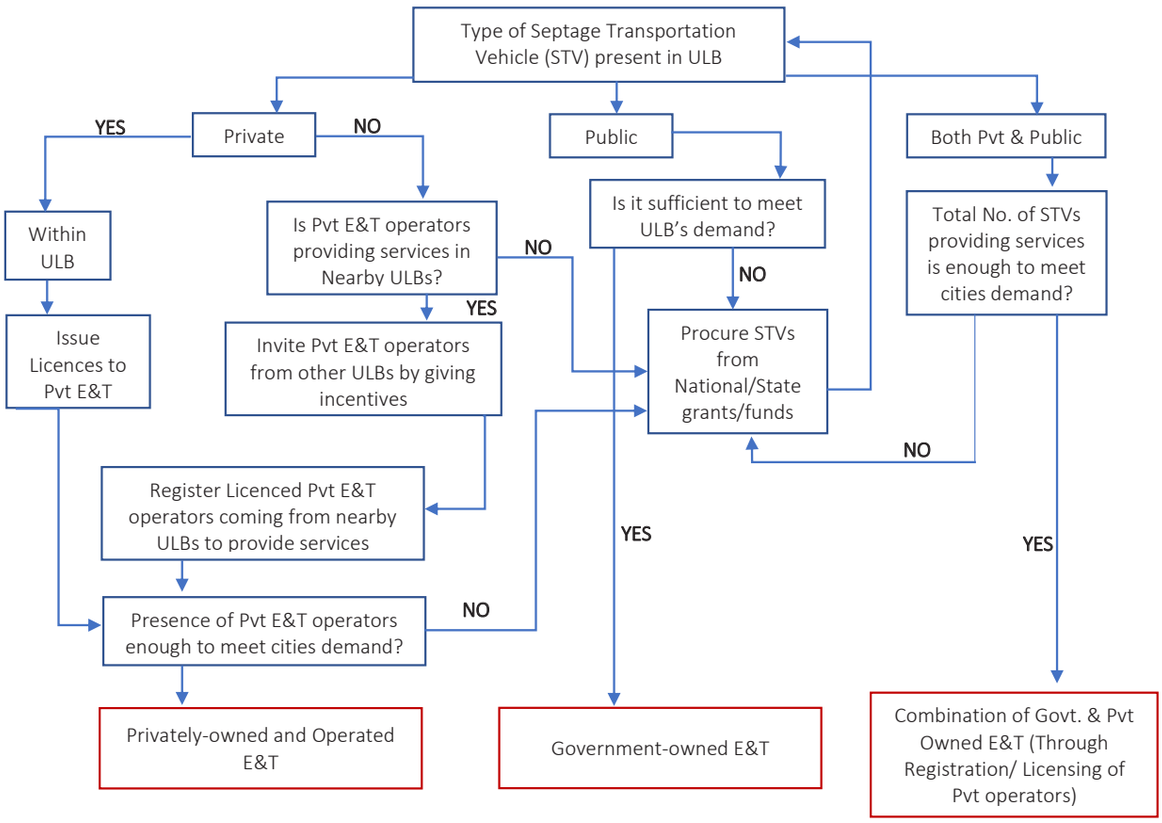
Table 5.2 Types of E&T Financial Models

S. No.	Types	Service Delivery	Description	Suited For	Mode of Payment	Funding	Business Value
1	Government-Owned E&T	Demand Based	Municipality: Owner of the desludging vehicles Private entity: Service contract for desludging operations.	Small towns where private entities are non-existent in the desludging sector.	Desludging fees	Capital Cost: State or National government programs. Operating Cost: Desludging fees or municipality pays private entity on a per trip basis.	The government can ensure equity in terms of service provision and fees charged.
2	Privately-Owned and Operated E&T a. E&T licensing b. Call centre c. Desludging association	Demand Based	Private entity: Owner of the desludging vehicles and O&M. Market-driven business model.	Towns with sufficient demand for desludging.	Desludging fees	Capital Cost: State or National government programs. Operating Cost: Desludging fees.	No capital and operational expenditure by the government.
3	Scheduled Desludging and Sanitation tax	Supply Based	ULB prepares a schedule of desludging and monitors private operators Private entity: Service contract for desludging operations. Treatment Plant Operator: Treatment of FS and O&M. OSS Owners: Pay Tax	Towns where residents and businesses are willing to pay the sanitation tax.	Sanitation tax	Capital Cost: State or National government programs. Operating Cost: Sanitation tax.	• Reduced cost of desludging due to improved logistics resulting in benefits to end-users and private operators • Maintenance of septic tanks and hence reduces public health and environmental risks • Assured FS disposal at designated sites due to performance-based payment • Sizing of FSTP and its operational efficiency can be better planned in comparison to demand-based desludging
4	Integrated Emptying, Transport and Treatment	Demand/ Supply Based	ULB: Monitoring of private entity Private entity: E&T and treatment including O&M of treatment unit In large towns where desludgers have to travel larger distances, transfer stations can be set up. Here entity operating the transfer stations can be the same entity operating the treatment plant.	Municipalities, who can solely focus on monitoring while service provision is handled entirely by a private entity.	Desludging fees	Capital Cost: Grants from donors and/or funds from State or National government. Operating Cost: Pays the private entity on a pay per trip model through user fees charged, local tax collection, and State & Central government financial assistance. In case of transfer station, FS disposal fee from desludging operators at the transfer stations.	Enables linkage of FSM investment directly to successful service delivery. Ease of management for the municipality since it deals with only one entity also greater focus on monitoring is feasible. In case of transfer station: Costs can be effectively utilized by ensuring more trips are undertaken at the same time. Optimizes desludging operations sewage pumping stations (SPS) can act as fixed transfer stations. Large desludging trucks or detachable tankers can be used as mobile transfer stations.

5.4 DECISION-MAKING FLOW

In all the financial models for FSSM in the state, SMC will be responsible for monitoring of FSSM activities as per the state's Septage Management Protocol, 2017. Given below is a decision making flow to select model for ownership and implementation of E&T activities within various ULBs:

Figure 5.2 Selection of E&T Financial Model



- ULBs can offer incentives for private operators to encourage their participation like greater share in distribution of funds generated through collection of desludging user charges, job assurance, health insurance, etc.
- Integrated financial model for E&T will not be viable in Uttarakhand's ULBs considering the fact that O&M of treatment units are done by Jal Sansthan and management of collection and transport activities is done by the ULBs. Also, there is a huge dependency on private sector for the same
- In cases where ULBs don't have treatment units within 25km road distance and number of trips are significant, then ULBs can opt for 'Mobile Transfer Stations' as an immediate solution to reduce no of trips, achieve cost efficiency and check unsafe disposal of faecal sludge and septage
- Based on the involvement of entities, distribution of funds generated by providing E&T services is done between municipality, treatment unit operator and E&T operator
- Involvement of private entities should be monitored through licencing or performance-based contract with the ULB
- Following are the major sources of funding for any ULB: State and National Grants, Desludging user fee, Licencing fee, Fines/ Penalties collected and Donations

- Preferred mode of collection for user charges is on per trip basis paid by the owner of the OSS directly to the E&T service provider or ULB as decided by the SMC unless scheduled based desludging and sanitation-tax model is adopted by the ULB
- Call centre model is being proposed by Rudrapur Nagar Nigam in Uttarakhand. In this model, ULB will receive a request for desludging from owners of the OSS through a dedicated call centre. ULB will then generate 4 slips and allocate the job to a licenced desludging operator. Private operator will be provided with two slips, one to be given to the treatment operator where septage will be emptied for record keeping and the second slip with the desludging operator will be signed by the owner of the OSS and the treatment unit operator. Once the desludging operator submits the received slip duly signed by the OSS owner and the treatment plant operator to the ULB, ULB shall make payment to the private operator either on a daily basis or on a monthly basis. The third slip will be handed over to the owners of the OSS on submission of the desludging fee (online mode/ cash) to the ULB. This slip acts as a bill for the owner. The fourth slip is for the ULB for record keeping.

5.5 RECOMMENDATIONS

Detailed recommendations for each ULB are discussed in annexure 7. Given below are the broad recommendations for E&T financial models for ULBs of Uttarakhand based on population, OSS dependency and type and number of E&T providers present:

For Municipal Corporations:

1. Cities with high population and significant presence of private entities for E&T, **a privately owned E&T model** with licenced private entities and a dedicated call centre is recommended
2. Cities with high population and public owned desludging vehicle which is insufficient to meet the city's demand, **a combination of public & private ownership** and encouragement to involvement of more private entities with a dedicated call centre is recommended
3. Cities with low OSS dependency and with sufficient private entities providing E&T services, **a privately owned E&T model** is recommended.

