RESEARCH REPORT

FAECAL SLUDGE AND SEPTAGE MANAGEMENT IN UTTARAKHAND: A REVIEW OF THE LAW AND POLICY FRAMEWORK

MARCH 2019

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ACKNOWLEDGEMENT:

Arkaja Singh from the Centre for Policy Research and Depinder Kapur from the National Institute of Urban Affairs managed and supported this assignment and provided feedback at various stages of the research. Yogini Oke from the Centre for Policy Research provided research assistance, support, and review, during the course of the assignment.

SUGGESTED CITATION:

Bhullar, L., Koonan, S.; Cullet, P. 2019. Faecal Sludge and Septage Management in: Uttarakhand: A review of the law and policy framework. New Delhi: Centre for Policy Research.

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I. BACKGROUND

A. FSSM: The Concept

The key focus of sanitation interventions in urban India has been to ensure access to toilets and construction of sanitation infrastructure such as a sewerage network and sewage treatment plants. They do not adequately focus on the issue of faecal sludge and septage management (FSSM) in a safe and sustainable manner [see Box 1 for definitions of faecal sludge and septage].

Individual households, government offices, institutions and commercial establishments have been/are constructing toilets without adequate awareness and facilities to ensure safe disposal of faecal sludge and septage. The same applies to community/public toilets. This leads to open dumping of untreated faecal sludge and septage in the environment. This is an important issue faced by the urban sanitation sector and it is going to become even more critical in the future as the government is getting a large number of toilets constructed as part of the Swachh Bharat Mission – Urban (SBM-Urban).

According to Census 2011, a majority of individual households with toilets (about 48 per cent) in urban India rely on on-site sanitation (OSS) systems such as septic tanks and pits.[1] The most important reason for this state-of-affairs is that the conventional sewerage system is not economically and technically viable in all urban areas. Therefore, basic sanitation infrastructure in urban areas in India follows a hybrid approach where off-site and on-site sanitation systems co-exist (see Figure 1).

Box 1: Definitions

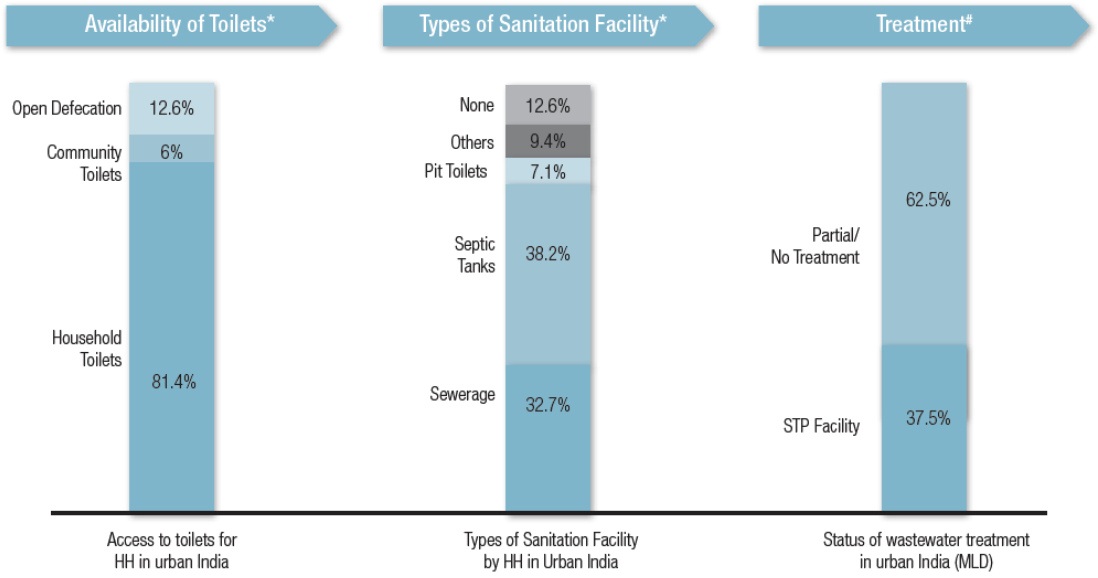
Faecal sludge is raw or partially digested, in a slurry or semisolid form, the collection, storage or treatment of combinations of excreta and black water, with or without grey water. It is the solid or settled contents of pit latrines and septic tanks. It comes from onsite sanitation systems.

Septage is the liquid and solid material that is pumped from a septic tank, cesspool, or such onsite treatment facility after it has accumulated over a period of time. Usually, septic tank retains 60% - 70% of the solids, oil, and grease that enter it. The scum accumulates on the top and the sludge settles to the bottom comprising 20% - 50% of the total septic tank volume when pumped.

Source: Ministry of Urban Development, National Policy on Faecal Sludge and Septage Management (FSSM) (MoUD 2017) 9.

1 Ministry of Urban Development, Primer on Faecal Sludge and Septage Management (MoUD 2017).

Figure–1: Status of urban sanitation in India[2]



Further, off-site sewage treatment plants are available only for 37.5 per cent of human waste. Households dump the remaining 62.5 per cent of untreated or partially treated human waste, which includes septage and sludge from on-site sanitation systems, on land or discharge it into drains or waterbodies. FSSM is essential because of potential implications for public health and the environment. A report highlights that a truckload of faecal sludge 'dumped indiscriminately is equivalent to 5000 open defecations.[3]

FSSM is the process of safe collection, conveyance, treatment and disposal/ reuse of faecal sludge and septage from on-site sanitation systems such as pit latrines and septic tanks. A typical FSSM system (see Figure 2) involves the following steps:

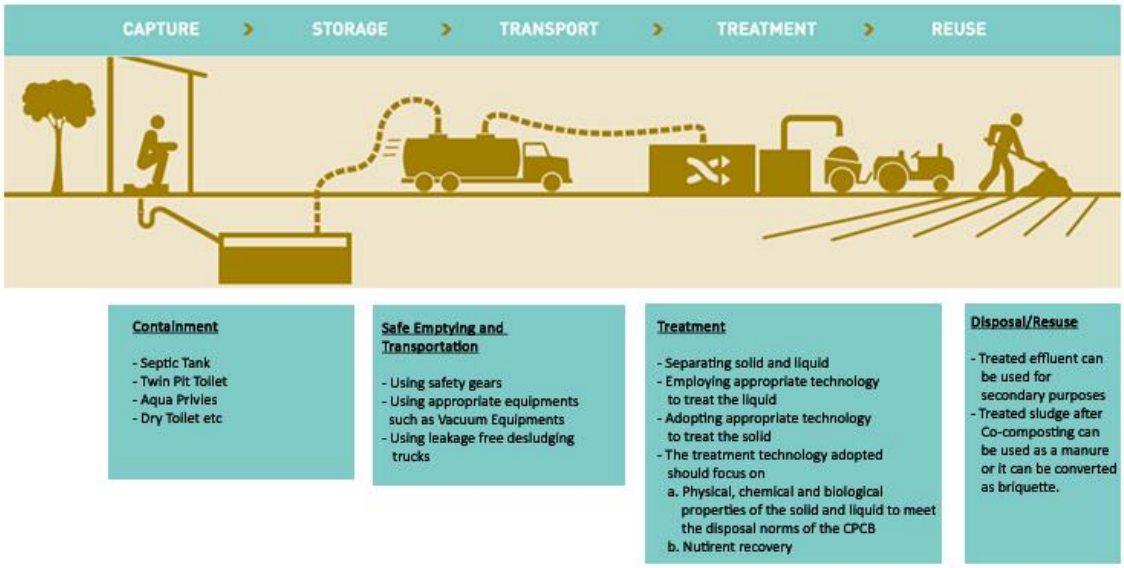
(a) Desludging of a septic tank/pit latrine;
(b) Storage of the collected waste in a sealed container;
(c) Transportation of the collected waste to a treatment facility;
(d) Treatment of the collected waste; and
(e) Disposal of treated waste or recycling/reuse of the treated waste.

Figure 3 depicts the reality of FSSM practice in India.

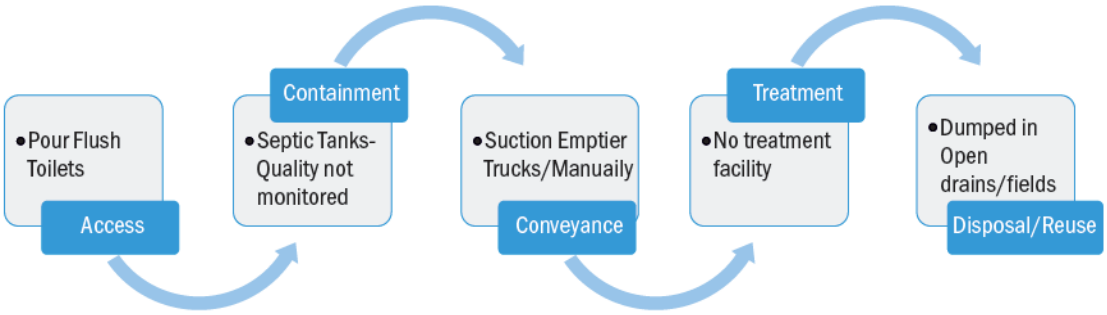
2 Ministry of Urban Development, National Policy on Faecal Sludge and Septage Management (MoUD 2017) 11.

3 D Kone et al, 'Helminth Eggs Inactivation Efficiency by Faecal Sludge Dewatering and Co-composing in Tropical Climates' (2007) 41(19) Water Research 4397-402.

