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अमृत
Atal Mission for Rejuvenation and Urban Transformation

2019

UTTAR PRADESH STATE SEPTAGE MANAGEMENT POLICY

Urban Development Department | Government of Uttar Pradesh

GLOSSARY

S.N	TERMINOLGY	MEANING
1	**Bio-solids**	By-product of the treatment of domestic wastewater in a domestic wastewater treatment plant. Bio-solids consist primarily of dead microbes and other organic matter and can be used as organic fertilizer or soil amendments.
2	**Desludging**	Process of cleaning or removing the accumulated septage from a septic tank or wastewater treatment facility.
3	**Digestion**	Microbiological process that converts chemically complex organic sludge to methane, carbon dioxide, and inoffensive humus-like material.
4	**Domestic Sewage**	Wastewater composed of untreated human waste coming from residential and commercial sources. Domestic sewage does not include industrial and/or hazardous wastes.
5	**Effluent**	General term for any wastewater, partially or completely treated, or in its natural state, flowing out of a drainage canal, septic tank, building, manufacturing plant, industrial plant, or treatment plant.
6	**Improved Sanitation**	Connection to a public sewer or septic system, or access to a pour-flush latrine, a simple pit latrine or a ventilated improved pit latrine, according to the Millennium Development Goals.
7	**Onsite Sanitation System**	Infrastructure that aims to contain human excreta at the building; comprises of septic tanks and improved latrines.
8	**Seepage Pit or soak pit**	A hole in the ground that receives the effluent from a septic tank and allows the effluent to seep through the pit bottom and sides; may be lined with bricks or filled with gravel.
9	**Septage**	The combination of scum, sludge, and liquid that accumulates in septic tanks. Septic Tank – a watertight, multi-chambered receptacle that receives sewage from houses or other buildings and is designed to separate and store the solids and partially digest the organic matter in the sewage.
10	**Service Provider**	A public or private entity, operator or water utility that is engaged in the collection, desludging, handling, transporting, treating, and disposing of sludge and septage from septic tanks, cesspools, Imhoff tanks, portalets, sewage treatment plants.
11	**Sewage**	Mainly liquid waste containing some solids produced by humans, which typically consists of washing water, feces, urine, laundry wastes, and other material that flows down drains and toilets from households and other buildings.
12	**Sewer**	A pipe or conduit for carrying sewage and wastewater.
13	**Sewerage**	System of sewers that conveys wastewater to a treatment plant or disposal point. It includes all infrastructure for collecting, transporting, and pumping sewage. Sludge – precipitated solid matter with a highly mineralized content produced by domestic wastewater treatment processes.
14	**STF**	Septage Treatment Facility
15	**Stabilization**	Process of treating septage to reduce pathogen densities and vector attraction to produce an organic material that may be applied to the land as a soil conditioner

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EXECUTIVE SUMMARY

The goal of the **Uttar Pradesh State Septage Management Policy(UPSSMP)**is to improve water quality and protect public health in urban areas of the State by 2023. The objective is to enhance the ability of local implementers to build and operate septage treatment systems for urban centers and promote the behavior change and supporting environment needed for systems to be effective and sustainable. The main strategy is to facilitate a bottom-up, demand-driven project development process by providing State Government support and incentives. On site sanitation systems in the State are based on septic tank, which is a simple structure and when designed, installed, and operated properly, can serve as the first step in the sewage treatment process, which transforms human waste into a manageable effluent. Effluent can be further treated, reused or disposed of, thus breaking a cycle of disease that is responsible for huge economic losses, countless lost lives, and immeasurable human suffering.

The National Urban Sanitation Policy (NUSP) of 2008 provides a vision for healthy and livable cities and outlines different elements that are needed to achieve the vision. Most recently, the National Faecal Sludge and Septage Management Policy (NFSSM) Policy (2017), Swacch Bharat Mission (SBM) (through ODF++ ratings) and Ministry of Housing and Urban Affairs (MoHUA), Government of India (GoI) through the Standard Operating Procedures (SOP), 2018 for cleaning of sewers and septic tanks has provided considerable impetus to this sector. NFFSM with an objective of fostering sustainable SM services in cities aims to create enabling environment, provide role clarity, align with existing Missions, comply with environmental discharge standards and negates gender insecurity. The Central Public Health and Environmental Engineering Organisation (CPHEEO) Manual of 2013 and The Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013, have provided key markers to further the technical, occupational & health support to personnel in this sector.

Uttar Pradesh with 652 ULBs and urban population of 4.9 Crores (es. 2018) have been making significant efforts in improving the status of urban sanitation in its cities. Currently, wastewater treatment capacity of 3159 MLD is available and another 1281 MLD is under different stages of implementation. Nearly 9 lakh Individual Household latrines (IHHLs) constructed under SBM (U) over last 3 years also warrant immediate attention on SM. Sanitation coverage in 610 ULBs are completely dependent on septic tanks. There are 72 lakh On-site Sanitation Systems (OSS) which generates approximately 5000 MLD of sewerage. This highlights the magnitude of effort required for addressing environmental and public health safety on account of untreated sewerage / septage.

Given this context, Government of Uttar Pradesh proposes a holistic approach for septagemanagement (integrated/standalone), as a way forward. It is with this view that this 5-year SM policy (2019 – 2023) for Uttar Pradesh has been prepared. Government of Uttar Pradesh under this policy envisages a goal that "All ULBs commit to continually adopt sustainable septage management services, that is inclusive and equitable; for its citizens to live in an environment free of pollution and health hazards; with the support of the public and private sector, under a sector regulator".

The Policy articulates a three-pronged Septage Management (SM) Vision:

a) by end of 2019, all preparatory activities of realizing SM target under a sector regulation is completed;

b) by end of 2021, SM is mainstreamed in all Urban Local Bodies (ULBs) and all Nagar Nigams (NNs) & Nagar Palika Parishads (NPPs) have significantly moved forward towards SM and;

c) by end of 2023, all ULBs have implemented SM solutions in an inclusive manner empowering all stakeholders in the process.

The Service levels and Charter for key stakeholders have been developed to streamline the processes. To facilitate impactful implementation, ULBs are categorized based on the availability of sewage treatment facilities. In the ULBs with existing operational STPs, co-treatment of septage will be promoted while Septage Treatment Plants will be taken up for large single cities or adopt a regional / cluster approach for group of cities with a view to achieving economies of scale. This policy also sets the direction for supportive actions to manage septage so as todeliver results on public health and environmental safety, occupational health &personnel safety issues, infrastructure, private sector engagement, financial sustainability and tariffs levels.

A clear monitoring and evaluation of policy performance is desired annually for direction setting and alignment of the budgets. The key outcomes envisaged are related to safe containment system, treatment of all generated wastes, safe working practices and reuse of all resources for a sustained circular sanitation economy. The policy shall bring about a paradigm shift in the management of septage with the active participation of citizens, private sector and Municipal bodies.