For Nagar Palika Parishads & Nagar Panchayats :

1. Cities with high OSS dependency and with public owned desludging vehicle which is insufficient to meet the city's demand, **a combination of public and private ownership** with encouragement to involvement of more private entities and licencing/ registration of private operators is recommended
2. Cities with low population and insufficient or no E&T operators, procurement of desludging truck by ULB and **a combination of public and private ownership E&T model** is suggested else a **government owned and operated model** can be adopted as well for E&T
3. Cities where there are sufficient desludging vehicles owned by the ULB/ Jal Sansthan, **a government owned and operated E&T model** is recommended
4. Cities with low population and with public owned desludging vehicle which is insufficient to meet the city's demand, procurement by the ULB should be done and **a government owned and operated E&T model** is recommended
5. Cities with population below 10,000 and with no presence of desludging vehicle, either ULB should procure enough vehicles and adopt **a government owned and operated model** or private entities should be invited and **a privately owned and operated model** should be adopted. Combination of ownership should be avoided here
6. Cities where presence of E&T operators is sufficient to meet the demand in the ULB, **a privately owned and operated model** should be adopted.

To decide on the service delivery model the following points should be taken in consideration:

- Average desludging frequency of all the OSS in the ULB is **3 years**
- Number of trips generated per month is financially viable to adopt **Schedule Desludging Model**
- There is a willingness to pay **Sanitation Tax** among OSS users in the ULB to get unhindered and timely service.

It is observed in large number of cities either in the hilly regions or densely populated settlements, the containment units are inaccessible for desludging vehicles. To tackle this issue the following can be explored:

1. On-site treatment options
2. Community Septic Tanks with shallow and solid free sewers
3. Decentralised STPs with shallow or small bore sewers
4. Alternative emptying & transportation mechanisms
5. These options can be piloted and scaled up based on the learnings.

6. FSSM INFORMATION, EDUCATION AND COMMUNICATION (IEC) CAMPAIGN

IEC is a powerful tool needed to bring about desired social and behavioural changes. Streamlining of FSSM needs to be done at multiple administrative levels – state, district, ULB etc. – and also requires concerted action by different stakeholder groups. Uttarakhand Protocol for Septage Management (2017) requires dedicated IEC campaigns to be rolled out in cities across the state. State support would be required for ULBs in implementing this IEC and Social Behaviour Change Communication (SBCC).

With the support of state government, ULBs would need to strategise an IEC campaign for septage management with clearly defined goals and objectives. They should identify target stakeholder groups, prioritize key messages to be disseminated, and develop a city-wide IEC plan for a sustained yet timebound roll-out.

Goal of FSSM: To ensure sustainable sanitation by addressing the entire sanitation value chain – from the access and continued use of toilets to safe collection and transport of septage to its proper treatment and reuse/safe disposal.

6.1 OBJECTIVES OF FSSM IEC CAMPAIGN

- Raise awareness on the sanitation chain beyond toilet use
- Increase risk perception around the unseen (in particular, the adverse impact to health and environment from the improper disposal of sludge)
- Awareness about the need for scientific design and construction of OSS
- Motivate households to desludge OSS regularly (at least once in 3 years)
- Awareness on need to transport to the designated safe disposal site/treatment facility

Table 6.1: State-level strategy for IEC campaign for FSSM

Part of FSSM chain	Target Stakeholder	Key Message*	Potential Forms of Dissemination
Containment	Property owners/owners of OSS, resident welfare associations, masons and plumbers, etc.	Build the right containment structure for your toilet	Interpersonal communication, pamphlets, hoardings, announcement over mike, media advertisements, video clips in theatre screens capacity building and training of masons etc.
Emptying and Transport of Septage	Desludging operators, sanitation workers, property owners/owners of OSS, resident welfare associations etc.	Mechanically desludge OSS once in 3 years through a licensed operator	Interpersonal communication, pamphlets, hoardings, announcement over mike, advertisements in various media, video clips in theatres, street plays, capacity building and training of operators etc.
Disposal	Desludging operators, sanitation workers, property owners/owners of OSS, resident welfare associations, Elected representatives etc.	Check with the desludging operator where the faecal sludge will be disposed and report indiscriminate dumping	Interpersonal communication, pamphlets, hoardings, announcement over mike, advertisements in various media, video clips in theatres, street plays etc.

**Key Messages as taken from Malasur public awareness campaign on Faecal Sludge Management issued by Ministry of Housing and Urban Affairs (MoHUA)*

At the state level, the SMC may take up the responsibility of strategizing an IEC campaign for FSSM, and direct the various ULBs (Nagar Nigam, Nagar Palika Parishad and Nagar Panchayat) for roll-out of the same. The state may consider utilizing IEC funds allocated under SBM, AMRUT 2.0, SBM 2.0, and FC-XV.

6.2 FUNDS REQUIREMENT FOR ROLLING OUT FSSM IEC CAMPAIGN IN CITIES ACROSS THE STATE

For the smaller towns of Uttarakhand, the state can provide support by preparing standardised collaterals with key messages on FSSM (as shown in the previous section) and disseminating them to the ULBs for roll-out. The ULB can then use its discretion for carrying out the IEC on FSSM using a smaller number of mediums, and may also club with other programs and events for cost-effectiveness. To roll out an awareness campaign for FSSM at the ULB level, the respective SMCs may take a call on the frequency and duration.

Ideally, the different messages should be disseminated sequentially with sufficient periods in between so that there is no confusion among the audience. Furthermore, a monitoring and evaluation component should be included where the efficacy of the campaign can be tested based on the extent of its reach and recall of messages by the audience.

The estimated annual budget demand for IEC using different media at the state level as per State Annual Action Plan for SBM is shown in Table 6.2.

Table 6.2: Uttarakhand IEC budget demand estimate as per State Annual Action Plan 2017-18 for different media to be used for public awareness campaign under Swachh Bharat Mission

IEC Tool	Component	Estimated Annual Cost (in lakhs INR)
Mass Media	Radio, Newspaper Advertisements, Display in Theatres	19.7
Mid Media	IEC display on vans, street plays, exhibitions	249.8
Printed Material	Stickers, brochures, best practices documentation etc.	86.7
Outdoor Media	Hoardings, bus panels, LED displays, performance awards etc.	186.6
ICT	SMS, social media platforms	2.36
Capacity Building and Training	Trainings, sensitization workshops, exposure visits	92
TOTAL		**637.16**

Considering the state estimated between INR 6 to 7 crore for IEC under the SBM, this budget may be utilized for awareness generation on FSSM, which is a core component of Swachhta.

While IEC on FSSM may be clubbed with SBM IEC, a dedicated campaign for it can also be carried out. As per the Malasur public awareness campaign toolkit of MoHUA, it is estimated that 30 to 40 lakhs INR is required to roll out a dedicated IEC campaign for FSSM using multiple media and dissemination tools in a ULB with a population of 3 lakhs over a period of 3 months, which translates to 4.5 lakh INR for a population of 1 lakh for 1 month. Extrapolating this for Uttarakhand, an estimated amount of minimum 6 crore INR will be required for a dedicated FSSM IEC campaign at the state level *(Refer annexure 8 for details)*.

7. IMPLEMENTATION APPROACH, INVESTMENT PLAN AND COSTING

7.1 IMPLEMENTATION APPROACH

To implement the State FSSM Strategy and Investment Plan following set of activities are required:

1. Ensure a co-treatment facility/ an FSTP
2. Initiate clustering of ULBs falling in the cluster
3. Formation and enforcement of bye-laws for cluster level treatment
4. Operation & maintenance of the treatment facility
5. Monitoring of FSSM activities
6. IEC activities
7. Land application as an interim solution for small towns or clusters (*Refer Guidelines for Implementation of Deep Row Entrenchment in Uttarakhand*).