Figure–2: FSSM Chain[4]



Figure–3: Current FSM practice in India[5]



Safety - of individuals involved in the abovementioned work, and of the environment - is an important aspect of FSSM. Thus, manual desludging is completely unacceptable. Desludging must be a mechanised process. The treatment facility could be either a dedicated Faecal Sludge Treatment Plant (FSTP) or a Sewage Treatment Plant (STP) where both sewage and faecal sludge and septage are co-treated. However, the latter may raise technical challenges or issues of feasibility because faecal sludge and septage is different from sewage in terms of chemical and physical characteristics. The former has a much higher pollution load and its degradation characteristics are very different from the latter.[6]

4 Ministry of Drinking Water and Sanitation, Solid and Liquid Resource Management: Faecal Sludge Management (MDWS) 11.

5 SK Sarkar et al, Faecal Sludge Management in Urban India: Policies, Practices, and Possibilities (TERI Discussion Paper 2016) 6.

6 ibid 5.

B. Methodology

The key objectives of the research were:

(a) Mapping and analysis of the potential and limitations of existing law, policy, institutional and operational framework concerning FSSM at the level of the Central Government and in the target state/cities; and
(b) Analysis of institutional issues and challenges to implement the legal and regulatory framework for FSSM with a special emphasis on the selected cities.

This research followed a two-stage process to achieve the abovementioned objectives. The first stage involved the mapping of relevant law, policy and institutional frameworks in the context of FSSM in the State of Uttarakhand with a special emphasis on three cities/towns (Doiwala, Pithoragarh and Rudrapur) through a desk-based review of primary documents and secondary literature.

The second stage involved the examination of implementation of the regulatory framework through fieldwork in the three cities/towns with varying populations that lead to their categorization as different forms of urban local bodies. Doiwala is located very close to the State capital and to important religious sites near the river Ganga. Following delimitation in 2018, it has become a Nagar Palika Parishad (municipality) (previously, it was a Nagar Panchayat (Notified Area Council)). A sewage treatment scheme is being implemented in Pithoragarh, which is a Nagar Palika Parishad (municipality) situated at a high altitude with rocky strata and the existence of the practice of manual scavenging. Rudrapur is a Nagar Nigam (municipal corporation) where the first pilot septage treatment plant is being established.

The fieldwork involved in-depth semi-structured and unstructured interviews with different agencies and stakeholders at the state level (in Dehradun) and local level (in Doiwala, Pithoragarh and Rudrapur). We supplemented these interviews with unstructured or semi-structured interviews with the residents of concerned urban areas (see **Annexure** for questionnaire).

II. FSSM IN UTTARAKHAND: GENERAL

The State of Uttarakhand is a mountainous state in the north of India. It occupies a total land area of 53,484 sq km, which is 1.73 per cent of India's total land area. According to Census 2011, the total population of Uttarakhand is 10,116,752, with a majority of the population (69.45 per cent) living in rural areas. Administratively, the State is divided into 13 districts, 78 sub-districts, 74 statutory towns, 41 Census towns and 16,793 villages.7 There are 92 Urban Local Bodies (ULBs), which include six Nagar Nigams, 42 Nagar Palika Parishads, and 44 Nagar Panchayats.

According to the Uttarakhand Jal Sansthan, 93 of its 500 water projects, which supply filtered water that takes care of both irrigation and drinking needs, have witnessed more than 90 percent decrease in water discharge in the past three years. The report notes that 268 projects have seen water discharge reduce by 75-90 percent and another 139 projects have seen it dip by 50-75

[7] Census of India 2011: Availability and Type of Latrine Facility: 2001-2011 <http://censusindia.gov.in/2011census/hlo/Data_sheet/India/Latrine.pdf>.

percent.8 This water scenario has significant implications for sanitation particularly in a context when the prevailing model of sanitation is water-based.

Piped sewerage system connects only 31.7 per cent of the total urban households with individual household latrines. More than half of the urban population in the State relies on On-Site Sanitation (OSS) systems such as septic tanks (53.1 per cent) for the collection of faecal sludge and wastewater. Further, some individual households in the State discharge the waste from their toilets directly into open drains.

Table 1 (a) and (b) documents the availability and type of latrine facility in the State as per Census 2011.[9]

In February 2018, the State Government declared itself open defecation free (ODF).

The sewage treatment capacity of the State is 152.9 MLD in contrast to sewage generation of 495 MLD. In other words, different sources discharge 342.1 MLD untreated sewage to water bodies, and this is responsible for deterioration of water quality.[10]

Given the limited availability of the piped sewer system, the absence of sewage treatment facilities in most urban areas, and reliance on-site sanitation as the primary sanitation system in urban areas, FSSM ought to form an important component of sanitation interventions in the State of Uttarakhand.

Table 2 documents the number of households by availability of type of latrine facility in the three fieldwork cities/towns based on Census 2011.[11]

Table 1 (a)

	Total households	**Percentage of households having**			
		Water closet	Pit latrine	Other latrines	No latrine
Total	1,997,068	53.2	11.9	0.7	34.2
Rural	1,404,845	39.4	14.1	0.5	45.9
Urban	592,223	85.9	6.5	1.1	6.4

[8] Uttarakhand Jal Sansthan, 'List of Schemes, Discharge decreased more than 50% in last 3 years' <http://ujs.uk.gov.in/pages/display/62-list-of-schemes-500>.
[9] Census of India 2011: Availability and Type of Latrine Facility: 2001-2011 (n 7).

[10] Central Pollution Control Board, 'Directions under section 18(1)(b) of the Water (Prevention and Control of Pollution) Act, 1974 regarding treatment and utilization of sewage' (21 April 2015) <http://cpcb.nic.in/cpcbold/Uttrakhand_swg_18(1)(b)_2015.pdf>.

[11] HH8: Households by availability of type of latrine facility (excluding institutional households), <http://censusindia.gov.in/2011census/hlo/HLO_Tablepage/HLO_table/05/HH2808-0500.pdf>.

Table 1 (b)

	Total households	**Percentage of households having**									
		Piped sewer system	Septic tank	Other system	With slab/ ventilated improved pit	Without slab/open pit	Night soil disposed into open drain	Night soil removed by human	Night soil serviced by animals	Public latrine	Open
Total	1,997,068	11.8	40.0	1.4	11.3	0.6	0.3	0.2	0.1	1.1	33.1
Rural	1,404,845	3.4	34.5	1.5	13.5	0.7	0.1	0.2	0.1	0.9	45.0
Urban	592,223	31.7	53.1	1.2	6.2	0.4	0.8	0.2	0.1	1.7	4.7

Table 2

	No. of households	**Households having**									
		Flush/pour flush latrine connected to			Pit latrine		Night soil disposed into open drain	Service latrine		No latrine within premises – alternative source	
		Piped sewer system	Septic tank	Other system	With slab/ VIP	Without slab/ open pit		Night soil removed by human	Night soil serviced by animals	Public latrine	Open
Doiwala	1832	46	1673	1	10	-	1	-	-	32	69
Pithoragarh	13068	3269	8406	125	835	50	3	-	3	117	260
Rudrapur	27541	5605	19103	725	492	332	100	24	23	161	976

C. Field observations

Observations from the field in respect of the status of FSSM in the selected towns and the issues that a ULB might face in FSSM implementation also highlight the need for urgent action in these and other parts of the State of Uttarakhand.

a. Sanitation system

There is no sewerage system or sewer line in Doiwala. Individual households have connected their toilets to soak pits, which they empty every two-three years.

Rudrapur is situated in the Terai region. There is no sewerage system or sewer line because of the potential danger of backflow. A majority of the households have constructed *pucca* septic tanks. There are very few soak pits because of the high-water table. The capacity of the septic tanks depends on the size of the household – 1 m^3, 2 m^3, 3m^3 etc. There are different sized septic tanks – 4*7, 6*6, 6*8 feet, etc. There is an increase in the frequency of emptying because there is less soakage and more liquid in the septic tank to the high-water table. Further, there is no decomposition because of the lined bottom, which leads to an increase in bacteria (BOD/COD). As a result, old septic tanks are full of sludge. Households may lay a concrete floor on top of the septic tank. They will not break the floor to empty the septic tank unless it is absolutely necessary.

b. Septage collection

The ULB in Doiwala does not own a cesspool emptier vehicle. Households rely on private operators for collection of septage. The local private operator (who is also a ULB employee) charges Rs 3500 per trip while private operators from Dehradun charge less (Rs 3000 per trip). According to one local resident, however, the ULB used to own a cesspool emptier vehicle and charged Rs 1000 per trip.

The ULB in Rudrapur owns two cesspool emptier vehicles – one is operational and the other is non-functional. The ULB charges Rs 1000 per trip and the clerical staff maintains a requisition register. According to a private operator, the government truck is not operational. There are 11 private cesspool emptier vehicles. Only a license to drive the truck is required. According to a ULB official, the private operators charge Rs 1500 per trip. One private operator who owns three trucks charges Rs 1800 per trip for local collection, and Rs 2500-3000 for outstation trips (within a 5-7 km radius). On a given day, this private operator makes up to 10 days, and he is busy during most of the month (except 2-3 days).

