

Advancing Decentralized Sanitation Solutions in the Indian Himalayan Region: Case of Uttarakhand

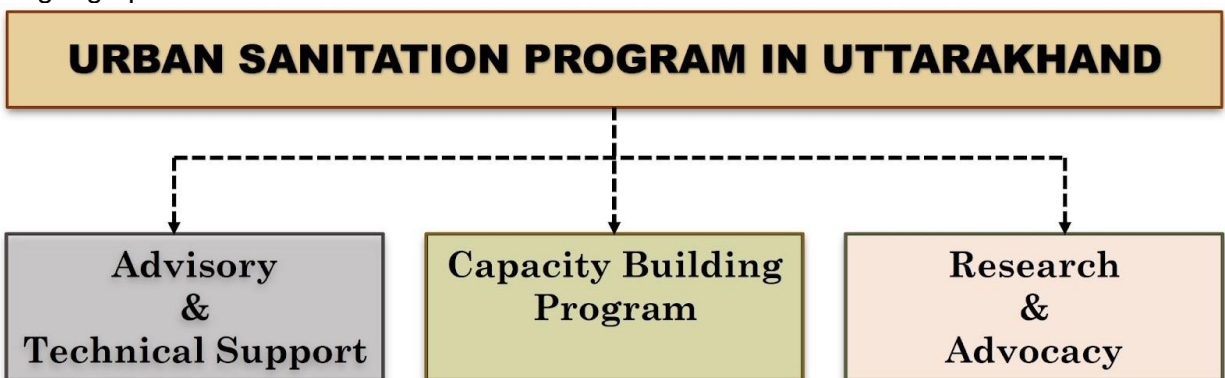
Background

With the onset of the Swachh Bharat Mission, the National Institute of Urban Affairs (NIUA), a research think tank under the Ministry of Housing and Urban Affairs (MoHUA), established the Sanitation Capacity Building Platform (SCBP) in the year 2016. This platform is designed to support states, cities, and medium and small towns in planning and implementing decentralized sanitation solutions, aiming to go beyond open defecation-free (ODF) status by addressing the safe disposal and treatment of human excreta. SCBP facilitates knowledge and experience sharing among cities to help achieve the goals of national missions such as the Swachh Bharat Mission (SBM), Atal Mission for Rejuvenation and Urban Transformation (AMRUT), the Smart Cities Mission, and the Namami Gange Programme. The platform has extended technical support to Rajasthan, Uttar Pradesh, and Uttarakhand and is currently focused on providing dedicated assistance to Uttarakhand. SCBP is also working to disseminate the state's learnings and experiences to the Indian Himalayan Region, covering eleven states and two union territories.

Introduction

To provide comprehensive support towards hand-holding the state of Uttarakhand for an urban sanitation programme under the umbrella of Swachh Bharat Mission-Urban, with the vision to make the state achieve robust and sustainable decentralized sanitation practices. In the year 2019 under the aegis of the National Institute of Urban Affairs (NIUA), Sanitation Capacity Building Platform (SCBP) signed an MoU with the Urban Development Directorate (UDD) of Uttarakhand for scaling the agenda of mainstreaming sustainable sanitation, including faecal sludge and septage management (FSSM) and integrated wastewater and septage management (IWSM) across the state and provide assistance on three fronts i.e. technical support, capacity building and policy advisory. With its mountainous terrain and scattered urban settlements, Uttarakhand presented a unique set of challenges for FSSM.

Additionally, NIUA supported other parastatal agencies of the state, namely, Uttarakhand Peyjal Nigam, Uttarakhand Jal Sansthan, Uttarakhand Urban Sector Development Agency (UUSDA). for addressing septage management challenges. Recognizing this, NIUA, in collaboration with the state government, developed region-specific capacity-building strategies, taking into account the geographical and infrastructural limitations.