The table below shows Phase-wise timeline of different activities for implementation of the State FSSM Strategy and Investment Plan:

Table 7.1 Phase-wise Timeline of Activities for Implementing SIP

Phases	Activity	0-1 Year	1-3 Year	Beyond 3 Year
Phase I	Initiate Cluster Formation	Form Clusters		
	Formation of City level Bye-laws	Formation & enforcement of Bye-laws for all the ULBs in the cluster		
	Septage Treatment Infrastructure	Co-treatment/FSTP proposed by state and work under progress		
	O&M of Cluster Treatment Facility		O&M of treatment facility, when plant gets functional	O&M of treatment facility, when plant gets functional
	Monitoring	Monitoring/ updation of all FSSM activities through SMC meetings	Monitoring/ updation of all FSSM activities through SMC meetings	Monitoring/ updation of all FSSM activities through SMC meetings
	IEC Activities	Preparation of standardised collaterals and key messages (state level) Dissemination of messages to ULBs for roll out at their discretion	Continuation of roll out of messages by the ULBs Evaluation to know the reach and recall	Continuation of roll out of messages by the ULBs Evaluation to know the reach and recall
	Scientific Land Application (Optional)			

Phases	Activity	0-1 Year	1-3 Year	Beyond 3 Year
Phase II	Initiate Cluster Formation	Form Clusters		
	Formation of City level Bye-laws	Formation & enforcement of Bye-laws for all the ULBs in the cluster		
	Septage Treatment Infrastructure	Push for co-treatment/ FSTP Explore technology options/investment options/land availability for FSTP	Creation of co-treatment/ FSTP	
	O&M of Cluster Treatment Facility		O&M of treatment facility, when plant gets functional	O&M of treatment facility, when plant gets functional
	Monitoring	Monitoring/ updation of all FSSM activities through SMC meetings	Monitoring/ updation of all FSSM activities through SMC meetings	Monitoring/ updation of all FSSM activities through SMC meetings
	IEC	Preparation of standardized collaterals and key messages (state level) Dissemination of messages to ULBs for roll out at their discretion	Continuation of roll out of messages by the ULBs Evaluation to know the reach and recall	Continuation of roll out of messages by the ULBs Evaluation to know the reach and recall
	Scientific Land Application (Optional)	Temporary Measure till infrastructure is created		
Phase III	Initiate Cluster Formation	Form Clusters		
	Formation of City level Bye-laws	Formation & enforcement of Bye-laws for all the ULBs in the cluster		
	Septage Treatment Infrastructure	Explore technology options/investment options/land availability for FSTP	Creation of septage treatment infrastructure, FSTP	Creation of septage treatment infrastructure, FSTP
	O&M of Cluster Treatment Facility			O&M of treatment facility, when plant gets functional
	Monitoring	Monitoring/ updation of all FSSM activities through SMC meetings	Monitoring/ updation of all FSSM activities through SMC meetings	Monitoring/ updation of all FSSM activities through SMC meetings
	IEC	Preparation of standardized collaterals and key messages (state level) Dissemination of messages to ULBs for roll out at their discretion	Continuation of roll out of messages by the ULBs Evaluation to know the reach and recall	Continuation of roll out of messages by the ULBs Evaluation to know the reach and recall
	Scientific Land Application (Optional)	Temporary Measure till infrastructure is created	Temporary Measure till infrastructure is created	

7.2 INVESTMENT PLAN

- Cities falling in Phase I have access to funding from AMRUT 2.0, NMCG, SBM 2.0, 15th FC, Multilateral/ Bilateral agencies, AMRUT and any other state budget
- Some host cities falling in Phase II have access to funding from AMRUT 2.0, NMCG, 15th FC, and Multilateral/ Bilateral agencies. However, some host cities might require to explore SBM 2.0 and other state budgets for funding. Additionally, the cities covered through clusters in this phase may also access SBM 2.0 and the state budget for any capital expenditure
- Host cities and cities falling in their clusters in Phase III do not have access to any funding agencies, they can explore 15th FC, Multilateral/ Bilateral agencies, SBM 2.0 or some other state budget for funding of treatment infrastructure and capital expenditure.

Table 7.2 Treatment Infrastructure, City Coverage through Phases and Possible Funding Options

Sl. No.	Component	Details	Phase I	Phase II	Phase III	Total
1.	Proposed Treatment Facility	Co-treatment in STPs	07	14	00	21
		FSTPs	01	10	16	27
		Scientific Land Application (Temporary solution/Optional)	00	04	03	07
2.	City Coverage	Nagar Nigam	06	03	00	09
		Nagar Palika Parishad	12	21	08	41
		Nagar Panchayat	15	22	16	53
		Total cities covered	33	46	24	103
3.	Funding	Possible sources of funding	NMCG, Multilateral/ Bilateral agencies, AMRUT, SBM2.0, AMRUT 2.0, 15th FC Other State Budget	NMCG, Multilateral/ Bilateral agencies, SBM2.0, AMRUT 2.0, 15th FC Other State Budget	Multilateral/ Bilateral agencies potential option, SBM2.0, 15th FC, Other State Budget	-

7.3 COSTING

Table 7.3 Cost estimation for Co-treatment & FSTP for all three Phases

Phase	Cost for Co-Treatment (In Lakhs)	Cost for FSTP (In Lakhs)	Total Cost (In Lakhs)
I	1,132	700	2,016
II	1,505	9,000	11,556
III	-	5,550	6,105
Total	2,637	15,250	19,677

**total cost includes 10% centage cost (Refer annexure 9 for detail costing in each Phase)*

Rationale behind costing of co-treatment & FSTP: *(Refer annexure 10 for break-up of costing rationale)*

- 10KLD is the minimum capacity considered for both co-treatment and FSTP
- For facilities with capacities 10KLD and 15KLD the minimum cost for co-treatment is estimated to be 60 Lakh
- For facilities with capacities 20KLD or more, estimated cost for co-treatment is 1 Lakh per KLD
- 15 Lakh per KLD is the cost considered for FSTPs
- A 10% centage cost has been added, which includes the DPR preparation fee, site investigation, characterisation of faecal sludge and septage and the project implementation unit fee
- Land acquisition costs are not included; ULB will acquire land at their discretion and add the extra cost to their final budget
- For already proposed infrastructures the cost and capacity as per their DPR is referred for the design and costing.

Assumptions to be considered for costing of Deep Row Entrenchment:

- Based on the experiences of other states like Odisha, Uttar Pradesh, etc., assumption for costing of DRE for Uttarakhand is derived below:
- Capital Cost: Includes, feasibility assessment of the site, fencing around the site with gate, drains for management of surface runoff, cabin for watchman, excavation of pit and borewells for groundwater monitoring. CAPEX – INR 73 ,500/KLD
- Operational Expenditure: Includes, cost of groundwater monitoring, earth filling in old pits and excavation of new pits, cost of human resource (watchman). OPEX – INR 31,500/KLD

7.4 SUMMARY OF COSTING

Table 7.4 Summary of cost and components for all three Phases

Component	Total Cost (in lakhs)	Remarks
Co-treatment	2,901	
FSTP	16,775	
DRE	-	*Refer section 7.3 for per KLD cost*
Desludging Vehicle	-	*Refer Annexure 11*
IEC	637.16	
Total	**20,313.16**	

The state requires a total budget of approximately 200 crore INR for implementing state-wide FSSM. This cost does not include procurement of desludging vehicles, land cost, and O&M of treatment facilities. If funds are efficiently channelised through the various government missions, programs, and state budget, the state can attain CWIS through the cluster approach by integrating co-treatment of septage with sewage in all its Sewage Treatment Plants (STPs) as it has the lowest cost per KLD for treatment of FSS, followed by FSTPs and finally land application as an interim solution for cities with septage collection less than 10KLD.

ANNEXURE

ANNEXURE-1					
STATUS OF URBAN LOCAL BODIES, UTTARAKHAND					
Sl.No	Nagar Nigam	Sl.No	Nagar Palika Parishad	Sl.No	Nagar Panchayat
1	Dehradun	1	Vikasnagar	1	Jhabrera
2	Rishikesh	2	Mussoorie	2	Landhaura
3	Haridwar	3	Herbertpur	3	Bhagwanpur
4	Kotdwar	4	Doiwala	4	Piran Kaliyar
5	Haldwani	5	Manglaur	5	Purola
6	Kashipur	6	Laksar	6	Naugaon
7	Roorkee	7	Shivalik Nagar	7	Nandaprayag
8	Rudrapur	8	Uttarkashi	8	Tapovan
9	Srinagar	9	Barkot	9	Pokhari
		10	Chinyalisaur	10	Gairsain
		11	Chamoli- Gopeshwar	11	Tharali
		12	Joshimath	12	Pipalkoti
		13	Gauchar	13	Kirtinagar
		14	Karnaprayag	14	Ghansali
		15	Tehri	15	Gaja
		16	Narendranagar	16	Lambgaon
		17	Chamba	17	Chamiyala
		18	Devprayag	18	Augustmuni
		19	Muni Ki Reti	19	Ukhimath
		20	Rudraprayag	20	Tilwara
		21	Pauri	21	Swargashram Jaunk
		22	Khatima	22	Satpuli
		23	Mahua Kheraganj	23	Gangolihat
		24	Dogadda	24	Berinag
		25	Pithoragarh	25	Lohaghat
		26	Didihat	26	Banbasa
		27	Dharchula	27	Dwarahat
		28	Tanakpur	28	Bhikiyasain
		29	Champawat	29	Lalkuan
		30	Almora	30	Bhimtal