As per Census 2011 (see Table 2 above), the manual removal of night soil from some toilets in Rudrapur indicates the continuing practice of manual scavenging in the State despite its explicit legal prohibition since 1993. The Ministry of Social Justice has already confirmed the existence of the practice in Rudrapur.12 During the fieldwork, a private operator in Rudrapur admitted that sometimes, when there is only dry sludge in the septic tank, they remove it manually (after consuming alcohol) and dump it on the municipal solid waste dump. Further, a study by NIUA found the existence of the practice of manual scavenging for cleaning of pits in Pithoragarh.[13]

[12] Ministry of Social Justice and Empowerment, Survey of Manual Scavengers in Statutory Towns <http://mssurvey.nic.in/UI/StatutoryTown.aspx>.
[13] NIUA, Study of Urban Sanitation, Septage and Waste Water Management in Uttarakhand – Interim Findings (June 2017) (available on file).

c. Septage treatment

There is no septage treatment infrastructure in any of the three towns.

d. Septage disposal

In Doiwala, a private operator disposes of septage on open land, into open drains, or at the STP in Rishikesh. According to the Executive Officer, the ULB complies with the NGT's order prohibiting indiscriminate disposal. The officials of the ULB were going to participate in a state-level workshop in September 2018 to determine next steps following achievement of ODF status, which include septage management.

According to a ULB official in Rudrapur, some households discharge septage directly into drains, and private operators empty septage in fields. A private operator also stated that he dumps septage on his own sugarcane field (which has improved the quality of the crop), or into holes (*gaddas*) in the fields of other farmers for free who sell it as fertilizer at Rs 10,000 per trolley for vegetables. He admitted that he used to dump septage in the river sometimes. However, since the last one year, a fine of Rs 50,000 is being imposed and so he does not engage in this practice anymore. While he linked the fine to the arrival of a new senior ULB official, in fact, the NGT imposed this fine. In fact, a ULB official confirmed that the ULB does not imposed any fines as of now as it cannot offer any alternatives for FSSM.

D. REGULATORY FRAMEWORK

According to the Constitution of India, sanitation and water are included in the State List (Seventh Schedule, List II, Entries 6 and 17 respectively). In other words, the Constitution vests the power to make laws on these subjects in the State. According to the 74th Constitutional Amendment Act, 1992, the responsibility for the planning and delivery of urban services, including sanitation, lies with ULBs under local municipal laws. In addition, Article 252 of the Constitution empowers Parliament to legislate for two or more States by consent and adoption of such legislation by any other State. This provision has led to the enactment by Parliament of laws relating to environment, and manual scavenging.

This section examines the provisions of these laws – first, at the national level and then, at the State level. It also looks at policies, administrative directions and guidelines issued by the government.

a. National level

i. Laws

Laws relating to environmental protection including prevention and control of water pollution, as well as those concerning the practice of manual scavenging are relevant for FSSM.

Environmental protection

Treatment and safe disposal of faecal sludge and septage are important components of the FSSM chain because of the potential of faecal sludge and septage to pollute the environment. The **Environment (Protection) Act, 1986** (EPA) and the **Water (Prevention and Control of Pollution) Act, 1974** (WPCPA) provide a framework for the control of domestic effluents. The EPA applies in principle to every establishment, agency, or individual discharging any pollutant into the environment. The term 'pollutant' includes treated or untreated sewage. The WPCPA

explicitly prohibits dumping of all pollutants beyond the prescribed limit to any stream, well or sewer. It also empowers the Central Pollution Control Board (CPCB) at the central level and the State Pollution Control Board at the state level to take regulatory measures to prevent and control water pollution. Thus, the direct discharge of untreated faecal sludge and septage on land or into water is undoubtedly not permissible under these laws. The violators are liable to be prosecuted and punished under these laws.

These laws also regulate treatment and disposal operations. The setting up of STPs or FSTPs is subject to a consent procedure, which means that the terms and conditions stipulated by the concerned SPCB govern their working. These operations are also subject to the effluent discharge standards prescribed under the **Environment (Protection) Rules, 1986** (EPR). On 13 October 2017, the Central Government amended Schedule I of EPR to include a new entry (Sl. No. 105), which lays down effluent discharge standards for STPs that are applicable to all modes of disposal. The parameters and their corresponding acceptable concentration is as follows:

- pH - 6.5-9.0
- BOD (mg/l) - 20-30 (depending on particular areas)
- TSS (mg/l) - < 50-<100 (depending on particular areas)
- Faecal Coliform (MPN/100 ml) - <1000

The amendment further provides that reuse/recycling of treated effluent shall be encouraged and in cases where part of the treated effluent is reused and recycled involving possibility of human contact, the abovementioned standards are applicable. Further, section 5 of EPA empowers the pollution control bodies at the central/state/Union Territory (UT) level to take into account local conditions and issue more stringent norms than existing ones.

These laws give an overarching supervising power to the CPCB and the Central Government to step in to take necessary actions if required.

Further, the Central Government has enacted the Solid Waste Management Rules, 2016 in exercise of its statutory power under EPA. These Rules apply to final and safe disposal of post-processed residual faecal sludge and septage to prevent contamination of ground water, surface water and ambient air.

Manual scavenging

The law prohibits manual handling of human excreta, which amounts to manual scavenging. According to the Employment of Manual Scavengers and Construction of Dry Latrines (Prohibition) Act, 1993, the employment of manual scavengers is a criminal offence. This law bans dry latrines, that is, latrines with no water-seal or flushing mechanism and provides for their conversion into pour/flush latrines.

This law is complemented by the Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013 (2013 Act), which is broader in scope and application. The 2013 Act specifically includes the acts of manual cleaning of septic tanks and sewers under the definition of ‘manual scavenging’. It bans ‘hazardous cleaning’ in relation to sewers and septic tanks. It permits manual cleaning of sewers and septic tanks, if necessary, only in very controlled situations, with adequate safety precautions, and in accordance with specific rules and protocols for the purpose. Thus, these two laws together prohibit manual scavenging in the contexts of dry latrines, OSS systems such as septic tanks and pits, and cleaning of sewerage systems.

The Prohibition of Employment as Manual Scavengers and their Rehabilitation Rules, 2013 (2013 Rules) provide details of measures to ensure the safety of the workers engaged in cleaning of OSS and sewerage systems. Rule 4 of the 2013 Rules provides a list of protective gear and safety

devices to prevent or control the exposure of sanitation workers to hazardous substances and gases while cleaning septic tanks. The list, which includes 44 protective gear and safety devices, is illustrative; it is not exhaustive. It also includes an illustrative list of 14 cleaning devices that the employer/contractor is required to provide to the workers. It is the duty of the local bodies to ensure that the workers are using cleaning devices so that they do not need to clean sewers manually. The implementation of these provisions is essential during the collection and transportation of faecal sludge and septage from households.

ii. Policies, administrative directions and guidelines

Non-binding instruments prepared by the Bureau of Indian Standards and ministries responsible for urban development and water resources also influence FSSM.

Bureau of Indian Standards

The BIS Code of Practice for Installation of Septic Tanks (IS:2470), 1985 (Code) prescribes norms and standards to be followed in the construction and maintenance of septic tanks. It is mandatory to have septic tanks in areas that are not connected to sewer networks. The Code also addresses issues such as the location of septic tanks, its size etc. For instance, it provides that septic tanks are not be constructed in swampy areas or areas prone to flooding and that they should be accessible for cleaning.

The Code also include norms regarding desludging of septic tanks. It provides that 'half yearly or yearly desludging of septic tank is desirable' (emphasis added). The Code further dilutes the norms and states that 'small domestic tanks, for economic reasons, may be cleaned at least once in 2 years provided the tank is not overloaded due to use by more than the number for which it is designed'. The Code also discourages very frequent desludging as it may inhibit the anaerobic action in the tank. At the same time, it specifically underlines the need for mechanisation of the sludge removal process and provides that 'manual cleaning of sludge should be removed'.

Ministry of Urban Development (MoUD) (now Ministry of Housing and Urban Affairs (MoHUA))

The National Urban Sanitation Policy, 2008 (NUSP) was adopted with the objective of making 'all Indian cities and towns totally sanitized, healthy and liveable and ensure and sustain good public health and environmental outcomes for all their citizens with a special focus on hygienic and affordable sanitation facilities for the urban poor and women'. It touches upon FSSM, for instance, by emphasising the need for inclusion of proper disposal and treatment of sludge from on-site installations as part of City Sanitation Plans (CSPs). It also underlines the importance of the use of modern and safe technology, and the provision of adequate safety equipment such as gloves and boots, regular health check-ups, medical and accident insurance cover for sanitation workers. Further, we can view FSSM as an integral part of the focus of the NUSP where the latter emphasises the objective of safe disposal of human excreta.

The objective of the Advisory Note – Septage Management in Urban India, 2013 is 'outlining the contents and steps of developing a Septage Management Sub-Plan (SMP) as a part of the city sanitation plans (CSP) being prepared and implemented by cities'. Septage here refers not only to faecal sludge from septic tanks but also from pit latrines and on-site toilets. The Advisory Note underlines the need to follow the relevant guidelines and laws such as the National Building Code, the CPHEEO Manual, and the EPA.

In addition, this instrument specifically emphasises certain aspects of FSSM related issues. For instance, on the frequency with which septic tanks and other OSS are de-sludged, it recommends de-sludging once in every two to three years, or when the tank becomes one-third full. Similarly, it emphatically suggests mechanisation of sewage cleaning services to avoid manual scavenging.

The Advisory Note goes on to suggest stringent restrictions on, and punitive measures for, all private parties offering manual septage cleaning services.

Insofar as treatment of septage is concerned, the Advisory Note advocates co-treatment of septage along with domestic sewage at a STP, albeit with adequate precautions to prevent the treatment process being affected by the high concentration of pathogens and other contents in septage when compared to sewage. In other words, the government should consider a separate facility for septage treatment in case STPs are not available, or it is not practically feasible to transport septage to the nearest STP.