The platform played a pivotal role in the capacity building of the urban local bodies (ULBs) officials with hands-on training, knowledge dissemination, and technical guidelines tailored to the state's diverse landscape. The introduction of cost-effective and context-specific FSSM solutions helped

bridge the service delivery gaps, especially in smaller cities and towns that lacked sewerage sanitation systems. Additionally, the programme's focus on strengthening governance frameworks enabled better coordination between local and state-level agencies, enhancing the implementation of FSSM strategies.

Uttarakhand, a hilly state, consists of 105 Urban Local Bodies (ULBs). According to the 2018 population enumeration conducted by the state's Urban Development Department (UDD), the urban population stands at 34,42,224, with approximately 80% reliant on Onsite Sanitation (OSS) systems. Data from the Central Pollution Control Board (CPCB) in 2022 indicates that the state currently operates 56 Sewage Treatment Plants (STPs) with a total treatment capacity of 341.24 MLD. However, only about 67% of this capacity is being utilized, leaving a significant portion of the treatment capacity unutilized.

This unused capacity presents an opportunity to extend services to households not currently connected to the sewerage system. A study conducted by the National Institute of Urban Affairs (NIUA) revealed that only 20% of households in Uttarakhand are connected to a sewerage network. However, NIUA estimates that 70-80% of cities in the state now have access to septage management facilities through operational Sewage Treatment Plants (STPs), meeting a significant portion of urban sanitation needs. This progress was made possible by adopting a holistic approach that addressed capacity-building needs, research, advocacy, and technical assistance for the state.

State sanitation programme

The first phase of the Uttarakhand State Support Program began in 2019 by NIUA and is set to continue providing support to the state until 2025, under the current grant to the platform. However, the knowledge developed by the SCBP between 2016 and 2019 was instrumental in laying the groundwork for this support. This foundational knowledge played a pivotal role in strategically planning and mainstreaming decentralized sanitation solutions, ensuring alignment with the state's long-term vision and setting a clear direction for future initiatives.

The major highlights of the Uttarakhand State Support Programme, along with the overall timeline, are illustrated in the figure below.

SCBP CAPACITY BUILDING OVERVIEW

<ol style="list-style-type: none"> 1. Faecal Sludge & Septage Management. (Technology & Financing Module) 2. Faecal Sludge & Septage Management. (Training of Trainers (ToT) Module) 3. Faecal Sludge & Septage Management. (An Orientation Module) 4. Advanced Training on Faecal Sludge & Septage Management 	2017
<ol style="list-style-type: none"> 1. Faecal Sludge & Septage Management (An Advanced Training Module) 2. Faecal Sludge & Septage Management (An Orientation Module) 3. Training Module on Preparation of Detailed Project Report (For Faecal Sludge & septage Management) 	2018
<ol style="list-style-type: none"> 1. Digital Dissemination Strategy For Capacity Development- 2. Online Training on Co-treatment of Faecal Sludge & Septage Management at STPs. 3. Online Training on the orientation of Co-Treatment FSSM 	2019 & 2020
<ol style="list-style-type: none"> 1. Faecal Sludge & Septage Management (An Orientation Module-Revised) 2. Faecal Sludge Treatment Systems (Design Module) 3. Co-treatment of Faecal Sludge & Septage with Sewerage in STP (Design Module) 4. Integrated Wastewater & Septage Management (Design Module) 5. Integrated Wastewater & Septage Management (Planning Module) 6. 1-Exposure Visit- Odisha 	2021
<ol style="list-style-type: none"> 1. Faecal Sludge & Septage Management. (Planning Module) 2. Integrated Wastewater & Septage Management (Planning Module-Revised) 3. Training on 'Role of SHGs in Urban Sanitation Service Delivery 4. State Consultation Event on Inclusive Sanitation 5. 2- Exposure Visits- Tamil Nadu 6. Strategic Plan for Capacity Building on Non-Sewered Sanitation in Uttarakhand: Learning Impact Assessment Study 	2022