ANNEXURE-1					
STATUS OF URBAN LOCAL BODIES, UTTARAKHAND					
Sl.No	Nagar Nigam	Sl.No	Nagar Palika Parishad	Sl.No	Nagar Panchayat
		31	Ranikhet	31	Mahua Dabra
		32	Bageshwar	32	Sultanpur Patti
		33	Nainital	33	Kelakhera
		34	Ramnagar	34	Dineshpur
		35	Bhowali	35	Shaktigarh
		36	Gadarpur	36	Nanakmatta
		37	Bajpur	37	Gularbhoj
		38	Jaspur	38	Gangotri
		39	Kichha	39	Badrinath
		40	Sitarganj	40	Kedarnath
		41	Nagla	41	Kaladhungi
				42	Chaukhutiya
				43	Kapkot
				44	Selaqui
				45	Dhandera
				46	Imlikheda
				47	Paldi Gujjar
				48	Rampur
				49	Thalisain
				50	Garur
				51	Sirauli Kalan
				52	Lalpur
				53	Sultanpur Adampur

ANNEXURE-2						
List of STPs in Uttarakhand (Operational, Under-construction and Proposed)						
S. No.	Name of the ULB served	S. No.	Name of the STP	Installed capacity in MLD	Current status	Utilised Capacity (MLD)
1	Dehradun	1	Motharawala 1	20	Operational	14
		2	Indranagar	5	Operational	4.7
		3	Jakhan Doon Vihar	1	Operational	0.14
		4	Salawala	0.71	Operational	0.35
		5	Vijay Colony	0.42	Operational	0.30
		6	Motharawala 2	20	Operational	11
		7	Kargi	68	Operational	18
		8	Kolagarh	3	Under-construction	-
		9	Raipur	24	Proposed	-
		10	Banjarawala	11	Proposed	-
2	Mussoorie	11	Kurli	0.9	Operational	0.35
		12	Landhor North	0.8	Operational	0.03
		13	Happy Valley	1.2	Operational	0.02
		14	Landhor South	1.3	Operational	0.17
		15	Bhatta Fall	3.12	Operational	1
3	Haridwar#	16	Jagjeetpur 1	18	Operational	18
		17	Jagjeetpur 2	27	Operational	27
		18	Sarai 1	18	Operational	18
		19	Sarai 2	14	Operational	13.70
		20	Jagjeetpur 3	68	Operational	62
4	Rishikesh#	21	Lakkarghat	26	Operational	13
		22	Tapovan	3.5	Operational	0.75
5	Swargashram Jaunk	23	Swargashram	3	Operational	3
6	Muni ki Reti	24	Chandreshwar Nagar	7.5	Operational	7
		25	Chorpani	5	Operational	3
7	Devprayag#	26	Bah Bazaar	1.4	Operational	0.15
		27	Sangam Bazaar	0.15	Operational	0.09
		28	Shanthi Bazaar	0.075	Operational	0.011

ANNEXURE-2						
List of STPs in Uttarakhand (Operational, Under-construction and Proposed)						
S. No.	Name of the ULB served	S. No.	Name of the STP	Installed capacity in MLD	Current status	Utilised Capacity (MLD)
8	Tehri	29	B. Puram	5	Operational	2.50
9	Uttarakashi#	30	Gyanshu	2	Operational	1.80
10	Gangotri#	31	Gangotri	1	Operational	0.20
11	Kirtinagar#	32	Kirtinagar Near DRO bridge	0.05	Operational	0.03
		33	Kirtinagar II Near Temple	0.01	Operational	0.01
12	Srinagar#	34	Srikote I	0.075	Operational	0.073
		35	Srikote II	0.05	Operational	0.01
		36	Srinagar I	3.5	Operational	2.08
		37	Srinagar II	1	Operational	0.528
13	Rudraprayag#	38	Near Anup Negi memorial public school	0.075	Operational	0.05
		39	Near Rudra complex	0.1	Operational	0.052
		40	Near bus stand	0.075	Operational	0.021
		41	Near SBI/Masjid	0.1	Operational	0.012
		42	Near Girder Bridge	0.125	Operational	0.083
		43	Near Belani Road	0.05	Operational	0.032
		44	Rudraprayag (FSTP)	-	Proposed	-
14	Karnprayag#	45	Near Subash Nagar	0.05	Operational	0.038
		46	Near Karnprayag Sangam	0.1	Operational	0.062
		47	Near Gandhi Nagar	0.05	Operational	0.044
		48	Near Karn Mandir	0.05	Operational	0.02
		49	Near New Bridge	0.1	Operational	0.053
15	Badrinath#	50	Bamini	0.26	Operational	0.13
		51	Temple	0.01	Operational	0.005
		52	Suspension Bridge	1	Operational	0.50

ANNEXURE-2						
List of STPs in Uttarakhand (Operational, Under-construction and Proposed)						
S. No.	Name of the ULB served	S. No.	Name of the STP	Installed capacity in MLD	Current status	Utilised Capacity (MLD)
16	Chamoli Gopeshwar#	53	Near Old Suspension bridge	0.05	Operational	0.02
		54	Chamoli Ghat	0.76	Operational	0.09
		55	Pokhari band	1.25	Operational	1.106
		56	Vivekanand colony	1.19	Operational	0.102
		57	Deendayal Upadhyay Park	1.12	Operational	0.067
17	Joshimath#	58	Near Pokhari Joshimath	1.08	Operational	0.30
		59	Marwari Joshimath	2.7	Under-construction	-
18	Nandprayag#	60	Near Forest Nala	0.1	Operational	0.073
		61	In Sangam Marg	0.05	Operational	0.01
19	Almora	62	Bukh	2	Operational	1.60
20	Nainital	63	Russi Village	10	Operational	6.75
		64	Hari nagar	0.45	Operational	0.30
		65	Krishnapur	0.8	Operational	0.54
		66	Nainital	17.5	Tender Stage	-
		67	Nainital	0.45	Under-Construction	-
21	Pithoragarh	68	Aicholi	5	Operational	3.00
		69	Nirada ward	1.5	Operational	1.00
22	Bhimtal	70	Bhimtal	1.25	Operational	0.81
23	Dharachula	71	Near stadium vivekanand ward	1	Proposed	-
24	Haldwani	72	Haldwani	38	DPR submitted	-
		73	Haldwani	28	Under-construction	-
25	Ramnagar	74	Ramnagar	7	Operational	3
		75	Ramnagar 2	1.5	Operational	0.90
26	Sitarganj	76	Sitarganj	3	DPR approved	
27	Doiwala	77	Doiwala	10	Proposed	-
28	Roorkee	78	Roorkee	15	DPR approved	-
		79	Roorkee	33.5	Operational	-

ANNEXURE-2						
List of STPs in Uttarakhand (Operational, Under-construction and Proposed)						
S. No.	Name of the ULB served	S. No.	Name of the STP	Installed capacity in MLD	Current status	Utilised Capacity (MLD)
29	Rudrapur	80	Rudrapur FSTP	0.125	Under-construction	-
30	Kotdwar	81	Kotdwar	18	DPR submitted	-
		82	Kotdwar	14	DPR submitted	-
31	Kashipur	83	Kashipur	18	Under-construction	-
		84	Jaspur+Hempur Ismail	3	DPR approved	-
		85	Kashipur, Belijudi, Gulriya	10.8	DPR approved	-
32	Bazpur	86	Bazpur	10	DPR approved	
33	Kichha	87	Kiccha	3	Tender Stage	

ANNEXURE-3		
CRITERIA FOR ARRIVING AT SEPTAGE COLLECTION		
Criteria	Number	Unit
Persons per household	5	no.
Desludging frequency	3	years
No. of working days in a year	300	days/year
Capacity of the STV	5	KL

ANNEXURE-4								
ULBs COVERED IN PHASE-1								
SL.NO	Host ULB	Type of Intervention	Names of ULBs in the cluster	"Total Cluster Pop (Post expansion) (2018) "	"Total Cluster Pop Project Base Year (2025)"	"Total Cluster Pop Project Design Year (2040)"	"Total Cluster Households (2040)"	"Total Cluster Septage Collection (2040) [KLD]"
1	Dehradun	Co-treatment	Doiwala & Selaqui	882,629	1,072,200	1,625,800	325,160	650
2	Rishikesh	Co-treatment	Muni ki Reti, Naren-dranagar, Swargash-ram Jaunk & Tapovan	149,564	176,800	254,100	50,820	100
3	Haridwar	Co-treatment	Shivalik Nagar, Imlikheda, Rampur & Sultanpur Adampur	338,439	406,800	603,000	120,600	220
4	Devprayag	Co-treatment	NA	3,098	3,500	4,300	860	0
5	Tehri	Co-treatment	Chamba & Gaja	36,271	40,100	49,500	9,900	20
6	Srinagar	Co-treatment	Kirtinagar & Pauri	71,957	76,200	85,900	17,180	50
7	Kashipur	Co-treatment	Sultanpur Patti & Mahua Kheraganj	198,284	251,200	415,800	83,160	250
8	Rudrapur	FSTP	Gularbhoj, Gadarpur, Dineshpur, Kichha, Kelakhera, Sirauli Kalan, Lalpur, Nagla & Lalkuan	385,617	488,000	806,500	161,300	910