The Central Public Health and Environmental Engineering Organisation (CPHEEO)'s Manual on Sewerage and Sewage Treatment, 2013 provides detailed guidelines on almost all aspects of FSSM. It lays down parameters for toilet superstructures such as squatting pan and trap and foot rests. It also lays down norms regarding location of pits, and the size and design of pits/septic tanks depending on the local topography. Similarly, the CPHEEO Manual prescribes the minimum distance between the OSS unit and drinking water sources. It provides:

'[I]f it cannot be avoided or the pits are to be constructed adjacent to ponds or tanks, then the top of pits should be raised to 0.6 m to 0.8 m above the ground level and earth filling should be done all around the pits up to a distance of 1.5 m right up to the pit top.'

The CPHEEO Manual prescribes that the minimum acceptable design interval between successive manual desludging of each twin leach pit could be one-and-a-half-years. However, to provide a reasonable degree of operational flexibility, it is desirable to provide storage volume for three years in urban areas and two years in rural areas. In the case of septic tanks, it underlines yearly desludging of septic tank as 'desirable'. In case yearly desludging is not feasible or economical, the CPHEEO Manual provides that households should get septic tanks cleaned 'at least once in two - three years, provided the tank is not overloaded due to use by more than the number of persons for which it is designed'.

SBM-Urban was launched in 2014 with the main objective of elimination of open defecation, elimination of manual scavenging and ensuring a system for modern and scientific management of solid waste. The implementation of SBM-Urban is relevant in the FSSM context because it promotes the construction and use of toilets connected to on-site treatment systems such as twin pits, septic tanks, bio-digesters, or bio-tanks in places where it is difficult or not possible to connect toilets to sewerage systems and sewage treatment plants.

The SBM-Urban Guidelines, 2014/2017 recommend different technological options for OSS such as twin-pit latrines and septic tanks. They also provide details of technical features and specifications for toilets that cover almost all aspects of FSSM such as design/technology of the superstructure of the OSS, different types of storage systems, and the transportation and treatment of septage.

From a law and policy perspective in the context of FSSM, the SBM-Urban Guidelines provide that the individual household or owner of the property is responsible for the operation and maintenance of OSS. It also prescribes desludging of septic tanks every two to three years. In case of pit latrines, the SBM-Urban Guidelines underline the responsibility of the concerned householder and provide a very vague standard for emptying of pits, that is, the users should ensure emptying of pits at the 'appropriate time'. Insofar as transportation is concerned, the Guidelines underline that the 'municipal utility or private contractors are required for desludging of septic tanks and to ensure safe disposal of septage at a treatment plant'.

The **Atal Mission for Rejuvenation and Urban Transformation (AMRUT)** was launched in June 2015. It aims to improve basic services (water supply, sewerage & septage, urban transport) in cities through reforms in urban governance, augmentation of basic infrastructure and

establishing a sound institutional framework for effective delivery, through an incremental approach. The AMRUT guidelines prioritise universal coverage of urban households with water supply and sewerage connections and ensuring water availability @ 135 litres per capita per day, followed by provision of storm water drains, urban transport and parks and green spaces. But AMRUT is restricted to Class-I cities, and it monitors ULBs' performance based on their sewerage coverage. There is no mention of septage in Service Level Benchmarks in the State Annual Action Plan 2017-18 (SAAP).

The National Building Code of India, 2016 governs the design, installation and maintenance of toilets, septic tanks, and sewers. Everyone is required to obtain permission from the concerned authority to install waterborne sanitary or drainage installations (Part 9, para 3.2). It further prescribes the design parameters that owners of premises are required to follow while constructing sanitary fixtures such as water closets and urinals. It prescribes that 'water closet compartment shall not be less than 760 mm in width and 1 520 mm in depth for floor mounted closets, and not less than 760 mm in width and 1 420 mm in depth for wall hung water closets' (Part 9, para 4.5.1.3). It also lays down a minimum distance of 18 metres between septic tanks and wells. The Code underlines that OSS like septic tanks is a preferred system in rural and peri-urban areas where the underground system may be neither feasible nor economical (Part 9, para 4.5.14.5.2). It also suggests that use of septic tanks without follow-up treatment should not be permitted. The BIS prepared the Code. Therefore, 'information contained in various Indian Standards is woven into a pattern of continuity and cogency with the interdependent requirements of Parts/Sections' (p.v).

The Model Building Bye Laws, 2016 provide that the location, design and construction of a septic tank shall conform to requirements of the National Building Code (para 4.15). They go on to lay down some requirements inter alia for the location of the septic tanks and subsurface absorption systems. Appendix 'H', which provides details in respect of the 'Regulations for Resettlement and Slum In-situ Upgradation' inter alia states:
'A septic tank shall be provided with capacity 141.6 litres (five cubic feet) per capita, where the municipal services are likely to be available within four or five years or so, pour flush water seal latrines (NEERI type) shall be permitted, where the municipal sewage system is not available and the water table in the area is not high.'

The Primer on Faecal Sludge and Septage Management, 2016 is a supplementary document to the Advisory Note of 2013. It stresses the need for state-wide operative guidelines, City level toolkits, operational manual, management/ financing/ operating FSSM, and FSSM plan for the city.

The National Policy on Faecal Sludge and Septage Management, 2017 sets out the following issues to be addressed through regulation:

- Design of OSS;
- Frequency of desludging;
- Operating procedures for desludging including safety procedures with an emphasis on the safety, health and dignity of sanitation workers;
- Tariff;
- Penalty clauses for untreated discharge for households as well as desludging agents and unsafe emptying and handling of faecal waste; and
- Registration of private service providers.

Ministry of Water Resources, River Development and Ganga Rejuvenation

The Namami Gange programme is an Integrated Conservation Mission, approved as 'Flagship Programme' by the Central Government in June 2014 with a budget outlay of Rs 20,000 crore to accomplish the twin objectives of effective abatement of pollution, conservation and rejuvenation of the river Ganga. The Central Government has divided its implementation into Entry-Level Activities (for immediate visible impact), Medium-Term Activities (to be implemented within five years) and Long-Term Activities (to be implemented within 10 years).

The National Mission for Clean Gangais the implementation arm of National Ganga River Basin Authority (NGRBA). The Central Government constituted the NGRBA under the EPA, but replaced it with the National Council for Rejuvenation, Protection and Management of the River Ganga.

b. State level

i. Laws

There is a link between laws relating to ULBs, to water supply and sewage, and to water more generally on the one hand, and FSSM on the other hand.

I. According to the 74th Constitutional Amendment Act, 1992, the responsibility for the planning and delivery of urban services, including sanitation, lies with ULBs under local municipal laws. Under the **Uttaranchal Municipalities Act, 1916**, every municipality is required 'to make reasonable provision within the municipal area for … constructing, altering and maintaining … latrines, privies, urinals, drains, drainage works and sewerage works' (s 7(h)). Further, the discretionary functions of municipalities, 'within the limits of the municipality and with the sanction of the Prescribed Authority outside such limits' include 'establishing and maintaining a farm or factory for the disposal of sewage' and 'making arrangements for preparation of compost manure from nightsoil and rubbish' (s 8(1)(j) & (jj)).

The municipality may, wherever considered appropriate in the public interest, (a) discharge any of its obligations for providing urban infrastructure and services in relation to water supply, drainage and sewerage, solid waste management on its own, or (b) enter into any private sector participation agreement' (s 97B(3)).

The municipality may undertake or relinquish 'the collection, removal and disposal of excrementitious and polluted matter from privies, urinals and cesspools in the municipal area' after giving public notice, or 'in any building or on any land' on the application or with the consent of the occupier (s 196).

'The municipality may by notice require an owner or occupier on whose land a drain, privy, latrine, urinal, cesspool or other receptacle for filth or refuse exists within fifty feet of a spring, well, tank, reservoir or other source from which water is, or may be, derived for public use, to remove or close the same within one week from the service of such notice' (s 227).

'A Municipality may require by notice the owner or occupier of any land or building

(a) to close, remove, alter repair, cleanse, disinfect or put in good order any latrine, urinal, water-closet, drain, cesspool, dust-bin or other receptacle for filth, sullage-water, rubbish or refuse pertaining to such land or building, or to remove or alter any door or trap-door of any such latrine, urinal or water-closet which opens on to a street or drain; or
(b) to provide such latrines, urinals, water-closets, drains, cesspools, dust-bins or other receptacles for filth, sullage-water, rubbish or refuse as should in its opinion be provided for the building or land whether in addition or not to any existing ones'.

'…the Municipality may specify the description of the thing to be provided, the pattern so as to conform with which the thing is to be altered, and the manner in which the thing is to be done' (s 267(2)).

'The Municipality may, by notice, require the owner or occupier of any land or building [to] cleanse, repair, cover, fill up or drain off a private well, tank, reservoir, pool, depression or excavation therein which may appear to be injurious to health or offensive to the neighbourhood' (s 269(1)). The Municipality may be required to 'provide, any land or right in land necessary for the purpose of effecting drainage' (s 269(2)).