SCBP POLICY ADVOCACY OVERVIEW

2019	<ol style="list-style-type: none"> 1. Governance Co-Treatment of Septage at STPs of Ganga Towns in Uttarakhand 2. Situation Assessment Report, Uttarakhand (Faecal Sludge & Septage Management)
2020	<ol style="list-style-type: none"> 1. Protocol for Septage Management, Uttarakhand. (Advisory Note for Urban Local Bodies for operationalizing) 2. Urban Faecal Sludge & Septage Management in Uttarakhand (A City-Level Sanitation Study)
2021	<ol style="list-style-type: none"> 1. Understanding Effectiveness of Capacity Development. (Lessons from Sanitation Capacity Building Platform-SCBP)
2022	<ol style="list-style-type: none"> 1. Co-Treatment of Faecal Sludge & Septage with Sewage in STP. (Uttarakhand State Advisory Note) 2. Faecal Sludge And Septage Management In Uttarakhand (Strategy and Investment Plan)

SCBP TECHNICAL SUPPORT OVERVIEW

<ol style="list-style-type: none"> 1. Co-Treatment Feasibility (Septage with Sewage)-Dehradun, Uttarakhand) (ADB supported Banjarawala, Mothrawala and Raipur Sewerage projects) 2. Co-Treatment of Septage at STPs of Ganga Towns in Uttarakhand 	2020
<ol style="list-style-type: none"> 1. Faecal Sludge and Septage Co-treatment Design Guidebook-Recommendations for co-treatment of fecal sludge and septage with sewage at Kargi Chowk STP Dehradun- (Volume I: Planning and Designing) (Volume II: Operationalization & Management) 	2021
<ol style="list-style-type: none"> 1. Characterization Of Faecal Sludge, Dewatered & Dried Sludge From Select Faecal Sludge And Sewage Treatment Plants. 	2022

I. Advisory and technical support:

Following the adoption of the National Faecal Sludge and Septage Management (FSSM) Policy in 2017, the Government of Uttarakhand's Urban Development Department (UDD) notified a Septage Management Protocol to provide a framework for effective septage management across all ULBs. This protocol laid the foundation for the state to integrate septage management at a statewide scale. In 2020, the NIUA developed an advisory to help ULBs operationalize this protocol and guide its implementation.

As one of the priority states under the National Mission for Clean Ganga (NMCG), Uttarakhand, along with NMCG, adopted co-treatment at all existing and upcoming Sewage Treatment Plants (STPs). Initially, this was achieved by utilizing 40% of the underutilized capacity of operational STPs, extending their services to nearby cities without treatment facilities through a cluster approach. In addition, Faecal Sludge Treatment Plants (FSTPs) and other interim septage management measures, such as scientific land application, were introduced to address the overall need for septage management.

By adopting this inclusive approach—utilizing existing STPs for co-treatment and employing other septage management techniques—the state is advancing towards Inclusive Sanitation. This strategy broadens the scope of Faecal Sludge and Septage (FSS) treatment and provides sanitation services to all stakeholders, including marginalized populations, through a mix of onsite and offsite sanitation.

In 2022, NIUA drafted an advisory on co-treatment of septage and faecal sludge, which was shared with stakeholders across the state. After consultations, the advisory was approved and circulated, targeting engineers from state parastatal agencies and ULBs responsible for wastewater and septage management. The advisory was endorsed by the then Minister of Housing and Urban Affairs, Shri Hardeep Singh Puri, on World Habitat Day 2022.

A technical report on the feasibility of co-treatment for a 30 KLD septage/faecal sludge facility was submitted to support Ramnagar Pey Jal Nigam's septage management efforts. This led to significant handholding support, including the development of Detailed Project Reports (DPRs) for projects like the 7 MLD Transport Nagar STP Plant, which helped the Ramnagar ULB achieve ODF++ status. This facility was the first of its kind in the Kumaon region, mainstreaming effective FSSM in the state.