ANNEXURE-5								
ULBs COVERED IN PHASE-2								
SL.NO	Host ULB	Type of Intervention	Names of ULBs in the cluster	"Total Cluster Pop (Post expansion) (2018) "	"Total Cluster Pop Project Base Year (2025)"	"Total Cluster Pop Project Design Year (2040)"	"Total Cluster Households (2040)"	"Total Cluster Septage Collection (2040) [KLD]"
1	Roorkee	Co-treatment	Bhagwanpur, Piran Kaliyar, Dhandera, Paldi Gujjar	302,765	364,000	539,600	107,920	340
2	Haldwani	Co-treatment	Kaladhungi, Bhimtal & Bhowali	311,450	374,400	555,000	111,000	330
3	Chamoli-Gopeshwar	Co-treatment	Nandprayag & Pipalkoti	27,415	30,800	38,800	7,760	30
4	Sitarganj	Co-treatment	Shaktigarh & Nankamtta	47,447	60,200	99,600	19,920	110
5	Bajpur	Co-treatment	NA	35,582	45,100	74,600	14,920	80
6	Nainital	Co-treatment	NA	41,377	49,800	73,700	14,740	0
7	Mussorie	Co-treatment	NA	30,118	36,600	55,500	11,100	20
8	Uttarkashi	Co-treatment	NA	27,102	31,200	42,000	8,400	20
9	Joshimath	Co-treatment	NA	17,010	19,000	24,100	4,820	10
10	Badrinath	Co-treatment	NA	2,438	2,800	3,500	700	0
11	Gangotri	Co-treatment	NA	110	200	200	40	0

ANNEXURE-5								
ULBs COVERED IN PHASE-2								
SL.NO	Host ULB	Type of Intervention	Names of ULBs in the cluster	"Total Cluster Pop (Post expansion) (2018) "	"Total Cluster Pop Project Base Year (2025)"	"Total Cluster Pop Project Design Year (2040)"	"Total Cluster Households (2040)"	"Total Cluster Septage Collection (2040) [KLD]"
12	Pitthoragarh	Co-treatment	NA	65,502	71,000	84,100	16,820	40
13	Ramnagar	Co-treatment	NA	54,787	65,900	97,600	19,520	110
14	Almora	Co-treatment	NA	38,598	40,800	45,800	9,160	20
15	Rudraprayag	FSTP	Agastyamuni & Tilwada	18,764	20,800	25,700	5,140	20
16	Jaspur	FSTP	Mahuvadavara	57,849	73,300	121,400	24,280	140
17	Gairsain	FSTP	NA	8,665	9,700	12,300	2,460	10
18	Kedarnath	FSTP	NA	612	700	900	180	0
19	Ukimath	FSTP	NA	3,638	4,100	5,000	1,000	10
20	Khatima	FSTP	Banbasa & Tanakpur	86,001	106,500	168,600	33,720	190
21	Kotdwara	FSTP	Dogadda	137,966	145,700	163,500	32,700	180
22	Dharchula	FSTP	NA	7,039	7,700	9,100	1,820	10
23	Karnaprayag	FSTP	Gochar & Pokhari	24,833	27,800	35,300	7,060	40
24	Manglaur	FSTP	Jhabrera, Laksar & Landhaura	104,287	125,500	186,000	37,200	200

ANNEXURE-6								
ULBs COVERED IN PHASE-III								
SL.NO	Host ULB	Type of Inter-vention	Names of ULBs in the cluster	Total Cluster Pop (Post expansion) (2018)	Total Cluster Pop Project Base Year (2025)	Total Cluster Pop Project Design Year (2040)	Total Cluster Households (2040)	Total Cluster Septage Collection (2040) [KLD]
1	Barkot	FSTP	Naugaon	12,588	14,600	19,600	3,920	20
2	Bageshwar	FSTP	Kapkot & Garur	35,023	38,800	47,800	9,560	60
3	Champawat	FSTP	Lohaghat	18,955	22,400	31,600	6,320	30
4	Berinaag	FSTP	Gangolihaat	14,753	16,000	19,100	3,820	20
5	Ghansali	FSTP	Chamiyala	13,081	14,500	17,900	3,580	20
6	Chaukhutiya	FSTP	Dwarahat	7,213	7,800	8,600	1,720	10
7	Vikasnagar	FSTP	Herbertpur	34,586	42,100	63,800	12,760	70
8	Purola	FSTP	NA	7,931	9,200	12,300	2,460	10
9	Chinyalisaur	FSTP	NA	8,844	10,200	13,700	2,740	20
10	Tharali	FSTP	NA	4,482	5,100	6,400	1,280	10
11	Lambgaon	FSTP	NA	2,330	2,600	3,200	640	0
12	Satpuli	FSTP	NA	4,345	4,600	5,200	1,040	10
13	Didihaat	FSTP	NA	6,522	7,100	8,400	1,680	10
14	Ranikhet	FSTP	NA	5,050	5,400	6,000	1,200	10
15	Bhikyasin	FSTP	NA	3,275	3,500	3,900	780	0
16	Thalisain	FSTP	NA	2,982	3,200	3,600	720	0

ANNEXURE-7									
District	ULBs No.	City/Town	ULB type	Population (Post expansion)	Pop Dependent on OSS	% of Population Dependent on OSS	Public Owned STVs	Privately Owned STV operators	Recommendation
Dehradun	1	Dehradun	Municipal Corporation	804379	518514	64%	1	32	For these 6 municipal corporations with population above 1 lakh and OSS dependency more than 50%: a privately owned E&T model is recommended where private entities are licenced by the ULB and there is a dedicated call center is in place to receive the service demands by the OSS owners and allocate the job to the licenced operators as per their designated areas.
Haridwar	2	Roorkee	Municipal Corporation	184060	110436	60%	2	20	
Nainital	3	Haldwani	Municipal Corporation	280514	253533	90%	0	16	
Udhamsingh Nagar	4	Rudrapur	Municipal Corporation	175723	175723	100%	0	10	
Udhamsingh Nagar	5	Kashipur	Municipal Corporation	175819	169854	97%	0	22	
Pauri	6	Kotdwar	Municipal Corporation	135544	135544	100%	2	7	
Dehradun	7	Rishikesh	Municipal Corporation	106320	71234	67%	2	1	Since in Rishikesh MC there is a huge dependency on OSS and there is only one private operator providing services along with 2 STVs owned by MC, involvement of private enties should be encouraged through a competitive bidding process and a dedicated call center should be in place to receive the service demands by the OSS owners.
Haridwar	8	Haridwar	Municipal Corporation	251197	50239	20%	0	3	Since dependency on OSS is in low here, Privately owned E&T model should be adopted here.

ANNEXURE-7									
District	ULBs No.	City/Town	ULB type	Population (Post expansion)	Pop Dependent on OSS	% of Population Dependent on OSS	Public Owned STVs	Privately Owned STV operators	Recommendation
Pauri	9	Srinagar	Municipal Corporation	44000	33130	75%	2	0	Low population but hight OSS dependency and no presence of private desludgers. ULB can procure more vehicles to meet the demand of the city and adopt a governemnt owned and operated E&T model.
Udhamsingh Nagar	10	Kichha	Nagar Palika Parishad	74356	74356	100%	2	0	Population in these NPPs is between 50000 to 1,00,000 and dependency on OSS is very high but number of STVs currently providing services is not sufficient to meet the demand. Thus, involvement of private sector should be encouraged and private entities from nearby ULBs should be invited by giving incentives and should be registered with the ULBs to provide services. A model with public and private ownership should be adopted here. Licencing of local private operators should be done to regulate and monitor their activities.
Udhamsingh Nagar	11	Jaspur	Nagar Palika Parishad	50523	50523	100%	1	0	
Udhamsingh Nagar	12	Khatima	Nagar Palika Parishad	58494	58494	100%	0	0	
Udhamsingh Nagar	13	Nagla	Nagar Palika Parishad	57977	57977	100%	0	0	
Haridwar	14	Manglaur	Nagar Palika Parishad	52971	52971	100%	2	1	
Nainital	15	Ramnagar	Nagar Palika Parishad	54787	54787	100%	0	2	
Pithoragarh	16	Pithoragarh	Nagar Palika Parishad	65502	57502	88%	0	1	
Dehradun	17	Doewala	Nagar Palika Parishad	61370	61370	100%	0	1	