'A Municipality by a special resolution may, and where required by the State Government shall, make bye-laws applicable to the whole or any part of the municipal area, consistent with this Act and with any rule, for the purpose of maintaining the health, safety and convenience of the inhabitants of the municipal area and for the furtherance of municipal administration under this Act' (s 298). The Municipality may make any bye-law described in List I, which includes 'B - Drains, privies, cesspools, etc.':

'(a) regulating in any manner not specifically provided for in this Act, the construction, alteration, maintenance, preservation, cleansing and repair of drains, ventilation shafts and pipes, water-closets, privies, latrines, cesspools and other drainage works;
(b) regulating or prohibiting the discharge into drains or deposit therein, of sewage, sullage polluted water and other offensive or obstructive matter'.

'Whenever the water of a sink, sewer or cesspool or any other offensive matter is allowed to flow, drain or be put upon a public street or place, or into a sewer or rain not set apart for the purpose without the permission in writing of the Municipality or in contravention of any prescribed condition in the permission, the owner or occupier of the land or building from which such water or offensive matter so flows, drains or is put shall be liable, upon conviction, to a fine which may extend to two hundred and fifty rupees' (s 276).

'The Municipality may require by notice any person employing more than twenty workmen or labourers or owning, managing or having control of a market, school or theatre or other place of public resort to provide such latrines and urinals as it may deem fit, and to cause the same to be kept in proper order and to be daily cleansed.' This provision does not apply to a factory regulated by the Indian Factories Act, 1911 (s 268).

The Municipality may 'inspect a drain, water-closet, latrine, urinal, cesspool or other receptacle for filth, and for that purpose may cause the ground to be opened where it thinks fit' (s 270(1)). It will bear the expenses unless any of the inspected facilities are 'found to be in bad order or condition, or was constructed in contravention' of a statutory provision. In the latter case, the expenses will be paid by the owner or occupier and recoverable in the manner provided by Chapter VI (s 270).

The Act includes the following provisions on fees and charges:

- The municipality levies a scavenging tax, or a tax for the cleansing of latrines and privies, on the annual value of buildings or lands or both (s 150).
- 'The municipality or any officer or agency or organisation authorised by it in this behalf may levy user charges, at such rates as may be prescribed from time to time by rules', for the provision of sewerage, and the construction, operation, maintenance and management of sewage treatment plants (s 293B(i) & (vii) respectively).
- 'A Municipality by a special resolution may, and where required by the State Government shall, make bye-laws' (s 298) inter alia for 'fixing any charges or fees to be paid for house

scavenging or the cleansing of latrines and privies under section 196(c), or for any municipal service or undertaking or to be paid under section 293(1) of the Act', and prescribing the time of payment, and designating the authorised person to receive the payment' (List I, J - Miscellaneous (d)).

The obligatory duties of the municipal corporations under the **Uttaranchal Municipal Corporation Act, 1959** extend to making 'reasonable and adequate provision, by any means or measures which it is lawfully competent to use or take, for the following matters', among others:

'(iii) the collection and removal of sewage, offensive matter and rubbish and treatment and disposal thereof including establishing and maintaining farm or factory;'

'(vi) the construction, maintenance and cleansing of drains and drainage works, and of public latrines, water-closets, urinals and similar conveniences;

(vii) supplying, constructing and maintaining in accordance with the general system approved by the Corporation receptacles, fittings, pipes and other appliances whatsoever on or for the use of premises for receiving and conducting the sewage thereof into drains under the control of the Corporation;'

'(ix) guarding from pollution water used for human consumption and preventing polluted water from being so used;

(ix-a) the construction and maintenance of public conveniences;' (s 114).

These two laws governing ULBs may fail to regulate FSSM effectively for several reasons. First, the sanitation-related provisions do not include any explicit reference to septage and/or sludge. Second, the penalties for violation of the provisions of these two laws by 'any person' or the owner of the premises are meagre and they may not have the desired deterrent effect. In any case, where the ULB tends to prioritize certain statutory duties over others or there are resource constraints, the relevant provisions may not even be enforced. Third, there are no consequences in case the authorities fail to comply with their statutory mandate. Finally, there is no regulation and licensing of private service providers.

More recently, the Urban Development Department has prepared a specific **Protocol for Septage Management, 2017**. It governs the ULB, the households and the operators (ULB or private) where facilities for treatment of septage and sludge are available. It includes the following provisions:

- Payment of a septage collection fee by households
- Addition of penalty amount to house tax
- Registration of private operators with the ULB and payment of fee (in addition to vehicle license)
- GPS tracking of vehicles
- Inspection of private operators to check spillage
- Use of treated septage (for agriculture) and treated sludge (for compost)
- Establishment of a Septage Monitoring Committee with the District Magistrate as the Chairperson by 31 July 2018
- Establishment of a Septage Management Cell at the district level.

II. Second, the State Government has established two agencies with a statutory mandate in respect of water supply and sewage in the State.

The **Uttarakhand Water Supply & Sewerage Act, 1975** defines terms such as 'cesspool', 'domestic sewage', 'drain', 'sewage', 'sewer' and 'sewerage' (s 2). Although there is no reference to septage or sludge, there is a specific reference to on-site sanitation systems. Specifically, a drain includes 'a sewer, tunnel, pipe, ditch, gutter or channel or a cistern, flush-tank, septic tank

or other device for carrying off or treating sewage, offensive matter, polluted water, sullage waste-water or sub-oil water' (s 2(6)).

The Act also lays down the functions and powers of the Jal Nigam (JN) (ss 14 and 15(2)) and the Jal Sansthans (JS) (ss 24 and 25(2)), of which the following specifically refer to sewerage/sewage:

Functions of the JN (s 14)

(i) to prepare, execute, promote and finance schemes for sewerage and sewage disposal;
(ii) to render all necessary services in regard to sewerage to the State Government and local bodies, on request to private institutions or individuals;
(iii) to prepare State plans for sewerage on the directions of the State Government;
(vi) to establish State standards for sewerage services;
(viii) to review annually the technical, financial, economic and other aspects of water supply and sewerage system of every JS or local bodies which have entered into an agreement with it;
(ix) to establish and maintain a facility to review and appraise the technical, financial, economic and other pertinent aspect of every water supply and sewerage scheme in the State;
(x) to operate, run and maintain any waterworks and sewerage system, if and when directed by the State Government, on such terms and conditions and for such period as may be specified by the State Government;
(xi) to assess the requirements for manpower and training in relation to water supply and sewerage services in the State;

The Act empowers the JN to inspect all sewerage facilities in the State by whomsoever they are operated; to prepare and carry out schemes for sewerage; to approve tariffs for sewerage services applicable to respective local areas comprised within the jurisdiction of JS and such local bodies as have entered into an agreement with it; and to disburse loans to local bodies for their sewerage schemes (s 15(2)).

Here, it is pertinent to mention that the Uttarakhand Pey Jal Nigam is involved in the construction of septage treatment plants under AMRUT (see below).

The functions of a JS are where feasible, to plan, promote and execute schemes of, and operate sewerage, sewage treatment and disposal; and to manage all its affairs so as to provide the people of the area within its jurisdiction with where feasible, efficient sewerage service (s 24).

Powers of a JS (s 25(2))

'(i) to exercise all powers and perform all the functions relating to sewerage and sewage disposal of the area which lies within its jurisdiction;
(ii) to acquire, possess and hold lands and other property and to carry any sewerage works through, across, over or under any highway, road, street or place and, after reasonable notice, in writing to the owner or occupier, into, through, over or under any building or land;
(iii) to dispose of waste water;
(vi) to introduce or amend tariff for sewerage services, subject to approval of the JN and collect all taxes and charges for these services as may be prescribed.'

A JS shall levy a sewerage tax on premises situated within its area that are covered by its sewerage services, at the following rates:

- In a local area other than a city - not less than two per cent and not more than four per cent of the assessed annual value of the premises, as notified by the State Government
- In a city – not less than 2.5 per cent and not more than five per cent of the annual value of the premises determined under the UK MCA, as notified by the State Government (s 52).

In the case of premises connected with the sewer of a JS, the tax shall be recoverable from the occupier of the premises; otherwise, from the owner of the premises (s 56). The sewerage tax shall not be levied on any premises of which no part is within a radius of 100 metres from the nearest sewer of the JS, or the annual value of which does not exceed Rs 150 (s 55).

The JS shall also fix the cost of wastewater disposal (s 60).

Chapter VIII of the Act deals with sewerage and includes provisions relating to:
- Right of owner or occupier to obtain a connection to empty sewage of the premises into a sewer of a JS
- Power of JS to require owner of premises without sufficient means of effectual disposal of sewage to have connection to its sewer situated at a distance of 50 metres from any part of the premises
- Prohibition of connection with sewer without permission of JS
- Power to examine and test a private sewer or cesspool believed to be defective

Where an offence under the Act is committed, the JN or a JS should file a complaint before a court within six months (s 83). The penalty is a fine, which may extend to Rs 1000 and with further fine which may extend to Rs 50 for every day on which such contravention or failure continues after the first conviction (s 84).

Byelaw 5 of the **Uttarakhand Jal Santhan Water Supply & Sewerage Byelaws, 2008** provides *inter alia* for application, sanction, execution, meter reading and billing of sewerage service connection. The application must be accompanied by a plan of the premises, which shall specify the location of sewers, soakage pits, septic tanks, soak pit, manholes, inspection chambers, storm water drains etc. Byelaw 13 lays down some requirements in respect of cisterns and water closets.

III. The third category of relevant laws concern local development authorities. Again, there is no mention of septage or sludge here.

The **Uttarakhand Urban and Country Planning and Development (Amendment) Act, 2013** empowers the Local Development Authority to dispose of sewage. The Act also includes a few references to the terms ‘drain’, ‘drainage’, ‘sewer’ and ‘sewerage’.