Faecal Sludge Treatment and Co-Treatment Design

As part of technical support for Uttarakhand Jal Sansthan, NIUA prepared a design guidebook for faecal sludge and septage co-treatment. The guidebook included two volumes:

- Volume 1: Planning and designing co-treatment facilities
- Volume 2: Operationalization and management of co-treatment facilities

The design aspects of Kargi STP in Dehradun were included as a case study in NITI Aayog's Faecal Sludge and Septage Management: Service Business Models report, highlighting innovative practices for safely managing septage in Indian cities.

Faecal Sludge Treatment Plant (FSTP) at Rudrapur

NIUA, in collaboration with UDD and Pey Jal Nigam, assisted in constructing Uttarakhand's first standalone Faecal Sludge Treatment Plant (FSTP) in Rudrapur. This 125 KLD FSTP, the largest in India, was built with NIUA's technical assistance and handholding support. The DPR of

Rudrapur FSTP was finalized with contributions from NIUA and Rudrapur Nagar Nigam. Currently, NIUA is providing support for the FSTP's operationalisation, in partnership with IIT-Roorkee.

As a result of NIUA's support:

- 92 ULBs have established Septage Management Cells (SMCs) to monitor FSSM activities.
- 58 ULBs have notified Septage Management Bylaws, with others in the approval process.
- 1 stand-alone FSTP and largest FSTP of Northern India is up and running.



125 KLD FSTP, Rudrapur, Uttarakhand (Source: NIUA, 2024)



II Capacity building Programme

In 2019, the SCBP team organized a National Workshop on 'Non-Sewered Sanitation Systems in India' in Mussoorie, followed by a state consultation meeting on 'Co-treatment of Septage at STPs and Technology Options for Septage Management' in Dehradun. These efforts aimed to foster knowledge sharing and collaboration among stakeholders, laying a solid foundation for advancing Faecal Sludge and Septage Management (FSSM) across Uttarakhand.

Between 2018 and 2021, the SCBP organized regular training sessions, including both orientation and advanced modules, as well as exposure visits for officials from ULBs, Pey Jal Nigam, and Jal Sansthan. These capacity-building initiatives aimed to enhance the effectiveness of FSSM across the state. Additionally, the Uttarakhand Academy of Administration in Nainital signed an MoU with the state's technical support unit to conduct state-wide events on FSSM.

Training and Capacity Building Milestones

By 2022, SCBP had conducted seven orientation sessions, reaching 81 ULBs and training 234 participants. These sessions introduced officials to the basics, planning and then advanced courses on FSSM, Integrated Wastewater and Faecal Sludge Management and Co-treatment of FS with sewage, equipping them to address urban sanitation challenges in non-sewered areas. SCBP organized six advanced training sessions, including four on the co-treatment of septage, one on FSTP design, and one on Integrated Waste and Sanitation Management (IWSM). These sessions trained 107 officials from Pey Jal Nigam and Jal Sansthan, enhancing their technical skills for FSSM project implementation. This training targeted officials from ULBs and the National Urban Livelihoods Mission (NULM), focusing on how Self-Help Groups (SHGs) can contribute to urban sanitation service delivery and community engagement.