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ABBREVIATIONS

BIS	Bureau of Indian Standards
CPHEEO	Central Public Health and Environmental Engineering Organization
CSTFs	City Sanitation Task Forces
FFD	Faecal Flow Diagram
SM	Septage Management
GoI	Government of India
GoUP	Government of Uttar Pradesh
IHHT	Individual Household Toilet
KL	Kilolitre
MA&UD	Municipal Administration & Urban Development
MLD	Million Litre per Day
NBC	National Building Code
OSS	On-site Sanitation
PESTLE	Political Economical Social Technological Legal Environmental
PPE	Personal Protective Equipment
SBM	Swachh Bharat Mission
SS	Swachh Survekshan
ST	Septic Tank
STP	Sewage Treatment Plant
SWM	Solid Waste Management
SWOT	Strength Weakness Opportunity
ULB	Urban Local Body
VTCO	Vacuum Truck Cleaner and Operator
WHO	World Health Organization

POLICY DOCUMENT

1 Background and Purpose

1.1 Definition of Septage

"Septage" is the liquid and solid material that is pumped from a septic tank, cesspool, or another treatment facility after it has accumulated over a period of time. The scum accumulates on the top and the sludge settles to the bottom of the septic tank volume when pumped. Offensive odour and appearance are the most prominent characteristics of septage. It is a host of many disease-causing organisms because of the contamination of a significant level of grease, grit, hair, and debris.

1.2 Sources of Septage

Septic tanks are the primary source of septage generation. A septic tank for the treatment of household wastewater is a horizontal continuous flow type sedimentation tank. This functions as a settling tank and digestion unit. The solids in the wastewater settle to the bottom of the tank where they undergo anaerobic degradation along with the organic matter in the wastewater. Oil and grease and other lighter material will rise and float on the surface of the liquid. This is referred to as scum.

The tank is designed such that the sludge and scum together occupy about half to two-thirds of the tank's capacity (prior to de-sludging). A septic tank should generally be followed by a soak-away pit to disperse the effluent into the ground. But mostly it flows into the storm water drain adjacent to the house. The sludge settled at the bottom and scum at the top is allowed to remain in the tank for several months during which they are decomposed by bacteria through anaerobic digestion.

1.3 Septage Generation Norms

Internationally, different norms have been followed for quantifying septage generation/sludge accumulation. A lot of variation is observed in the computations whether the fraction of wet or dry is to be considered while computing septage generation. For the purposes of this policy, IS2470 guideline is followed that recommends septage generation rate of 0.00021 cum / capita / day. A detailed list of national and international septage generation and accumulation rates is presented in Annexure 1.

1.4 National Policy Guidance - MoHUA

The National Urban Sanitation Policy (NUSP) of 2008 brought about a paradigm shift in India's approach from 'conventional centralized sewerage system' approach of urban sanitation to a more 'holistic framework'. With regard to SM, NUSP has very clearly outlined:

a. Promoting proper disposal and treatment of sludge from on-site installations (septic tanks, pit latrines amongst others);
b. Ensuring that all human wastes are collected safely, confined, and disposed of after treatment so as not to cause any hazard to public health or the environment;
c. Promoting proper functioning of network-based sewerage systems and ensuring connections of households to them;
d. Encourage recycle and reuse of treated wastewater for non-potable applications, wherever possible.

NUSP outlined a framework for cities to prepare City Sanitation Plans (CSPs), under the aegis of a State Sanitation Strategy and introduced Urban Sanitation Awards based on the benchmarking of sanitation services in cities. NUSP guidelines remained very broad and failed to provide specific suggestions for SM, leaving further scope for policy development and role delegation to the respective

states. However, the message of NUSP received a slow response from the states in terms of framing of septage-management policies.

1.5 National Actions and Missions

MoHUA is the nodal ministry for policy framework at the national level for urban sanitation. Recently, MoHUA has issued directions and guidelines for streamlining and focusing on issues of SM under SBM (U) and making provision in AMRUT programmefor its implementation by States. A few of them are outlined below.

a. The MoUD has directed the states to rename the 'Water and Sanitation Board' as 'Water, Sanitation and Septage Boards'. This activity should be made operational at the earliest through the dissemination of knowledge, strengthening local administrative and capacity building and thereby integrating septage treatment in an environmentally safe manner.
b. MoUD through their DO letter number20/3/2016-SBM-2 dated 22nd August 2016 has directed all the Mission Director in states to use rapid assessment tool for SM for submission of proposal and investment plan for SM as part of AMRUT SAAP.
c. In 2017, MoHUA issued National Policy on SM outlining the broad contours of the goals envisioned for states and cities. The urban sanitation being a state subject require a follow up by the state government. As yet, nearly 15 states have developed their own SMpolicies in alignment with the national policy.
d. In 2018, SBM (U) accorded specific focus on SMby way of including indicators related to septage management under ODF++ ratings for the cities.
e. CPCB has encouraged ULBs having primary sewerage treatment facilities to upgrade them to secondary treatment facilities leading to an opportunity for the ULBs to to integrate septage disposal facilities in all such locations along with STP upgradation.
f. Funding under AMRUT has been made available for construction of FSTPs and linked activities from 2018 onwards.

1.6 Central Laws and Rules

The legal context for SM includes environment laws, municipal building byelaws, legislation regarding manual scavenging and institutional laws that provide for the establishment, powersand functions of local authorities and bodies. More specifically, it relates to Environment (Protection) Act, 1986; the Municipal Act, and the Water (Prevention and Control of Pollution) Act, 1974 which provides a framework for control of effluent, sewageand septage discharge. Further, the Solid Waste Management (SWM) Rules, 2016 under the Environment (Protection) Act apply for the final and safe disposal of post-processed residual septage to prevent contamination of groundwater, surface waterand ambient air. Further, the SWM Rules 2016 will also apply on the disposal and treatment of septage, before or after processing, at sanitary landfills and use as compost. The provisions of the National Building Code of India published by the Bureau of Indian Standards (BIS) as applicable for Septic tanks, soakage pits, cess pools, leach pits, drainage fields,amongst others also come within the ambit.

The Employment of Manual Scavengers and Construction of Dry Latrines (Prohibition) Act, 1993 has put a ban on the use of dry latrines, i.e., latrines with no water-seal or flushing mechanism, and prohibits employment of persons for manually carrying human excreta which is referred as night soil. This was supplemented in 2013 with the Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013 by which "hazardous cleaning" in relation to sewers and septic tanks was also banned. The safety norms for complianceare provided in the CPHEEO Sewerage and Sewage Treatment Manual, 2013.

2 Septage Management (SM) Value Chain

The first step towards benchmarking the current service levels across the sanitation value chain is through a city level assessment. It helps in understanding and identifying the gaps in the services across the sanitation value chain. The ODF++ toolkit provides the necessary guidance to support and develop detailed assessments and projects. The lacunae observed in the existing system are addressed through the missions/schemes for corrective measures. This policy focus on the last four stages of the value chain, i.e. collection and / or containment, emptying and / or conveyance, treatment, disposal and if applicable, resuse. A snapshot of the aspects covered under critical stages are given in the Figure 1.