ANNEXURE-7									
District	ULBs No.	City/Town	ULB type	Population (Post expansion)	Pop Dependent on OSS	% of Population Dependent on OSS	Public Owned STVs	Privately Owned STV operators	Recommendation
Dehradun	18	Mussoorie	Nagar Palika Parishad	30118	21083	70%	1	0	OSS dependency is high and there is no presence of private sector in E&T sector. Since Population in these ULBs is low (between 20000 to 50000) , ULB can think of procuring more vehicles to meet the demand of the city and adopt a governemnt owned and operated E&T model. If procuremnet is not possible then a combination of public and private ownership model can be adopted for E&T. Private entities should be invited from nearby ULBs through competitive bidding process and same should be registered with the respective ULBs.
Champawat	19	Tanakpur	Nagar Palika Parishad	21484	21484	100%	1	0	
Almora	20	Almora	Nagar Palika Parishad	38598	31650	82%	1	0	
Udhamsingh Nagar	21	Gadarpur	Nagar Palika Parishad	23289	23289	100%	1	0	
Udhamsingh Nagar	22	Bajpur	Nagar Palika Parishad	35582	35582	100%	1	0	
Udhamsingh Nagar	23	Sitarganj	Nagar Palika Parishad	31185	31185	100%	2	0	
Uttarkashi	24	Uttarkashi	Nagar Palika Parishad	27102	24663	91%	1	0	
Chamoli	25	Chamoli-Gopeshwar	Nagar Palika Parishad	21447	20137	94%	1	0	
Dehradun	26	Vikasnagar	Nagar Palika Parishad	24019	24019	100%	1	5	A combination of public and private ownership model can be adopted for E&T. Private entities should be invited from nearby ULBs through a competitive bidding process and same should be registered with the respective ULBs.
Dehradun	27	Selaqui	Nagar Panchayat	16880	16880	100%	1	7	
Tehri	28	Muni ki Reti - Dhalanwala	Nagar Palika Parishad	28636	19472	68%	2	1	

ANNEXURE-7									
District	ULBs No.	City/Town	ULB type	Population (Post expansion)	Pop Dependent on OSS	% of Population Dependent on OSS	Public Owned STVs	Privately Owned STV operators	Recommendation
Haridwar	29	Laksar	Nagar Palika Parishad	21760	21760	100%	0	3	A privately owned and operated model should be adopted here and more private entities should be invited and registered with the ULB from nearby cities by giving them incentives.
Haridwar	30	Shivalik Nagar	Nagar Palika Parishad	33600	33600	100%	0	0	
Haridwar	31	Landhaura	Nagar Panchayat	18370	18370	100%	0	2	
Haridwar	32	Jhabrera	Nagar Panchayat	11186	11186	100%	0	0	
Haridwar	33	Piran Kaliyar	Nagar Panchayat	19201	19201	100%	0	0	
Haridwar	34	Dhandera	Nagar Panchayat	23257	23257	100%	0	0	
Haridwar	35	Imlikhera	Nagar Panchayat	10236	10236	100%	0	0	
Haridwar	36	Paldi Gujjar	Nagar Panchayat	21468	21468	100%	0	0	
Haridwar	37	Rampur	Nagar Panchayat	27364	27364	100%	0	0	
Haridwar	38	Sultanpur adampur	Nagar Panchayat	16042	16042	100%	0	0	
Bageshwar	39	Bageshwar	Nagar Palika Parishad	24656	24656	100%	0	0	
Bageshwar	40	Garud	Nagar Panchayat	5002	5002	100%	0	0	
Pauri	41	Pauri	Nagar Palika Parishad	25440	25440	100%	0	0	
Pauri	42	Thalisain	Nagar Panchayat	2982	2982	100%	0	0	
Pauri	43	Swargarhram Jaunk	Nagar Panchayat	4669	3595	77%	0	1	
Pauri	44	Satpuli	Nagar Panchayat	4345	4345	100%	0	1	

ANNEXURE-7									
District	ULBs No.	City/Town	ULB type	Population (Post expansion)	Pop Dependent on OSS	% of Population Dependent on OSS	Public Owned STVs	Privately Owned STV operators	Recommendation
Udhamsingh Nagar	45	Dineshpur	Nagar Panchayat	11342	11342	100%	0	1	A privately owned and operated model should be adopted here and more private entities should be invited and registered with the ULB from nearby cities by giving them incentives.
Udhamsingh Nagar	46	Sirauli Kalan	Nagar Panchayat	13725	13725	100%	0	0	
Udhamsingh Nagar	47	Lalpur	Nagar Panchayat	3675	3675	100%	0	0	
Udhamsingh Nagar	48	Mahua kheraganj	Nagar Palika Parishad	12584	12584	100%	0	0	
Udhamsingh Nagar	49	Kelakhera	Nagar Panchayat	10929	10929	100%	0	0	
Nainital	50	Bhimtaal	Nagar Panchayat	14882	9402	63%	0	0	
Chamoli	51	Joshimath	Nagar Palika Parishad	17010	10206	60%	0	0	
Uttarkashi	52	Purola	Nagar Panchayat	7931	7931	100%	0	2	
Uttarkashi	53	Naugaon	Nagar Panchayat	5174	5174	100%	0	2	
Uttarkashi	54	Chinyasilaur	Nagar Palika Parishad	8844	8844	100%	0	2	
Chamoli	55	Gairsain	Nagar Panchayat	8665	8665	100%	0	1	
Tehri	56	Narendra Nagar	Nagar Palika Parishad	6049	6049	100%	0	1	
Champawat	57	Lohaghat	Nagar Panchayat	7926	7926	100%	0	1	

ANNEXURE-7									
District	ULBs No.	City/Town	ULB type	Population (Post expansion)	Pop Dependent on OSS	% of Population Dependent on OSS	Public Owned STVs	Privately Owned STV operators	Recommendation
Nainital	58	Nainital	Nagar Palika Parishad	41377	3310	8%	2	0	A government owned and operated E&T model is recommended for these ULBs.
Tehri	59	Tehri	Nagar Palika Parishad	24014	4950	21%	2	0	
Dehradun	60	Herbertpur	Nagar Palika Parishad	10567	10567	100%	1	0	ULB should try to procure more vehicles to meet the demand of the city and adopt a government owned and operated E&T model.
Tehri	61	Chamba	Nagar Palika Parishad	10457	10457	100%	1	0	
Tehri	62	Dev Prayag	Nagar Palika Parishad	3098	1298	42%	1	0	
Tehri	63	Kirtinagar	Nagar Panchayat	2517	2517	100%	1	0	
Champawat	64	Champawat	Nagar Palika Parishad	11029	11029	100%	1	0	
Champawat	65	Banbasa	Nagar Panchayat	6023	6023	100%	1	0	
Pauri	66	Dogadda	Nagar Palika Parishad	2422	2422	100%	1	0	
Pithoragarh	67	Berinaag	Nagar Panchayat	7641	7641	100%	1	0	
Almora	68	Dwarahat	Nagar Panchayat	2749	2749	100%	1	0	
Udhamsingh Nagar	69	Nankamtta	Nagar Panchayat	8478	8478	100%	1	0	
Udhamsingh Nagar	70	Gularbhoj	Nagar Panchayat	6957	6957	100%	1	0	
Chamoli	71	Badrinath	Nagar Panchayat	2438	488	20%	1	0	
Nainital	72	Lalkuan	Nagar Panchayat	7644	7644	100%	2	0	

ANNEXURE-7									
District	ULBs No.	City/Town	ULB type	Population (Post expansion)	Pop Dependent on OSS	% of Population Dependent on OSS	Public Owned STVs	Privately Owned STV operators	Recommendation
Uttarkashi	73	Gangotri	Nagar Panchayat	110	17	15%	0	0	
Rudraprayag	74	Kedarnath	Nagar Panchayat	612	612	100%	0	0	
Haridwar	75	Bhagwanpur	Nagar Panchayat	17179	17179	100%	0	8	A privately owned and operated model should be adopted here and private operators should be be given licence by the ULB.
Almora	76	Ranikhet-Chiniyanaula	Nagar Palika Parishad	5050	5050	100%	0	0	Since these are small ULBs, instead of going for a combination of public and private ownership model, either uLB should procure enough vehicles to meet the demand of the city and adopt a government owned and operated model for E&T or invite private entities from nearby ULBs and adopt a privately owned and operated model for E&T. Private entities must be registered with the ULB to regulate and monitor their activities.
Almora	77	Bhikiyasain	Nagar Panchayat	3275	3275	100%	0	0	
Almora	78	Chaukhutiya	Nagar Panchayat	4464	4464	100%	0	0	
Nainital	79	Kaladugi	Nagar Panchayat	7611	7611	100%	0	0	
Bageshwar	80	Kapkot	Nagar Panchayat	5365	5365	100%	0	0	
Pithoragarh	81	Didihaat	Nagar Palika Parishad	6522	6522	100%	0	0	
Pithoragarh	82	Gangolihaat	Nagar Panchayat	7112	7112	100%	0	0	