The **Uttarakhand Building Construction and Development Bye-Laws/Regulations, 2011** (Amendment 2015) provide that:

‘3.1 For general construction requirements, stability of structure and as per part-4 of National Building Code – 2005, permission for construction of building shall not be required for the following works if bye-laws/regulation related to fire safety requirements are not violated, …

xii Construction work for implementation of any services by central/state Government or any local body for the purpose of inspection or renovation or repair of sewer lines…

xv Construction of septic tank/soak pit’.

IV. FSSM will have a bearing on laws relating to water management and regulation more generally whether or not the laws link the two explicitly. Under the **Uttarakhand Water Management and Regulatory Act, 2013**, the Authority is empowered to impose penalty on any

organization or agency, whether Government or private, any individual or a group of individuals who change, alters or cause to change or alter the status of any surface or ground water resources without its specific sanction or approval (s 12(h)). Further, the Authority shall support and aid the enhancement and preservation of water quality within the State in close coordination with the relevant State agencies (s 13(3)). However, the Act has not come into force yet.

c. Implementation of Central Government initiatives

63 ULBs in the State of Uttarakhand are developing CSPs under the NUSP 2008. The Central Government has sanctioned three CSPs, including for Doiwala,[14] and the ULB in Doiwala has formed the City Sanitation Task Force.[15]

The Central Government has identified seven ULBs – Dehradun, Haridwar, Haldwani, Rudrapur, Kashipur, Roorkee, and Nainital – as Mission cities under AMRUT.[16] The total project fund for sewerage and septage management (FY 2015-19) is Rs 211.83 crore, and the sharing pattern between Centre and State (90:10) is Rs 190.65 crore and Rs 21.18 crore.[17]

Out of Rs 79.65 crore earmarked for Rudrapur, Rs seven crore will be invested for sewerage and septage management.[18] As mentioned earlier, the Uttarakhand Pey Jal Nigam is responsible for planning, survey, design and execution of sewage schemes in the State. The law also authorizes it as a construction agency. The Project Implementation Unit Kashipur is implementing the Rudrapur septage scheme (on pilot basis) to cover a population of more than 25 per cent and less than 50 per cent.[19] On 31 May 2018, the Office of the Superintending Engineer, Construction Circle, Uttarakhand Pey Jal Nigam Nainital issued an e-tender notice to Design, Build, Operate and Transfer a 125 KLD capacity septage treatment plant and all allied infrastructure at Rudrapur city on any well proven technology including five year O&M under AMRUT on turn-key basis.[20]

As of 2018, the Central Government had sanctioned 31 sewage management projects for the State of Uttarakhand including the construction of new STPs, upgradation of existing STPs and Interception & Diversion (I&D) works. Of these, the State Government has completed 13 projects and 18 projects are under construction (including upgradation of existing STPs in Haridwar and Rishikesh, construction of new STPs in Haridwar and Rishikesh, and I&D works in Haridwar).

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[14] Urban Development Department, City Sanitation Plan, Uttarakhand, p.10 <http://udd.uk.gov.in/files/DOIWALA_CSP.pdf>.

[15] Ministry of Housing and Urban Affairs, City Sanitation Plans of Uttarakhand <http://mohua.gov.in/upload/uploadfiles/files/AnnexureXI.pdf>.

[16] Urban Development Department, AMRUT <www.udd.uk.gov.in/pages/display/125-amrut>.

[17] AMRUT, State Annual Action Plan (SAAP) (FY 2017-18): Uttarakhand, p.12 <https://amrut.gov.in/writereaddata/saap/Saap17_20/Uttarakhand.pdf>.

[18] ibid p.14.

[19] Uttarakhand Peyjal Sansadhan Vikas Evam Nirman Nigam, Scheme Estimate Information System, Estimate Profile (Urban) <www.peyjalmis.uk.gov.in/Boundry/Estimate/EstimateProfile.aspx?Id=551>.

[20] Superintending Engineer, Construction Circle, Uttarakhand Peyjal Nigam Nainital, Bid Document for 125 KLD SeTP at Rudrapur (31 May 2018)

<https://ofbcipher.s3.amazonaws.com/tendersDataFiles/uktenders.gov.in/2018_MDPEY_11883_1/biddocumentstp.pdf>.

This list does not include any of the three towns that form the subject matter of this study. However, the private operators dump some of the collected septage at the STP in Rishikesh.

d. Judicial interventions

Since 1985, when MC Mehta filed the Ganga river pollution cases before the Supreme Court of India, litigants have filed a number of cases before the Court and later the National Green Tribunal and the High Court of Uttarakhand on this issue. The NGT directed the State and all its agencies to prepare and notify proper management scheme or protocol to ensure that households empty the sewerage or sewage effluent collected in common septic tanks regularly, and that the sewerage or sewage effluent is taken to the STP for appropriate treatment before its release.[21]

Just in the past year, the NGT and the High Court have directed the State Government to ensure that no one releases untreated sewage water into the river.22 The High Court issued directions:

- To the district magistrates of all 13 districts - to identify and seal the premises that are letting untreated sewage into the river,23
- To the urban local bodies - to complete the construction of toilets on the ghats in a time-bound manner and to connect them to the main sewerage line, and
- To the State Government, the SPCB and the State Mission for Clean Ganga, among others - to take immediate steps to stop dumping of sewerage in the river.[24]

e. Institutional framework—national, state and city level

The institutional framework related to FSSM is complex because of the presence of a number of institutions (statutory and administrative) at different levels. From a law perspective, the State Government is supposed to develop the statutory framework related to FSSM because sanitation is a State subject in respect of which the state legislature has the power to make laws. The Constitution of India further promotes decentralisation and envisages the governance of sanitation interventions at the ULB level. However, the Central Government also plays a key role in FSSM partly because central laws regulate certain aspects of FSSM such as environmental pollution and manual scavenging and partly because sanitation interventions in urban areas are being undertaken mainly through programmes and policies adopted at the national level such as SBM and AMRUT.

Table 3 provides an overview of the key institutions and their roles

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[21] *Indian Council for Enviro-Legal Action v National Ganga River Basin Authority and Others* (National Green Tribunal – Principal Bench, Judgment of 10 December 2015) para 98.II(j) <www.greentribunal.gov.in/Writereaddata/Downloads/200-2014(PB-I-Judg)OA_18-12-2015.pdf>.

[22] 'NGT calls meeting of Uttarakhand officials to make Ganga pollution free' <https://uttarakhandnewsnetwork.com/2015/11/ngt-calls-meeting-of-uttarakhand-officials-to-make-ganga-pollution-free/amp/>.

[23] Kavita Upadhyay, 'Ganga pollution: HC orders Uttarakhand govt to seal establishments polluting rivers' *Indian Express* (20 December 2017) <https://indianexpress.com/article/india/ganga-pollution-hc-orders-uttarakhand-govt-to-seal-establishments-polluting-rivers-4991923/>.

[24] Neeraj Santoshi, 'No untreated sewerage to be directly emptied into Ganga: Uttarakhand high court' *Hindustan Times* (12 September 2018) <www.hindustantimes.com/dehradun/no-untreated-sewerage-to-be-directly-emptied-into-ganga-uttarakhand-high-court/story-SUXymjnUDnLdKvS0vz91vM.html>; Neeraj Santoshi, 'Uttarakhand HC notices to Centre, four states over river pollution' *Hindustan Times* (26 September 2018) <www.hindustantimes.com/dehradun/uttarakhand-hc-notices-to-centre-four-states-over-river-pollution/story-jFMkpNJV1Y8VqC4tUlUMJJ.html>.

Table 3

INSTITUTION	LEVEL	KEY ROLES
Ministry of Urban Development	National	• Technical and planning support to States and ULBs • Training and capacity building of State level officials and those from select ULBs • Funding through specific schemes and plans • National level awareness and behaviour change campaign • Support research and capacity building in the sector • Create enabling environment for participation of the private sector, NGOs and CSOs in provision of FSSM services including to the poor and marginalized households and areas • National level monitoring and evaluation
Ministry of Environment, Forest and Climate Change	National	• Enforce compliance of the relevant environmental laws and rules during the collection, transport, treatment and disposal of faecal sludge and septage
Ministry of Social Justice and Empowerment	National	• Elimination of manual scavenging and rehabilitation of manual scavengers • Monitor and evaluate progress at the national level • National level awareness campaign
Urban Development Directorate (UDD)	State	• Administrative department for local self-governments
State Urban Development Agency (SUDA)	State	• Under the UDD • Proper implementation and monitoring of the centrally assisted programmes for alleviation of property throughout the State • Swachh Bharat Abhiyan (SBA) Committee
Uttarakhand Housing & Urban Development Authority	State	• Development authority in relation to the whole of the State Area
Local Development Authority	State	• Development authority in relation to any development area
Town & Country Planning Department	State	• Urban planning and development control
Uttarakhand Pey Jal Nigam (UJN)	State	• Planning, designing and execution of sewage and water supply services in urban areas • Ganga Pollution Control unit