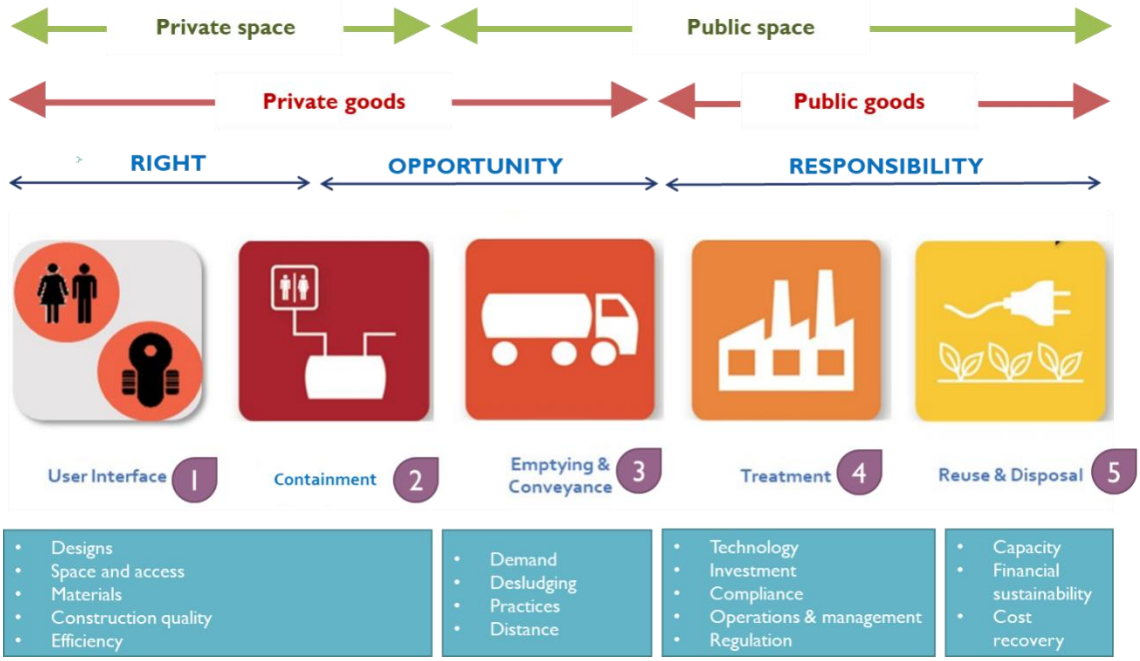


Figure 1: Septage Management (SM) Value Chain and Key Parameters

2.1 User interface

A significant progress has been made in the provisioning of IHHLs under SBM (U). Also, efforts have been made to upgrade insanitary latrines to sanitary toilets as well as provision for toilets for those households resorting to open defecation. This is the most critical part of the value chain. If well done, rest of the value chain gears up for sustainable results.

2.2 Collection and Containment

Understanding this part of the value chain in terms of processes involved is paramount, as it provides clarity on furthering the system either independently as a sector or integrates with the sewerage sector. The database on the septic tank site location, quality of septic tanks construction, complainace to the septic tank specificationslargely determines the corrective measures in the subsequent steps of the value chain. The process of granting building permissions, compliance check and finally completion certification for occupation of the building needs a linkage with a database record for septage management. Additionally, establishment such a septic tank database will support in future migration to sewerage connections when the networks are made available.

2.3 Emptying and Conveyance

This stage involves evacuation of waste material from the septic tanks and its physical transport to designated disposal point and / or treatment facilities located either at the municipal or regional level. The existing cleaning services are unorganized and therefore require establishment of the processes that

bring seamless onboarding of the private sector including a level of regulation.The development and enforcement of the protocol for personnel health and safety with the support of the necessary legislation serves a useful purpose to ensure safety net for the persons engaged in the cleaning of the septic tank and conveyance of the septage.The planning for emptying and conveyance involves an assessment of the demand in terms of the property profile related to a household size, public buildings, commercial establishments and community or public toilets, amongst others. The demand is also shaped by pre-defined frequency choice of cleaning, typically either at the interval of 3 or 5 years.The ability to realistically do a demand assessment will determine the efficacy of resources deployed towards SM infrastructure and services and overall success of towards achievement of public health and environmental outcomes including the success of PPP modalities. Further, this element of SM planning needs a synchronization with the existing/proposed treatment system to prevent any open disposal leading to environmental damage or compromising public health.

2.4 Treatment

The primary focus of the treatment process is to achievehealth and environmental safety by adopting a scientific treatment of septage. The Municipal Bodies will take initiatives to undertake an assessment of the septage load in their city and town to determine the treatment plant capacity exclusively for septage treatment or for co-treatment with wastewater or solid waste with the guidance of a dedicated Technical Unit at the State level. The selection of the technology option for treatment of septage shall take in to account the availability of land and cater the needs of the adjoining small towns and habitations lying within an immediate proximity.

2.5 Reuse and Disposal

The treatment of the waste results in mitigating the environment and public health concerns while generating a resource in form of treated waste for potential reuse for recovery of energy and nutrients. The reuse and safe disposal of treated waste refers to the processes and methods for recovery or recycling material and productsfrom septage prior to their safe return to the environment. The need and feasibility of resource recovery should befinancially and economically justified given the process complexity and end-use market potential. It is recommended that ULBs are encouraged to document field level implementation on the reuse, recycling and disposal experience so that the state generate a knowledge from resource management and financial sustainability perspective for use in the policy updation and replication on a case by case basis.

3 Situation Analysis in Uttar Pradesh

3.1 Demographic Status

The state of Uttar Pradesh has 652 Urban Local Bodies (ULBs) spread across 17 Nagar Nigams (NNs), 197 Nagar Palika Parishad (NPPs) and 438 Nagar Panchayats (NPs). For the purposes of analysis, the policy has taken into consideration 652 ULBs (including outgrowths where applicable), accounting for a total population of 4.2 croresand 72.53 lakhs HHs in Uttar Pradesh (2011).

Table 1: ULB wise Demographic Details

Category of Towns	Population (2011)	% Share	Households	% share	HH Size	No. of ULBs	% share
NN & NN+OG	18622978	44%	3361115	46%	5.54	17	3%
NPP & NPP+OG	15354567	37%	2591247	36%	5.93	197	30%
NP & NP+OG	8032233	19%	1301418	18%	6.17	438	67%
Total	**42009778**	**100%**	**7253780**	**100%**	**5.87**	**652**	**100%**

**Source – RGCI (2011)*

The population distribution across different ULB categories – NNs (3% of towns) accounting for 44% of the population, whereas 67% of NPs account for 19% of the population. The HH shares among ULBs also follow a similar trend. As the city size reduces (NN to NP) the household size increases. It is to be noted that the average size of household in ULBs is 5.87and not 5, as universally assumed for computations. The skewed distribution requires multiple strategies forSeptage management in the State.