ANNEXURE-7									
District	ULBs No.	City/Town	ULB type	Population (Post expansion)	Pop Dependent on OSS	% of Population Dependent on OSS	Public Owned STVs	Privately Owned STV operators	Recommendation
Pithoragarh	83	Dharchula	Nagar Palika Parishad	7039	7039	100%	0	0	Since these are small ULBs, instead of going for a combination of public and private ownership model, either uLB should procure enough vehicles to meet the demand of the city and adopt a government owned and operated model for E&T or invite private entities from nearby ULBs and adopt a privately owned and operated model for E&T. Private entities must be registered with the ULB to regulate and monitor their activities.
Tehri	84	Ghansali	Nagar Panchayat	7775	7775	100%	0	0	
Tehri	85	Gaja	Nagar Panchayat	1800	1800	100%	0	0	
Tehri	86	Lambgaon	Nagar Panchayat	2330	2330	100%	0	0	
Tehri	87	Chamiyala	Nagar Panchayat	5306	5306	100%	0	0	
Tehri	88	Tapovan	Nagar Panchayat	3890	3890	100%	0	0	
Rudraprayag	89	Rudraprayag	Nagar Palika Parishad	9307	9307	100%	0	0	
Rudraprayag	90	Agastyamuni	Nagar Panchayat	6557	6557	100%	0	0	
Rudraprayag	91	Ukhimath	Nagar Panchayat	3638	3638	100%	0	0	
Chamoli	92	Pokhari	Nagar Panchayat	6119	6119	100%	0	0	
Chamoli	93	Tharali	Nagar Panchayat	4482	4482	100%	0	0	
Chamoli	94	Pipalkoti	Nagar Panchayat	3521	3521	100%	0	0	
Chamoli	95	Nandprayag	Nagar Panchayat	2447	2447	100%	0	0	

ANNEXURE-7									
District	ULBs No.	City/Town	ULB type	Population (Post expansion)	Pop Dependent on OSS	% of Population Dependent on OSS	Public Owned STVs	Privately Owned STV operators	Recommendation
Chamoli	96	Gauchar	Nagar Palika Parishad	8864	8864	100%	0	0	Since these are small ULBs, instead of going for a combination of public and private ownership model, either uLB should procure enough vehicles to meet the demand of the city and adopt a government owned and operated model for E&T or invite private entities from nearby ULBs and adopt a privately owned and operated model for E&T. Private entities must be registered with the ULB to regulate and monitor their activities.
Chamoli	97	Karnaprayag	Nagar Palika Parishad	9850	9850	100%	0	0	
Uttarkashi	98	Barkot	Nagar Palika Parishad	7414	7414	100%	0	0	
Rudraprayag	99	Tilwada	Nagar Panchayat	2900	2900	100%	0	0	
Udhamsingh Nagar	100	Shaktigarh	Nagar Panchayat	7784	7784	100%	0	0	
Nainital	101	Bahowali	Nagar Palika Parishad	8443	8443	100%	0	0	
Udhamsingh Nagar	102	Mahuvadavara	Nagar Panchayat	7326	7326	100%	0	0	
Udhamsingh Nagar	103	Sultanpur Patti	Nagar Panchayat	9881	9881	100%	0	0	

ANNEXURE-8			
Cost estimate for IEC campaign at ULBs in Uttarakhand			
Assumption based on Malasur campaign rolled out in Behrampur, Odisha Rs. 40 lakhs – 3 months – 3,00,000 pop ~ Rs. 15 per capita			
ULB	DETAILS		COST (Pop.*15)
NAGAR NIGAM	Population	2,157,556	32,363,340
	No. of ULBs	9	
NAGAR PALIKA PARISHAD	Population	1,072,836	16,092,540
	No. of ULBs	41	
NAGAR PANCHAYAT	Population	431,182	6,467,730
	No. of ULBs	53	
TOTAL COST			54,923,610

ANNEXURE-9								
COSTING-CO-TREATMENT PHASE I								
Cluster No.	City	Population (Post expansion) (2018)	Population Project Base Year (2025)	Population Project Design Year (2040)	Households (2040)	Required Capacity (in KLD)	Costing (in lakhs)	Remarks
1	Dehradun	804,379	977,000	1,481,600	296,320	130	₹ 183	Cost and capacity from DPR. 670 KLD design capacity as per Septage collection for design year 2040
	Doiwala	61,370	74,600	113,100	22,620			
	Selaqui	16,880	20,600	31,100	6,220			
2	Rishikesh	106,320	129,200	195,900	39,180	100	₹ 140	104.85 lakh cost mentioned in DPR. However, capacity unknown therefore projection considered here
	Muni ki Reti	28,636	31,600	39,000	7,800			
	Narendra Nagar	6,049	6,700	8,300	1,660			
	Swargashram Jaunk	4,669	5,000	5,600	1,120			
	Tapovan	3,890	4,300	5,300	1,060			
3	Haridwar	251,197	301,900	447,400	89,480	150	₹ 349	Cost and capacity from DPR. 220 KLD design capacity as per Septage collection for design year 2040
	Shivalik Nagar	33,600	40,400	59,900	11,980			
	Imlikheda	10,236	12,300	18,300	3,660			
	Rampur	27,364	32,900	48,800	9,760			
	Sultanpur Adampur	16,042	19,300	28,600	5,720			
4	Devprayag	3,098	3,500	4,300	860	10	₹ 60	
5	Tehri	24,014	26,500	32,700	6,540	20	₹ 60	
	Chamba	10,457	11,600	14,300	2,860			
	Gaja	1,800	2,000	2,500	500			
6	Srinagar	44,000	46,500	52,200	10,440	30	₹ 125	Cost and capacity from DPR. 50 KLD design capacity as per Septage collection for design year 2040
	Kirtinagar	2,517	2,800	3,500	700			
	Pauri	25,440	26,900	30,200	6,040			
7	Kashipur	175,819	222,600	368,600	73,720	175	₹ 215	Very high design capacity not feasible for under construction/upcoming STPs therefore 70% septage efficiency considered based on current practices. This design capacity will be executed in the under construction and upcoming STPs
	Sultanpur Patti	9,881	12,600	20,800	4,160			
	Mahua Kheraganj	12,584	16,000	26,400	5,280			
Total		1,680,242	2,026,800	3,038,400	607,680	615	₹ 1,132	

ANNEXURE-9								
COSTING-CO-TREATMENT PHASE II								
Cluster No.	City	Population (Post expansion) (2018)	Population Project Base Year (2025)	Population Project Design Year (2040)	Households (2040)	Required Capacity (in KLD)	Costing (in lakhs)	Remarks
1	Rudrapur	175,723	222,400	368,400	73,680	125	₹ 700	Cost and capacity from DPR. 770 KLD design capacity as per Septage collection for design year 2040
	Gularbhoj	6,957	8,900	14,600	2,920			
	Gadarpur	23,289	29,500	48,900	9,780			
	Dineshpur	11,342	14,400	23,800	4,760			
	Kichha	74,356	94,200	155,900	31,180			
	Kelakhera	10,929	13,900	23,000	4,600			
	Sirauli Kalan	13,725	17,400	28,800	5,760			
	Lalpur	3,675	4,700	7,800	1,560			
	Nagla	57,977	73,400	121,600	24,320			
	Lalkuan	8,844	10,200	13,700	2,740			
Total		386,817	489,000	806,500	161,300	125	₹ 700	