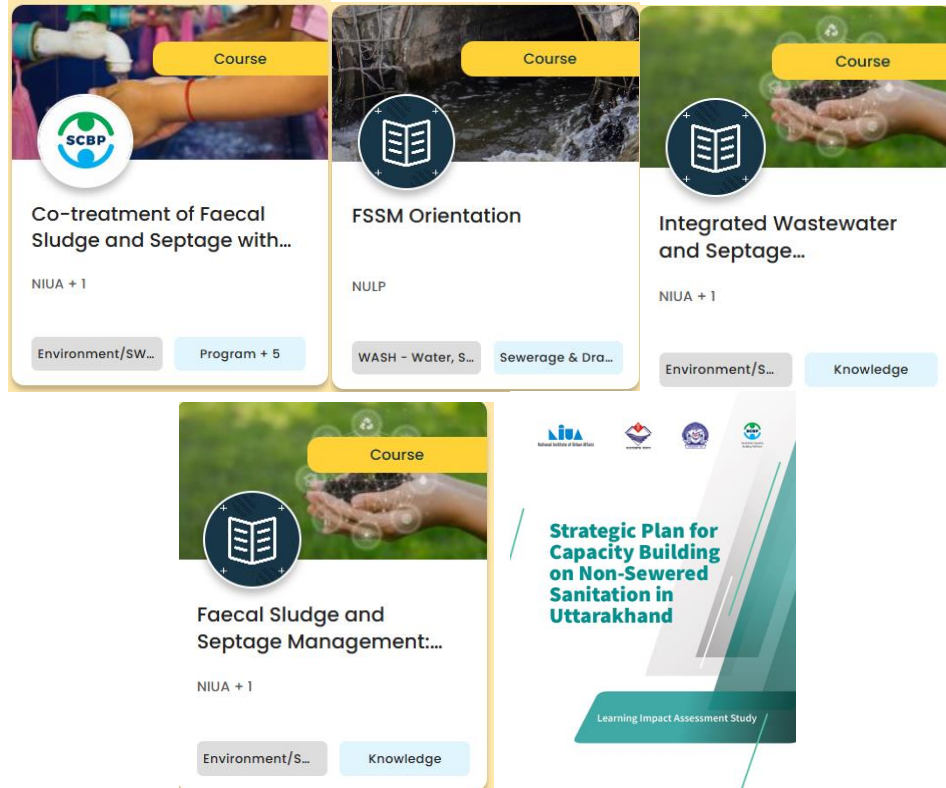
Through the Training Module Review Committee (TMRC) of the National FSSM Alliance, NIUA developed interactive e-learning modules on FSSM and IWSM. These modules, integrated into platforms like Integrated Government Online Training - Mission Karmayogi and the National Urban Learning Platform, equipped thousands of government officials, including those from Uttarakhand, with crucial skills.

Also, SCBP organized three exposure visits to Odisha and Tamil Nadu, allowing officials from Uttarakhand to observe successful FSSM practices. These visits provided insights into scalable models for faecal sludge management.

State Consultation on Inclusive Sanitation: In a state consultation event on Inclusive Sanitation, over 60 ULB and parastatal officials gathered to discuss equity in sanitation, focusing on the needs of marginalized communities and promoting inclusive service delivery.

Based on the capacity building programmes implemented in the state, SCBP developed a Strategic Plan for Capacity Building on Non-Sewered Sanitation in Uttarakhand, which included a Learning Impact Assessment Study to evaluate how training initiatives have influenced the knowledge, skills, and attitudes of the state and city officials. Feedback from participants has been instrumental in refining future FSSM training and implementation strategies.

These concerted efforts have positioned Uttarakhand as a leader in advancing FSSM and Used Water Management, setting the stage for continued progress toward achieving sustainable, inclusive sanitation solutions across the state.



Over the past 5 years, Uttarakhand state has significantly progressed towards managing safe disposal of septage via various interventions through capacity building of the stakeholders (over 368 officials from more than 85 ULBs, parastatal and state departments have been trained through trainings organized by NIUA focussing on wastewater and septage management), developing advisory documents and technical documents at state level as well as through hand-holding support to potential cities.

III Research and Advocacy

In early 2019, NIUA, in collaboration with IIT Roorkee, conducted a research study to assess the co-treatment of septage at Sewage Treatment Plants (STPs) in five Ganga towns of Uttarakhand. This study provided a comprehensive evaluation of the existing status of the STPs and laid the foundation for improved septage management in these towns. Leveraging scientific expertise, the

research informed strategies for optimizing the co-treatment process, particularly for towns along the Ganga River.

NIUA also developed a Strategic Investment Plan (SIP) to help Urban Local Bodies (ULBs) collaborate on safely managing human excreta. Recognizing that implementing standalone FSSM units is a time-intensive process, NIUA formalized advisory notes for interim solutions, such as "Deep Row Entrenchment" as recommended in the SBM 2.0 guidelines, to manage septage efficiently in the short term.