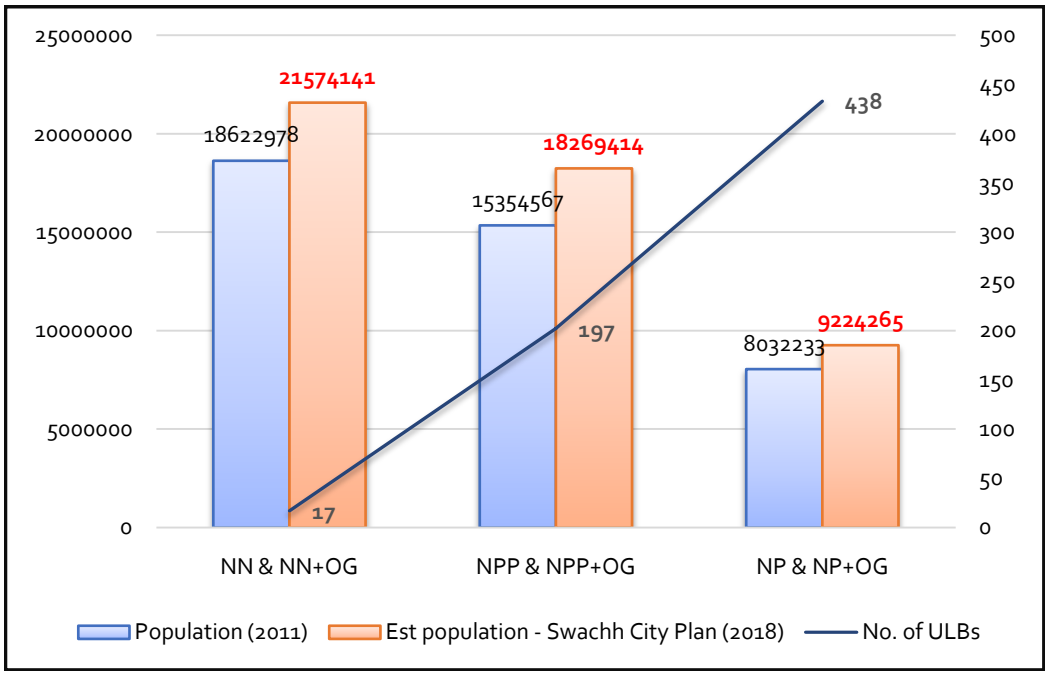
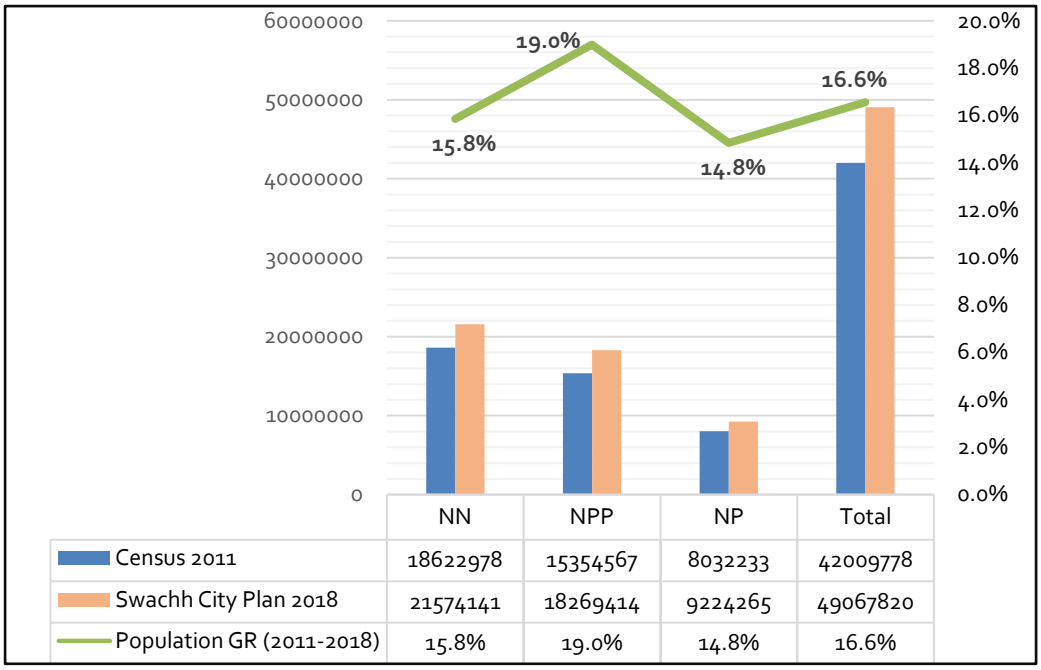


Figure 2: UP State - Population & ULBs Distribution

The annual average population growth rate in NNs is 2.1%, NPPs2.3% and NPs 1.9%. The differential growth rate require consideration while projecting future requirements in different city categories.



	NN	NPP	NP	Total
Census 2011	18622978	15354567	8032233	42009778
Swachh City Plan 2018	21574141	18269414	9224265	49067820
Population GR (2011-2018)	15.8%	19.0%	14.8%	16.6%

Figure 3: ULB wise Population Growth Rate

3.2 Status of Sewer Connections and Septic Tanks in Uttar Pradesh

Across the urban parts of the State, 86% HHs have OSS, and their distribution among ULBs are 78% HHs in NNs, 98% NPs, 90% NPPs. Assuming that there is 1 septic tank per household, there are 72 lakh septic tanks in UP State. The distribution among the different ULBs categories is 30.2 lakhs in NNs, 26.7 lakhs in NPPs and 15 lakhs in NPs.

3.3 Status of Existing Wastewater Generation in Uttar Pradesh

As of 2018, it is estimated that 5558 MLD of wastewater is generated every day in the State.

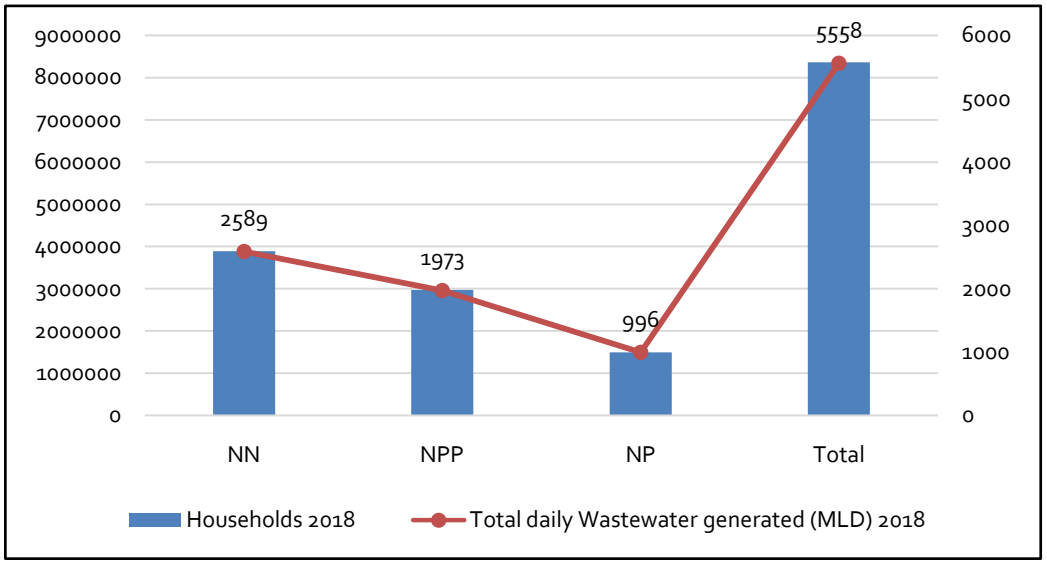


Figure 4: Wastewater Generation in Different ULB Categories

3.4 Status of Existing and Proposed STPs in Uttar Pradesh

In the 652 ULBs, STPs are present in 29ULBs with established capacity of ~2646MLD through 99 STPs.An aspect that requires attention is the reported receipt of sewage at the STPs (currently at 71%) and there are pockets not covered by the sewerage network in the sewered cities. There is an opportunity for the cities with STPsto take advantage for septage management and co-treatment, subject to techno-economic feasibilities of collection and transport.

Norms – ONE person generates 80% of the water used as wastewater

- 108 / 120 lpcd (water supply - NPP or NN 135 / NN 150 lpcd) OR 39 to 44 KL per year wastewater
- 120 litres per year septage

This is waste generated per person yearlyto be treated to prevent unsafe discharge into the environment.

Across 18 ULBs, additional capacity has been created through new STPsto treat ~1948MLD (10 in new ULBs and 8in existing ULBs) under State schemes, AMRUT and NamamiGange. The total available treatment capacity will be 4594MLD upon completion in the urban parts of the State.