Uttarakhand Jal Sansthan (UJS)	State	• Operation and maintenance of sewage and water supply services in urban areas
Uttarakhand Environment Protection and Pollution Control Board (UEPPCB)	State	• Monitoring and enforcement of environmental laws enacted by the central and state governments • Regulatory role for environmental protection, most importantly prevention and control of environmental pollution during the FSSM process such as desludging, treatment and disposal
Uttarakhand Urban Sector Development Investment Program (UUSDIP)	State	• Support the Government of India and State Government in their policy of balanced regional socio-economic development and poverty reduction throughout the urban sector • Funded by ADB through Multitranche Financing Facility (MFF) and also by the central-sponsored JNNURM • Executing Agency is the UDD, which has set up a state-level urban sector Project Management Unit (PMU) for this purpose • The implementation agencies are the respective urban local bodies, UPJN, UJD and PWD, which in collaboration with PMU will set up Project Implementation Units
State Ganga River Conservation Authority (State Ganga Committee)	State	• Effective abatement of pollution and conservation of the river Ganga and its tributaries • Implementation of the decision or directions of the NGRBA • Chairperson - Chief Minister • Nodal department and secretariat - Department of Drinking Water and Sanitation – provides logistical support
State Project Management Group, NGRBA	State	• Implementation of World Bank assisted 'National Mission for Clean Ganga (NMCG)' • Works under Department of Drinking Water and Sanitation
Uttarakhand State Commission for Safai Karamcharis	State	• Protection of the rights of sanitation workers in the state
Urban local bodies (Nagar Nigam, Nagar Parishad or Nagar Panchayat	Local	• Implementation of SBM (Urban) and AMRUT • Provisioning of desludging services, operation and maintenance of sewage treatment plants, and ensuring the safety of sanitation workers employed by the local government

III. ISSUES, CONCERNS AND CHALLENGES: LESSONS FROM THE FIELD

The State Government acknowledges the need for FSSM in Uttarakhand, and it has started mainstreaming FSSM in the law and policy agenda. The UPJN is the executing agency for sewage treatment plants, and the UJS is responsible for their O&M. The fieldwork identified a number of other issues, concerns and challenges.

A. Operationalising FSSM and ensuring its sustainability

There is no doubt that FSSM ought to form an integral component of any sanitation-related law or policy intervention. Until recently, however, regulations were either silent in respect of this important issue, or there was ineffective or non-implementation of relevant provisions in binding documents, or relevant provisions were included in non-binding documents. The Central Government prepared a primer on FSSM in 2015, and the national policy on FSSM in 2016 to provide guidance to state governments.

In the State of Uttarakhand, the UDD is the nodal department for the development of the regulatory and institutional frameworks for FSSM in the State, and it has prepared s Protocol on Septage Management in 2018. Ultimately, however, the ULBs must adopt the Protocol through a Council resolution in order for it to become binding and enforceable within its jurisdiction, and implement it by monitoring compliance and punishing violations. The effectiveness of the FSSM framework depends on a clear division of powers, functions and duties among these institutions. The government must also address concerns relating to the institutional, financial and human resource capacity of ULBs to provide and monitor FSSM.

Political will and interest of champions at the ULB level is also critical. The need for FSSM is slowly trickling down from the State level and/or through the initiatives of agencies such as the National Institute of Urban Affairs (NIUA) and the Bill and Melinda Gates Foundation (BMGF). The latter have organised/funded awareness-raising workshops and/or site visits to septage treatment facilities in Devanahalli (Karnataka) and Bhubaneshwar (Odisha) and international exposure visit to Philippines for officials of the State Government. For instance, the ULB officials whom we interviewed in Doiwala and Rudrapur had participated in such events and therefore recognized the importance of FSSM.

Like sewage management, FSSM in the State of Uttarakhand is heavily dependent on financial resources from the Central Government. The Central Government is currently funding the development of FSSM infrastructure in seven cities including Rudrapur (under AMRUT). In contrast, in Doiwala, the ULB can organize the land but construction will depend on funding through SBM or a special component.

The human resource capacity of ULBs poses another concern. In Doiwala, for instance, there is only one sanitary inspector, no government-owned cesspool emptier vehicles, and one private operator. The ULB needs to make the public aware of the need for FSSM and meet their demand for FSSM services (through adequate number of vehicles). It also requires adequate staff with an understanding of the rules for regulation of FSSM, as well as the ability and willingness to monitor and implement the rules vis-à-vis households as well as operators of cesspool emptier vehicles. The involvement of consultants from non-governmental institutions during the design phase, and of private contractors for construction, operation and maintenance of infrastructure and service delivery raise additional issues. Institutional capacity was also an issue where the UEPPCB lacked adequate staff to monitor illegal dumping of septage/sludge on land or its

discharge into drains or water bodies. The NGT's order25 directing the State Government to appoint new staff members to the UEPPCB may address this problem to some extent.

At the same time, the question of sustainability of these developments arises. What will be the future of FSSM sans the interventions of external/non-governmental expert agencies? How far can a proactive State Government carry the FSSM agenda without the support of local leadership? How will the State ensure FSSM in cities and towns and villages that do not fall under the purview of Central Government schemes and programmes (such as AMRUT) but where the construction and use of toilets under the two flagship programmes of the Central Government - SBM-Urban and SBM-Rural – is going to create a need/ demand for FSSM?

B. Non-regulation of septic tanks & septage

The design of septic tanks for toilets in individual households, community/public places and commercial establishments are largely unregulated. Owners of premises or masons follow their own understanding and perceptions while constructing septic tanks of different sizes. The capacity of the septic tank depends on the size of the household. Where households lay a costly floor on top of septic tanks, they may only desludge the tank when there is a problem instead of every two-three years. The Protocol proposes different time-periods for individual households and commercial establishments for the service of emptying of septic tanks/pits.

There are different mechanisms for disposal of septage. It may be transported to the nearest sewage treatment plant, or dumped into the sewer or in open fields or in a forest, or discharged into a drain or a water body, or disposed in tanks dug up for this purpose. The STP in Dehradun, for example, is underutilised (25 per cent of capacity). Therefore, the ULB permits private operators to dump septage collected from households in the manhole on the STP premises after paying Rs 300. Discharge into drains or the inlet tank of the STP may create a problem where the BOD load of sludge is high because the bottom of the pit is lined and/or the households do not get the sludge removed regularly. The installation and monitoring of vehicle tracking devices can address some of these illegal practices and deter potential violators.

One private operator claimed that he dumped septage in his own sugarcane field, which improved the quality of the produce, or into ditches on the fields of other farmers who sold the fertiliser at Rs 10,000 per trolley for growing vegetables. Of course, this raises the concern of public health impacts of consuming such produce, and highlights the need for specific standards for reuse of treated septage and sludge.

ULBs do not impose fines because they cannot provide alternative sites for disposal. According to a private operator in Rudrapur, they have stopped the practice of dumping septage into rivers following the NGT's directions to this effect and imposition of fines. Instead, they dispose of the septage on agricultural fields, and sludge in the municipal solid waste disposal site.

C. Septage collection: co-existence of multiple service providers and payment structures

Mainly four kinds of service providers in the FSSM sector empty OSS systems and transport the septage and faecal sludge to treatment/disposal sites. First, sanitation workers who are permanent employees of the ULB carry out the work, using cesspool emptier vehicles owned by the ULB. Second, in many places, the ULB outsources sanitation work such as septic tank emptying and sewage cleaning to private operators who use cesspool emptier vehicles owned by the ULB. In both cases, the ULB confines coverage to areas where vehicles can gain access to the OSS systems. Third, the owners or occupiers of premises with toilets may directly contact private

25 *Rajendra Singh Bhandari v State of Uttarakhand and Others* OA No. 318 of 2013 (NGT – Principal Bench, 24 August 2016) <www.livelaw.in/ngt-issues-guidelines-appointments-state-pollution-control-boards/>.

operators to carry out the work. Fourth, in some cases, households simply call manual scavengers from the Harijan basti to carry out the work. Thus, either individuals or a group of individuals are involved in this work adding informality to the FSSM related work in the urban sanitation sector in Uttarakhand. The operations of the informal service providers in the abovementioned third and fourth categories remain largely unregulated.

The researchers found that cesspool emptier vehicles owned by the ULB were non-existent, or non-functional in some cases. The response time of functional ULB vehicles may also be longer. This state-of-affairs compels consumers to resort to private operators who may charge higher rates particularly in the absence of competition. Even if the ULB procures the required number of vehicles, the existence of a limited number of operators may affect their availability to operate these vehicles. This issue of adequacy of service providers is likely to become more salient with growing awareness of the need for FSSM and the proper implementation of regulations mandating the construction of septic tanks in accordance with specifications and their periodic desludging.

The cost-effectiveness of every transaction from the perspectives of the operators and the consumers is another relevant consideration. At present, the ULB and the private operators charge different rates for emptying a septic tank in Rudrapur, that is, Rs 1500 and Rs 1000 respectively. Not surprisingly, the private operators charge different rates for local and outstation trips. For instance, private operators from Dehradun charge Rs 3000 per trip for collection of septage from Doiwala whereas the local private operator in Doiwala charges Rs 3500 per trip. The Protocol proposes different rates for individual households and commercial establishments for the service of emptying of septic tanks/pits.

D. FSSM as a stopgap arrangement

FSSM is included in sanitation projects for major cities (eg AMRUT cities) in Uttarakhand. However, off-site sanitation systems are the primary focus of sanitation policy, in respect of treatment and disposal of human waste. The State Government is pursuing FSSM in Rudrapur and Kashipur due to difficulties in constructing a gravity-based system sewer system in these low-lying areas because of the high water table (5-6 feet) and/or mountainous terrain. The State Government is considering a septage treatment plant in Srinagar because although it has constructed a STP under Namami Gange, the sewer line is incomplete. Some of the government respondents identified non-availability of piped water supply and the cost of piped water supply as well as pumping in gravity-based sewer systems as other reasons for the absence of off-site sanitation systems. In all these cases, government officials view the construction of septage treatment plants as a stopgap arrangement rather than an end in itself, while regarding off-site sanitation systems as the ideal, long-term solution.