ANNEXURE-9								
COSTING-CO-TREATMENT PHASE II								
Cluster No.	City	Population (Post expansion) (2018)	Population Project Base Year (2025)	Population Project Design Year (2040)	Households (2040)	Required Capacity (in KLD)	Costing (in lakhs)	Remarks
1	Roorkee	184,060	221,200	327,900	65,580	270	₹ 310.00	Upcoming sewerage lines, therefore OSS dependency will decrease drastically, hence, 50% septage efficiency considered based on current practices. This capacity will be implemented in 2 STPs.
	Bhagwanpur	17,179	20,700	30,600	6,120			
	Piran Kaliyar	19,201	23,100	34,200	6,840			
	Dhandera	23,257	28,000	41,500	8,300			
	Paldi Gujjar	21,468	25,800	38,300	7,660			
2	Haldwani	280,514	337,100	499,700	99,940	165	₹ 205.00	Upcoming sewerage lines therefore OSS dependency will decrease drastically, hence 50% septage efficiency considered based on current practices. This capacity will be implemented in 2 STPs.
	Kaladugi	7,611	9,200	13,600	2,720			
	Bhimtaal	14,882	17,900	26,600	5,320			
	Bhowali	8,443	10,200	15,100	3,020			
3	Chamoli-Gopeshwar	21,447	24,000	30,300	6,060	30	₹ 70.00	
	Nandprayag	2,447	2,800	3,500	700			
	Pipalkoti	3,521	4,000	5,000	1,000			
4	Sitarganj	31,185	39,500	65,400	13,080	110	₹ 150.00	
	Shaktigarh	7,784	9,900	16,400	3,280			
	Nanakmatta	8,478	10,800	17,800	3,560			
5	Bajpur	35,582	45,100	74,600	14,920	80	₹ 120.00	
6	Nainital	41,377	49,800	73,700	14,740	10	₹ 60.00	
7	Mussoorie	30,118	36,600	55,500	11,100	20	₹ 60.00	
8	Uttarkashi	27,102	31,200	42,000	8,400	20	₹ 60.00	
9	Joshimath	17,010	19,000	24,100	4,820	10	₹ 60.00	
10	Badrinath	2,438	2,800	3,500	700	10	₹ 60.00	
11	Gangotri	110	200	200	40	10	₹ 60.00	
12	Pithoragarh	65,502	71,000	84,100	16,820	40	₹ 80.00	
13	Ramnagar	54,787	65,900	97,600	19,520	110	₹ 150.00	
14	Almora	38,598	40,800	45,800	9,160	20	₹ 60.00	
Total		964,101	1,146,600	1,667,000	333,400	905	₹ 1,505.00	

ANNEXURE-9								
COSTING-FSTP PHASE II								
Cluster No.	City	Population (Post expansion) (2018)	Population Project Base Year (2025)	Population Project Design Year (2040)	Households (2040)	Required Capacity (in KLD)	Costing (in lakhs)	Remarks
1	Rudraprayag	9,307	10,300	12,700	2,540	20	₹ 300	
	Agastyamuni	6,557	7,300	9,000	1,800			
	Tilwada	2,900	3,200	4,000	800			
2	Jaspur	50,523	64,000	106,000	21,200	100	₹ 1,500	Very high design capacity therefore 70% septage efficiency considered based on current practices.
	Mahuvadavara	7,326	9,300	15,400	3,080			
3	Gairsain	8,665	9,700	12,300	2,460	10	₹ 150	
4	Kedarnath	612	700	900	180	10	₹ 150	
5	Ukhimath	3,638	4,100	5,000	1,000	10	₹ 150	
6	Khatima	58,494	74,100	122,700	24,540	135	₹ 2,025	Very high design therefore 70% septage efficiency considered based on current practices.
	Tanakpur	21,484	25,300	35,800	7,160			
	Banbasa	6,023	7,100	10,100	2,020			
7	Kotdwar	135,544	143,100	160,600	32,120	125	₹ 1,875	Very high design therefore 70% septage efficiency considered based on current practices.
	Dogadda	2,422	2,600	2,900	580			
8	Dharchula	7,039	7,700	9,100	1,820	10	₹ 150	
9	Karnaprayag	9,850	11,000	14,000	2,800	40	₹ 600	
	Gauchar	8,864	9,900	12,600	2,520			
	Pokhari	6,119	6,900	8,700	1,740			
10	Manglaur	6,049	6,700	8,300	1,660	140	₹ 2,100	Very high design therefore 70% septage efficiency considered based on current practices.
	Jhabrera	7,775	8,600	10,600	2,120			
	Landhaura	2,330	2,600	3,200	640			
	Laksar	1,800	2,000	2,500	500			
Total		363,321	416,200	566,400	113,280	600	₹ 9,000	

ANNEXURE-9								
COSTING-FSTP PHASE III								
Cluster No.	City	Population (Post expansion) (2018)	Population Project Base Year (2025)	Population Project Design Year (2040)	Households (2040)	Required Capacity (in KLD)	Costing (in lakhs)	Remarks
1	Barkot	7,414	8,600	11,500	2,300	20	₹ 300	
	Naugaon	5,174	6,000	8,100	1,620			
2	Bageshwar	24,656	27,200	33,600	6,720	60	₹ 900	
	Kapkot	5,365	6,000	7,300	1,460			
	Garur	5,002	5,600	6,900	1,380			
3	Champawat	11,029	13,000	18,400	3,680	30	₹ 450	
	Lohaghat	7,926	9,400	13,200	2,640			
4	Berinaag	7,641	8,300	9,900	1,980	20	₹ 900	
	Gangolihaat	7,112	7,700	9,200	1,840			
5	Ghansali	7,775	8,600	10,600	2,120	20	₹ 300	
	Chamiyala	5,306	5,900	7,300	1,460			
6	Chaukhutiya	4,464	4,800	5,300	1,060	10	₹ 150	
	Dwarahat	2,749	3,000	3,300	660			
7	Vikasnagar	24,019	29,200	44,300	8,860	70	₹ 1,050	
	Herbertpur	10,567	12,900	19,500	3,900			
8	Purola	7,931	9,200	12,300	2,460	10	₹ 150	
9	Chinyasilaur	8,844	10,200	13,700	2,740	20	₹ 300	
10	Tharali	4,482	5,100	6,400	1,280	10	₹ 150	
11	Lambgaon	2,330	2,600	3,200	640	10	₹ 150	
12	Satpuli	4,345	4,600	5,200	1,040	10	₹ 150	
13	Didihaat	6,522	7,100	8,400	1,680	10	₹ 150	
14	Ranikhet	5,050	5,400	6,000	1,200	10	₹ 150	
15	Bhikiyasain	3,275	3,500	3,900	780	10	₹ 150	
16	Thalisain	2,982	3,200	3,600	720	10	₹ 150	
Total		181,960	207,100	271,100	54,220	330	₹ 5,550	

ANNEXURE 10		
RATIONALE FOR COSTING OF CO-TREATMENT & FSTP		
Item	**Cost/ percentage**	**Unit**
Cost of FSTP (as per FSTP implemented in period 2015-2016)	10	lakh per KLD
Cost escalation to time (5 years)	4%	per annum
Cost escalation (for hilly state)	6%	one time
Centages	10%	one time
Cost of FSTP	14.20	lakh per KLD
Rounded off	15	lakh per KLD
Note: The cost is highly dependent on the selection of site. *Approach road, electricity and water supply is required to the site before the construction process starts. The cost will also escalate in accordance to escalation of price of cement, steel and diesel.*		
Item	**Cost/ percentage**	**Unit**
Discharge rate	5	cum per 15 min
	20	cum per hour
Cost of septage receiving station Piped inlet, screens, grit chamber	45	lakh
Cost of sump pump	10	lakh
Centages	10%	
Cost of co treatment It is expected that new STPs will not require any additional changes in the process, as sewage sludge handling units are already part of STP	60.5	lakh per unit up to 20 KLD
Rounded off	60	lakh per unit up to 20 KLD
NOTE: For capacity higher than 20 KLD, cost of receiving station will be the same; however extra decanting station and cost of sump pump, will increase @ 1 lakh per KLD		

ANNEXURE 11			
SEPTIC TANK EQUIPMENT AVAILABLE IN INDIAN MARKET			
Sl. No.	**Name of the product**	**No of Models listed**	**Price Range (Rs)**
1	Truck Chassis Mounted Suction Cum Jetting Machine-Heavy	73	43.00 –174.24 Lakhs
2	Truck Chassis Mounted Suction Cum Jetting Machine (Medium)	40	39.15 – 79.04 Lakhs
3	3 Truck Chassis Mounted Suction Cum Jetting Machine (Small)	30	28.09 – 56.47 Lakhs
4	Super Sucker Machine	28	47.79 – 374.58 Lakhs
5	Super Sucker With Auxiliary Engine	2	245.00 – 324.00 Lakhs
6	Tractor Trailer Mounted Suction Cum Jetting Machine	109	2.74 – 26.68 Lakhs
7	Truck Mounted Suction Machine (Heavy)	8	23.5 – 85.00 Lakhs

Refer ESRU Advisory for details

Notes

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National Institute of Urban Affairs