Table 2: ULB wise Treatment Plants Installations in Uttar Pradesh

Category of Towns	Number of ULBs	Existing			Proposed			Total STP Capacity upon completion (MLD)	STPs (32 KLD plant) proposed	
		STP Capacity (MLD)	Number of STPs	No. of ULBs	STP Capacity (MLD)	Number of STPs	Number of ULBs		No. of ULBs	No of STPs
NN	17	3036.4	75	14	875.38	29	12	**3911.78**	5	5
NPP	197	254.59	26	17	393.55	25	22	**648.14**	25	25
NP	438	7.85	3	2	12.4	2	2	**20.25**	1	1
Total	**652**	**3298.84**	**104**	**33**	**1281.33**	**56**	**36**	**4580.17**	**31**	**31**

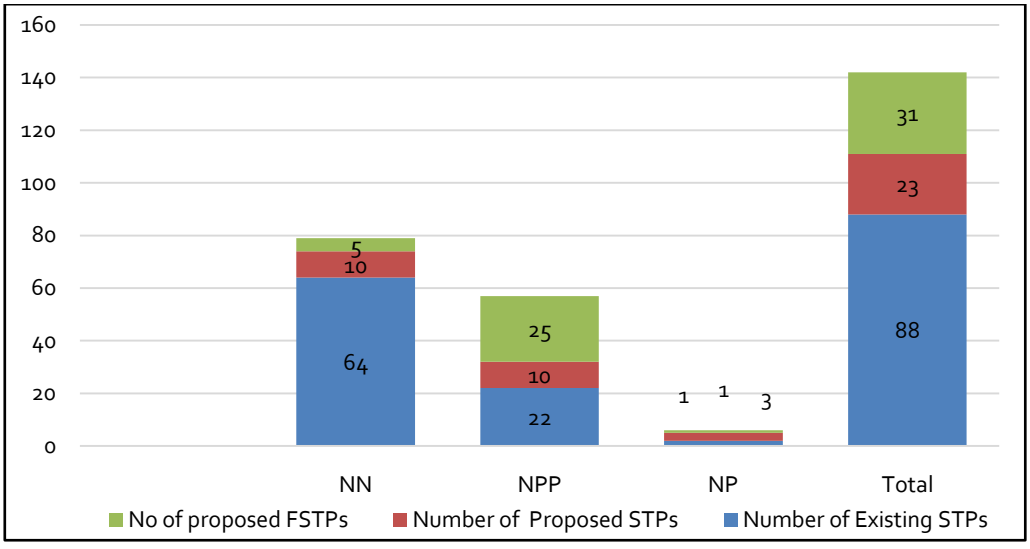


Figure 5: Distribution of Treatment Units in UP State

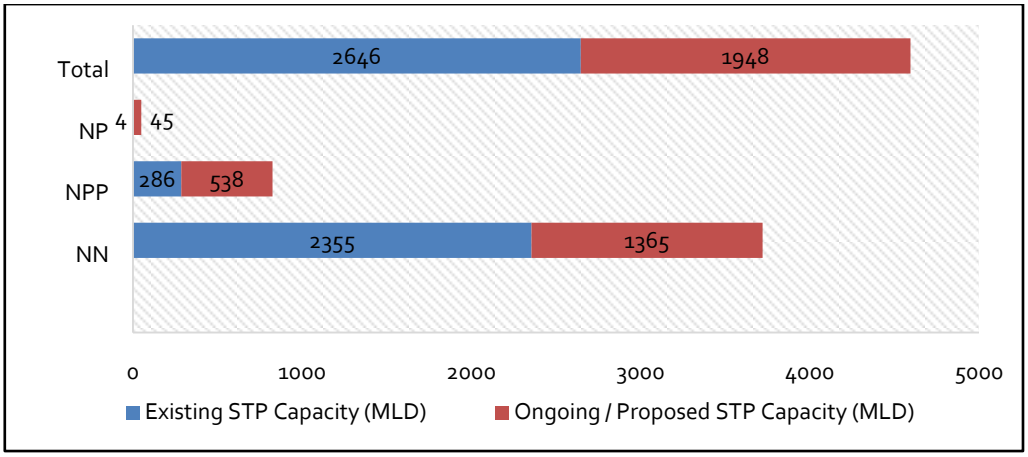


Figure 6: Gap in Treatment Capacity in Different ULB Categories

3.5 Status of Wastewater Projects Across ULBs

A snapshot of different schemes and the ULBs in which they are operational is presented in the Figure 7. The distribution of different schemes provides an opportunity to harness them for different elements of the value chain.

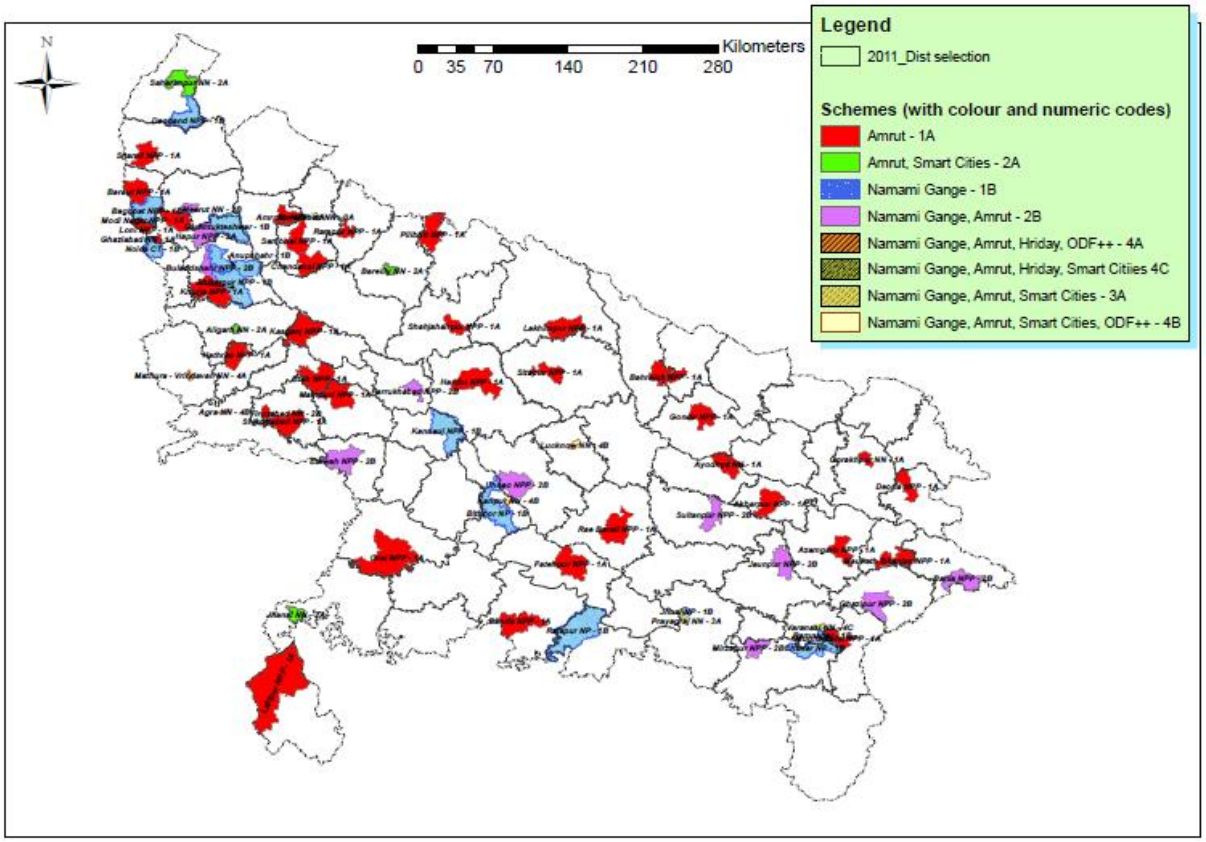


Figure 7: UP State –Schemes and Programs

3.6 Status of Septage Management (SM) in Uttar Pradesh

There are major gaps in the state of SM services. The status mapping of these gaps forms basis of formulating this policy. A summary of gap analysis is presented here:

a. Limited knowledge on existing system
   - Insufficient knowledge & public involvement during construction