The SIP was structured in three phases:

1. Proof-of-Concept Phase: Focused on larger towns and cities with existing or proposed co-treatment facilities at operational or under-construction STPs, or at proposed Faecal Sludge Treatment Plants (FSTPs).
2. Upscaling Phase: Proposed co-treatment at additional STPs and FSTPs in smaller towns.
3. Closure Phase: Targeted 100% FSSM coverage, particularly in small towns and peri-urban areas, ensuring sanitation access in remote locations.

The SIP formalization ensured the optimal utilization of resources. Towns were clustered based on a road distance of 25 km, as recommended by the Uttarakhand Septage Management Protocol. This SIP was consolidated through a city-level sanitation study, which included assessments of the entire sanitation value chain—containment, conveyance, treatment, and disposal—in nine cities. The study also evaluated municipal staffing, financial resources, and the budget allocated for sanitation services.

To further advance the reuse and disposal of treated faecal sludge and septage, NIUA, in collaboration with IIT Roorkee, analysed the characteristics of faecal sludge, co-treated sludge, and sewage sludge from selected STPs and FSTPs. The study aimed to advocate for national-level standards for the utilization of biosolids and treated faecal sludge, contributing to the safe reuse of treated wastewater and septage.

Additionally, NIUA facilitated a research initiative with Biome organization to examine the informal reuse of untreated wastewater and faecal sludge in agriculture and its impact on health and the environment. This study highlighted the risks posed by unregulated reuse practices, emphasizing the need for safe and sustainable approaches to wastewater and faecal sludge management. The findings addressed critical knowledge gaps and aimed to inform better practices in the urban sanitation sector, aligning with the reuse objectives outlined in SBM 2.0.



Parvat Manthan': Manifestation of clean and sustainable hill - To scale and amplify the learnings from Uttarakhand to other Indian Himalayan States,

NIUA conceptualized a forum - 'Parvat Manthan': Manifestation of clean and sustainable hill states, to bring together Himalayan states and cities to act and achieve the UN Sustainable Development Goals (SDGs) primarily on SDG 6 and 11. The forum is timely as the UN-SDG recognizes this decade as the 'Decade for Action' to achieve the goals, and an explicit reference to "Human rights to a clean, healthy, and sustainable environment" has been included in the Conference of Parties (COP27).

The forum aims to build a collaborative and responsive platform that provides handholding support to hill states and cities to engage actively with each other and with the central governments to support them in becoming inclusive, sustainable, and climate-resilient states in the areas of urban water and sanitation.

The forum is facilitating knowledge and experience sharing on water and sanitation to achieve the objectives of national missions such as the SBM, AMRUT, Smart Cities Mission (SCM) and NMCG.

The forum initiated its programme and launched during the Dialogue on Clean and Sustainable Hill States on 19th June 2023. The support in the Indian Himalayan Region (IHR) is being provided in the areas of advocacy, policy formulation, capacity building and technical handholding support.

Conclusion

To tackle the multifaceted challenges associated with sanitation, it is crucial to adopt a comprehensive understanding of the state's situation from both social and technical perspectives. A key lesson from the state's experience is that a one-size-fits-all solution is insufficient; instead, an integrated approach that is affordable, inclusive, and climate-resilient is essential. This approach should encompass continuous capacity building, ongoing research and advocacy, and sustained advisory and technical support. Such a holistic strategy is vital for developing, enabling, and sustaining effective sanitation programming, ultimately contributing to improved public health outcomes.

References:

- [Rapid Assessment of Water and Sanitation in Hill States](#)
- [Uttarakhand State Advisory Note on Co-treatment](#)
- [Advisory note for Urban Local Bodies for operationalizing Protocol for Septage Management](#)
- [Strategic Plan for Capacity Building on NSS in Uttarakhand](#)
- [Faecal Sludge and Septage Management in Uttarakhand , Strategy and Investment Plan](#)

For more documents, visit: <https://scbp.niua.org/>