Further, the State Government is cautiously developing the regulatory framework for FSSM with the ongoing construction of a septage treatment plant in Rudrapur as a ‘pilot’ project. This is an example of ‘learning by doing’. One must consider the time lag between the construction and operationalisation of this plant, and the required time-period for approval of other similar projects in the future subject to the availability of funds and fulfilment of other requirements, vis-a-vis the public health and environmental impacts of faecal sludge and septage, which will continue to be generated in the State.

FSSM requires more attention, as does infrastructure for septage management, which is likely to be cheaper, localised and more effective. This shift in approach is also required given the abovementioned issues concerning STPs.

E. Widening the FSSM framework

Septage treatment plants are currently under construction or proposed in AMRUT cities with high water table. There are other cities as well as a vast number of small towns in the State that lack sewer networks and STPs. These cities and towns require FSSM facilities due to existing OSS systems and the possible increase in toilets due to the implementation of SBM-Urban. According to one respondent, there is room for the treatment of septage generated in some of these small towns at the existing sewage treatment plants or proposed septage treatment plants. But this will depend on their proximity to the treatment plants and the willingness of the vehicle operators to collect and transport septage. This will also depend on the load of septage collected for treatment in the cities/towns with septage treatment plants, which is likely to increase with growing awareness of and access to these septage treatment plants. It is pertinent to mention that according to the AMRUT consultant/expert, the septage treatment plant, which is under construction in Rudrapur, is only for the municipal area and the ULB will not permit desludging vehicles to collect septage from outside municipal jurisdiction.

Here, one cannot rule out unhealthy competition among private vehicle operators. For instance, the private operators operating in a large urban area may be willing to pick up waste from a nearby small(er) urban area at a cheaper rate because of economies of scale (eg because they already have a guaranteed waste stream in their own area).

F. Limited suitability of sewage treatment plants

The State of Uttarakhand is heavily forested and mountainous with a number of lakes, and the river Ganga and its tributaries flow through it on their way to the plains. Confronted with the monumental challenge of addressing the problem of pollution of the river Ganga, the government has proposed sewage treatment plants (STPs) as the technological solution to manage the increasingly large quantities of sewage that is generated by cities and towns in the State.

Previously under the Ganga Action Plans, and now under the Namami Gange programme, the Central Government has been funding, and the State Government has been implementing, the construction of STPs but only at different points on the riverbank in the State. In addition to other factors, the geographical landscape of the State, which may not have received ample consideration in the design stage, has given rise to issues concerning the acquisition of land for, and the construction, operation and maintenance of, STPs.

G. Importance of strong environmental controls

The UEPPCB's role is not limited to cases of industrial pollution or to monitoring of river water quality and STPs. The officials of the UEPPCB must also discharge their statutory duties, powers and functions in respect of FSSM. This includes the development of the process and standards for recycling/reuse of treated septage and sludge. This issue has received very little attention so far and merits much greater emphasis assuming that the government will implement the regulatory, institutional and infrastructural framework for FSSM across the State. As of now, there are no standards in respect of septage treatment plants at the central or State level. However, the operator of the septage treatment plant is required to obtain consent to establish and consent to operate from the UEPPCB. According to an official of the UEPPCB, once the Board receives such an application, it will consult the Indian Institute of Technology.

The Solid Waste Management Rules 2016 lay down the criteria in respect of manure, which will apply in respect of the use of treated sludge (cake) from the septage treatment plant. However, there is no interaction between the Board and the Directorate of Agriculture, although farmers are likely to use treated septage and sludge for irrigation and/or as a fertiliser.

There is also a need to search for alternative means of treatment and disposal of septage. This is partly because the Board will not allow new oxidation ponds because they require a lot of land, they are open and emit foul smell, there is the risk of percolation into groundwater from the kutcha lagoon, and it is difficult to remove sludge.

H. Plight of sanitation workers: need for awareness, compliance and enforcement

Local government, private cesspool emptier vehicle operators, households and commercial establishments call upon members of certain scheduled castes (as employees or contractors) for desludging of septic tanks. Non-recognition or lack of regulation of informal service providers means that issues related to health, environment and exploitation of the workers remain unaddressed.

Private operators do not use or provide protective gear and devices to sanitation workers. One private operator informed us that where only dry sludge remains in the septic tank, they consume alcohol and then remove it manually and dump it on the municipal solid waste dump.

Further, the growing practice of outsourcing the provision of government services such as sweeping, solid waste management, and cleaning of septic tanks, etc. to private operators adversely affects the ability of members of scheduled castes who work as sanitation workers to make ends meet. The employer/contractor forces them to work in unsafe environments and they are unable to raise their voice against blatant violations of the provisions of laws that lawmakers have designed to protect their rights and interests.

I. Facilitative role of the judiciary

Litigants have raised some of the issues concerning STPs before the judiciary – the Supreme Court of India, the National Green Tribunal as well as the High Court of Uttarakhand. They have named concerned departments of the State Government and the UEPPCB as the respondents. Court directions in these cases have improved transparency and accountability. They have also triggered compliance in a number of situations where the government officials were not reluctant to do their job but were constrained by financial, technical and human resource constraints as well as competing priorities and political pressure from above. There is also greater awareness about the existing legal framework and the practical realities that promote or impede the implementation of a regulatory framework. The government must apply these lessons to the regulation of FSSM – both in the design stage as well as implementation

IV. REGULATORY OPPORTUNITIES

While there are a number of issues, concerns and challenges in the urban sanitation sector generally and in the FSSM sector in particular, the existing framework also presents significant opportunities to tackle or address them at least partially.

First, sanitation programmes such as SBM-Urban are a useful opportunity for FSSM. It is important to ensure that all the existing toilets in use, as well as the toilets that are under construction and will be used in the near future, as well as OSS systems in the State, are built in accordance with the norms and standards relating to FSSM.

Second, the Protocol for Septage Management provides an opportunity to ensure the incorporation of existing provisions on FSSM. These include:

- norms and standards to ensure proper OSS systems in existing building regulations (eg the National Building Code, 2016),
- protection of the rights of sanitation workers involved in desludging of septic tanks in accordance with the Prohibition of Manual Scavenging and their Rehabilitation Act, 2013 and the rules framed thereunder, and

- treatment, reuse and/or disposal of septage and sludge in accordance with existing environmental laws.

Third, the rules framed at the local level based on the Protocol for Septage Management ought to clarify related powers, duties and functions, and identify the appropriate authorities in order to ensure transparency and accountability. They must also be responsive to the concerns of private operators such as profit margin after payment of registration fee etc.

Fourth, in light of the experience with STPs, the State Government and local governments ought to adopt a long-term perspective while considering the costs and benefits of investing in FSSM today. It may also be useful to study the viability of decentralised approaches that are responsive to local needs in more detail.

Finally, the State Government and local governments must draw on the experience of other states such as Odisha and Rajasthan in terms of designing and implementing FSSM regulations. This may relate to creating public awareness about FSSM, regulation of vehicles operated by the ULB itself, relationship between existing laws, use of GPS technology, technology for septage and sludge treatment, reuse/recycling of treated septage/sludge, guidance for vehicle operators, identification of competent authority and guidance for exercise of discretionary powers, penalty amount, etc. These lessons would allow the State of Uttarakhand and local governments to identify similarities and differences in advance to prevent poor decisions and bad investments that the stakeholders reject. The design, construction and operation of septage treatment plants in other states as well as the potential for co-treatment of septage with sewage in sewage treatment plants also merit closer examination.

V. ANNEXURE: QUESTIONNAIRE

A. Design, construction and maintenance of toilets

(a) Whether and to what extent implementing agencies and individual users are aware of the existing guidelines and standards?
(b) To what extent implementing agencies enforce these norms and standards?
(c) Whether and to what extent individual users follow these norms and standards?
(d) Whether and to what extent local level masons are aware of and equipped to follow these norms and standards?

B. Desludging and transportation

(a) What is the general practice in terms of desludging of OSS?
(b) Whether cities in Uttarakhand have adequate service providers for desludging and transportation of faecal sludge and septage?
(c) If there are private service providers, how they are regulated?
(d) What are the existing mechanisms to treat faecal sludge and septage?
(e) Whether ULBs have taken initiatives to prevent manual scavenging?

C. Treatment and disposal

(a) Whether faecal sludge and septage are treated in the State? If yes, how?
(b) What standards are followed by the existing STPs or FSTPs in Uttarakhand?
(c) Whether and to what extent the treated faecal sludge and septage are recycled/reused?
(d) In case of recycling and reuse of treated faecal sludge and septage, what are the purposes for which it is used and which agency monitors the safety aspect?
(e) Whether the UEPPCB has taken any action to prevent direct dumping of untreated faecal sludge and septage?

SCALING CITY INSTITUTIONS FOR INDIA: SANITATION (SCI-FI: SANITATION)

Sanitation programme at the Centre for Policy Research (CPR) is a multi-disciplinary research, outreach and policy support initiative. The programme seeks to improve the understanding of the reasons for poor sanitation, and to examine how these might be related to technology and service delivery models, institutions, governance and financial issues, and socio-economic dimensions. Based on research findings, it seeks to support national, state and city authorities develop policies and programmes for intervention with the goal of increasing access to inclusive, safe and sustainable sanitation. Initiated in 2013, the programme is primarily funded by the Bill and Melinda Gates Foundation (BMGF).

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