- Poor knowledge of maintenance services affecting system management

b. Septic tanks location
   - Limited land space has led the HHs to relegate OSS/ septic tanklocation to the least priority, leading to general siting of the tanks below toilets, on the road/drains, direct disposal to drains/water bodies and quite a few instances encroachment by building habitated rooms over them

c. Inappropriate septic tank design and construction
   - local construction practices, not standardized
   - material and skill of masons/ contractors not adequate

d. Septic tanks are not maintained / de-sludged
   - emptying not regular
   - Spillage, bad odour, health hazards for workers

e. Disposal without treatment
   - Overflowing Septic Tanks causing pollution.
   - Indiscrimatedumping of septage in open fields, water bodies etc.
   - Vacuum tankers discharge their load at the shortest possible distance from the points of collection to save time and cost.

f. Regulation failure
   - Poor O&M and sellers (cleaning service) market
   - Lack of inspection, monitoring, evaluation and regulation
   - Enforcement by State Pollution Control Board

g. Capacity issue across the value chain for ULBs related to
   - Design, construct & operate SM Infrastructure
   - No facility for treatment and means for septage disposal
   - Private sector unorganized and with serious occupation health and safety issues

The result of the above gapindicate towards the following shortcomings:

- Low demand for improved sanitation systems
- Over dependence on investments on STPs
- Contamination of surface/ground water – unregulated dumping by the private sector

3.7 Need for Septage Management Policy

The goal to improve the quality of life for the citizens of Uttar Pradesh will greatly benefit from the improvement in the public health and environmental conditions that are presently under risk from current situation of limited waste treatment capacity (presently in 48 ULBs out of total of 652), low number of septic tanks connection to the sewer network, partial sewer networks, imbalance in population growth and pace of infrastructure construction, weak capacities in the Municipal Bodies, low level of community awareness and unregulated private sector. Further, a high level of dependence of about 610 ULBs completely on septic tanks raises the issue of ensuring that the septic tanks are designed for construction as per the legal provisions and authorities responsible for compliance checks play their role effectively so that the leakages and desludging issues do not poise risk to the environment and public health. This clearly highlights the magnitude of effortsrequiredby many stakeholders. With this background, this policy serves an urgent need to comprehensively guide a range of stakeholders a holistic approach for septage management, as a way forward.

This policy outlines the measures envisages for range of stakeholders towards preparedness to handle the entire sanitation value chainwhileaddressing the following sectoral issues:

- ULBs are of different sizes and morphology having different onsite sanitation treatment systems of varying size.
- Treatment gaps have implications on environmental safety.
- Varied capacity utilization of STPs has implications on septage addition and hence becomes a dynamic process to match unpredictable wastewater flows.
- The sectorbeing in a nascent stage, requires an integrated planning and life cycle approach for management.
- Fractured roles for agencies mandated for asset ownership, creation, operation and management (Jal Nigam, Jal Kal, ULB, Private sector, non-profits and citizens), requiring work coordination structures and role clarity.
- 92% of ULBs have no mechanism and require sustainable solutions. They need a dedicated focus and attention for septage management.

service chain is not yet developed and integrated

- Lack of understanding about containment and estimations have implications on system design for scheduled emptying.
- Service chain is largely dominated by private investments and is unorganized.
- Significant market opportunity to harness private sector efficiencies for emptying and treatment services.
- Occupational health & safety concerns for workers.
- Pricing for services and cost recovery.
- Low level of community awareness resulting in unscientific construction of OSS and cleaning practices.
- Weak capacities within Municipal bodies.

4 Septage Management Policy: Vision development

4.1 Key Tenets

The policy is being formulated on the following key tenets:

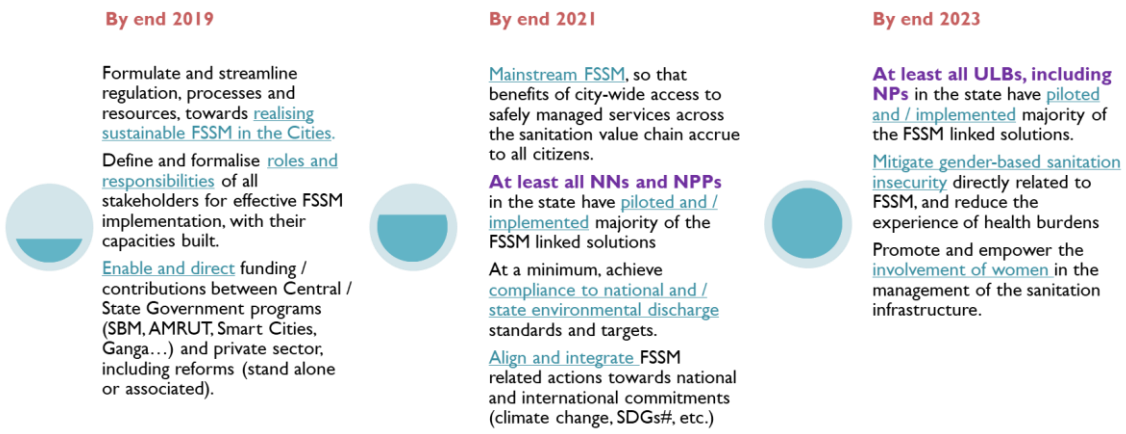
a. The households will continue to invest their financial resources in the construction of HH toilets (user interface) and septic tanks as per the prevailing guidelines and scheme requirements. Notwithstanding this private investment, the Government will make all efforts to advocate sound design and construction practices.
b. To treat septage management (SM) as a service, beyond infrastructure.
c. SM plans at the city level will integrate existing infrastructure besidesnewasset creation and serve as prerequisite for funding.
d. "Polluter pays principle" applies to all stakeholders i.e. citizensas waste generators. The payments are mandatory for all recipients of services to ameliorate pollution i.e. septage /sewerage service.
e. An efficient and single point payment system irrespective of whether it is through taxation by ULBs or levy of charges/fees by private operators.
f. Universal household coverage with septage services on equity principles; while tariff design will account for the true cost of the services, includingsubsidiesand / or top-up incentives to account for all disadvantaged groups.
    - Cover 100% opex across along the value chain

- Extended to cover capex (current + depreciation; all value chain elements; payments for ecosystem services) and refinancing of future assets

g. The government will financially support & regulate across the value chain until
   - A formalized private sector services market is developed for various value chain elements and
   - ULBs become financially self-reliant to invest in infrastructure creation and management.

h. Towards achieving environmental and public health safety, the government will invest in asset building (including private assets i.e. IHHL) up to a basic level through different schemes for poor and slum dwellers.

4.2 Septage Management Vision for UP State



The policy outlines a 3 stageprocess on key milestones to achieve as roll out.

Figure 8: UP SMVision

4.3 Goal

The goal of the Policy is:

"All ULBs commit to continually adopt sustainable septage services, which is inclusive and equitable; for its citizens to live in an environment free of pollution and health hazards; with the support of public and private sector, under a sector regulator".

The Policy provides for addressing the needs of the urban poor and slum dwellers on priority and those desirous for continued on-site sanitation services; on the same lines as that of the whole city. Also, covered is the aspect of reduction in pollution load in the immediate ecosystem across all ULBs, by managing 5558 MLD of wastewater annually and 13.7 MLD septage treated daily.

4.4 Septage Policy Target

This Policy articulates and set priorities, commitments,and direction for ULBs to undertake the city-wide implementation of SM services alongside sewerage services, within its jurisdiction, such that safe and sustainable sanitation becomes a reality for all households.

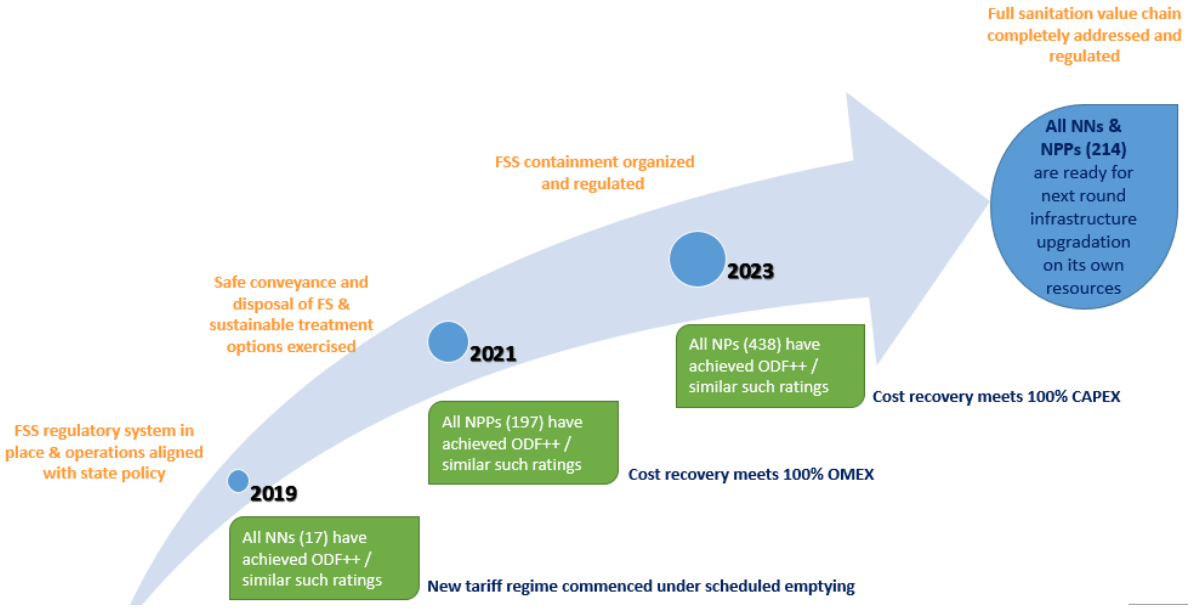


Figure 9: UP State Septage Policy Targets

4.5 Scope of the Policy and Applicability

a. The policy is valid until the end of 2023. Given that 652 ULBs require to implement the policy, it is expected that changes and modifications would be required in the policy as lessons are learned year on year. The annual and terminal evaluation by the Department will advise the policy amendment(s).
b. This policy shall apply to all ULBs, outgrowths in urban agglomerations, census towns as declared by the Registrar General and Census Commissioner of India, notified areas, notified industrial townships, areas under the control of Indian Railways, airports, airbases, defense establishments, special economic zones, State and Central Government organizations, places of pilgrimage, religious and historical importance as may be notified by State Government from time to time.
c. The policy shall apply to all newly added geographical areas to the ULBs, between the time of ratification and 2023.
d. The policy does not address the exclusive need(s) of sewerage systems but envisages a complementary role in ULBs where such systems exist or is currently under implementation.

4.6 Service Levels

The criteria of service levels will be as follows:

a. Coverage of adequate onsite sanitation system
b. Collection efficiency of the sanitation system
c. Adequacy of treatment capacity of sanitation system
d. Quality of treatment of sanitation system
e. Extent of reuse and recycling in the sanitation system

4.7 Service Charter

To ensure consistency in operations across all ULBs, a set of permissible codes for key stakeholders is drawn in Table 3 which will form the basis of engagement with the operators (individuals/firms). This charter shall be updated once in 2 years based on compliance levels under different conditions.

Table 3: ULB SM Service Charter

S No.	Value chain element	Minimum service level	Time limit for action / repair / rectification
1	Opening of customer accounts	ULB to create a database of all customers to raise septage demand tax or user charges based on volume and distance	All septic tank databaseiscreated &Customer IDisgenerated. Septage Manifest Form is used to updatedatabase.
2	Building plan inspections for a septic tank facility	ULB and Development Authority staff is responsible to share a database of all new buildings and Septic Tank dimensions to include in the cleaning schedule.	Monthly
3	Septage tax demand raised	ULB sends notices along with water tax/sewertax/property tax	Quarterly or Annually
4	Processing licenses/permits to operate issued to VTOs	ULBs to invite application/ identify VTOs operating without proper permits/licenses	Temporary licenses/permitsissuedwithin one month and full license/permit within 3 months for those in compliance ambit.
5	Establish and attend to cleaning schedule	ULBs establish monthly cleaning schedule for scheduled emptying of septic tanks	Provided at the beginning of the month
6	Communicating to households	Establish helpline or VTO to call the HH to inform of the date and time of cleaning upon receiving the schedule from ULB.	If phone numbers of HHs are not available or accessible, the same is reported to ULB. If HHs refuse to clean septic tanks, report to ULB for rescheduling.
7	Documentation to be carried in all trucks	Permits/licenses, vehicle documents, owner details, emergency contact details, drivers driving licenses, identity cards for staff	all missing documents to be replaced/provided within 24 hours of detection
8	Display of contact related information on ULB&VTO besides user fees or taxes &helpline details	Visible and legible at ULB office and all vehicles and dissemination through media channels, print and electronic	Dirty information boards/signage shall be cleaned immediately. Changes in names of personnel/contact details within 24 hours
9	GPS equipment	Installed and route maps prepared by ULB on a monthly basis and distance travelled computed	functioning checked by ULB on a monthly basis
10	Protective gear for staff	All staff to get 1 kit and replaced by the owner upon failure from normal wear and tear. Staff wears kit at all times while at work.	Faulty gear to be replaced within 3 days. 1 additional kit available in the truck and Stock for 3 kits available with the truck owner at his office
11	Septic tank cleaning	Septic tank should not be emptied fully, leaving sludge layer of 10 cm at the bottom. The staff will not enter the septic tank for cleaning. It should be only from the ground level and mechanized.	Household signs Septage Manifest Form
12	Covering of Septic tank post cleaning	Immediately after cleaning.	Sealed immediately. VTO signs in Septage Manifest Form
13	Hygiene condition around the septic tanks maintained	No waste shall be dumped. No wastewater shall stagnate.	To be removed or rectified immediately upon detection and cleaning of septic tank.

S No.	Value chain element	Minimum service level	Time limit for action / repair / rectification
14	Transparency	Septage Manifest Form filled and submitted to ULB. Household provided with one part of the copy.	Monthly submission of a copy of manifest form to ULB
15	Recording of emptying at the disposal site	Emptying at the disposal site, only after submitting manifest form copy and filing of the disposallog book.	Weekly aggregation of records into software or system for reconciliation of records and payments.
16	Disposal of septage	Use only designated disposal points. If the disposal is not available, report to ULB and hold the vehicle until alternate arrangements are made.	Waiting time of the full laden truck max. for 3 hours
17	vacuum truck/suction vehicle cleanliness	Vehicle is kept clean, dry without any visible display of septage or leaks. Keep hose/pipes dry.	Vehicle cleaned at disposal site after every emptying including pipes.
18	Health check-up for staff	Conducted once in 6 months. Reports submitted to ULB.	Check-up done at a Govt./Private hospital. Vehicle owner submits data for all staff with ULB and any changes in staff immediately reported.
19	Accidental spillage on the roads	Leaks if any detected,at any stage, immediately inform ULB to seek support on cleaning and cordoning off the area if required. Responsibility of cleaning will be of the operator.	Cleaned within 3 hours of detection
20	Complaint register	At all times available and accessible to users during operational hours	-
21	Call centre / Helpline	Available at all times with caller identification / integrated with grievance redressal cell of ULB. Phone numbers and email id displayed in all places across the city along with other SBM hoardings.	Take calls within 90 secs or return calls within 5 mins to redress. Respond to email within 2 hours of receipt. Update in the database within 1 hour of receiving the call to generate action.
22	Verification of payment to the operator by customers	ULB calls customers on a sample basis on a monthly basis for oversight.	Monthly random verification through call.

5 Policy Outline and Commitments

The Urban Development Department (UDD) shall support initiatives under septage management to achieve universal and safe environmental sanitation by taking following steps:

5.1 PlanningConsiderationwith City Nomenclature

"Categorization of ULBs to strategize interventions and implementation plans".

Due to huge variation in size of ULBs, spatial distribution and the pace of creation of sewerage systems, auniform sectoral approach will not bear desirable results.It is proposed to adopt a segmented approach to managetheseptage management sector in the state.

Table 4: ULB Categorization Methodology for an urban nomenclature

Nomenclature (predominant ULB type)	Category type	Sewer connections (%)	Septic tanks (%)	Other forms of connections
	Definition	***% of Properties/households to total***	***% of Properties/households to total***	HHs or properties having non-conforming connections (typically 10% of the total), which will be mandatorily improved to sewer or septic tanks, irrespective of category
A (Nagar Nigam [NN], Nagar Palika Parishad [NPP])	Sewered ULB	75 to 100	0 to 25	
B (NN, NPP)	Hybrid ULB (predominantly sewered)	50 to 75	25 to 50	
C (NPP, Nagar Panchyat [NP])	Hybrid ULB (predominantly septage)	25 to 50	50 to 75	
D (NPP, NP)	Septage ULB	0 to 25	75 to 100	

Note: Definition of sewer connections and septic tanks as defined in CPHEEO, 2013 Manual on sewerage systems

The following categorization is outlined:

- **Category A:** Universal septage management coverage through the sewerage system. SM to play a gap filling and complementary role prior to HHs migration to sewered mode. SM sector requiresinvestment and regulatory control to serve the unsewered areas.
- **Category B:** Universal SM coverage through a combination of sewerage and septage solutions. A large number of house sewer connections have been sanctioned under AMRUT, eventuallyULBs with STPs will end in this category. SM interventions to be targeted in uncovered areas or until the transition to sewer connections is completed.
- **Category C:** Universal SM coverage through predominantly septage services. Except for pending sewerage projects, all new projects will aim to formalize end-to-end septage services. Investments will be made towards STPs and a viable, regulated emptying &conveyance model.
- **Category D:**For smaller towns the way forward is to establish septage services. Given a small market in such towns and unviable for sewerage services and septage treatment, FSSTPs can be planned on cluster basis as well.

The purpose of this classification is to direct interventions under the policy, towards a particular type of service management to benefit from economies of scale within the city as well as the region.

Accounting for future increase in ULB area:

It is well understood that ULBs'geographicalsize and morphology changes with time. The pre-dominant reasons are:

a. Increase in the administrativearea of ULBs on account of
   i. Merging, upgradation of ULBs and creation of new ULBs.
   ii. Addition of surrounding rural areas to the ULB.
b. Semi-urban areas showing similar characteristics of urban areas that can benefit from economic reasons of service delivery.

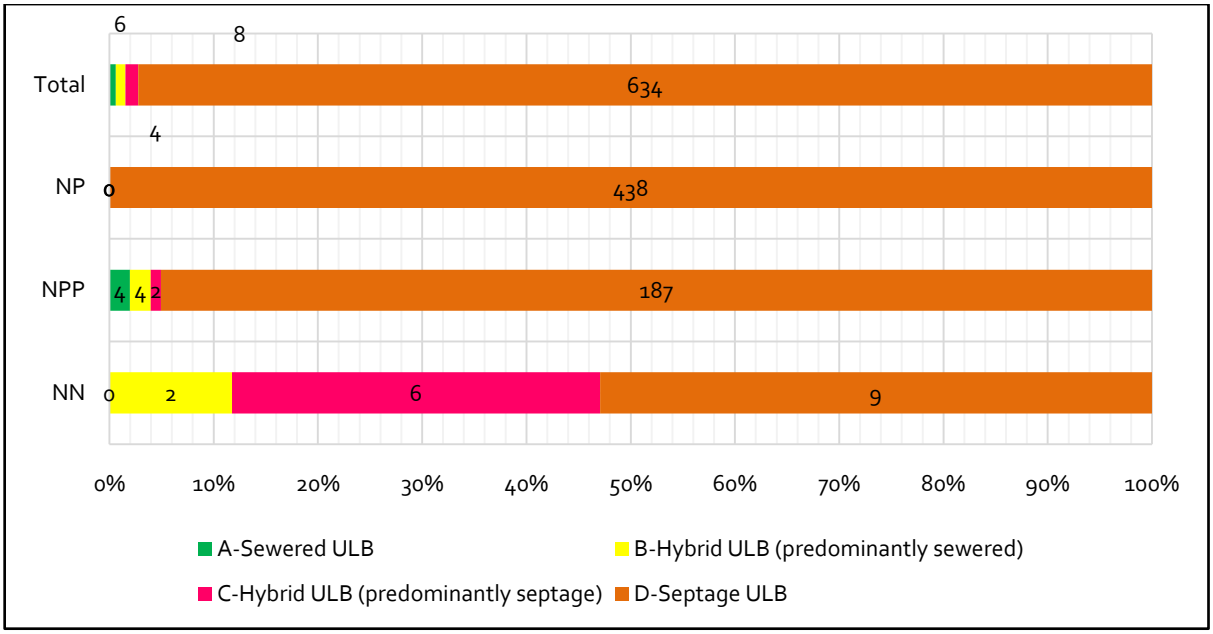


Figure 10: ULB Categories as per Policy Formulation

5.2 Public Health & Environmental Safety Considerations

The outcomes on public health and environment are paramount to the policy deliberations. It is for this reason that the wastewater generated across ULBs require regular monitoring especially for the cities with treatment and disposal mechanisms. The database generated through the monitoring mechanism will be used to establish ULB categorizationas an input and basis for channelizing the resources.

Table 5: Pollution Discharge Norms

Parameters	Grey Water	Black Water	Sewage	Septic Tank Effluent*	Septage	Parameters Limit ()*
BOD (mg/l)	100-300	600-1000	250-400	300-600	440-76600	Not more than 10
COD (mg/l)	200-500	1000-2000	500-800	600-1000	1200-70300	Not more than 50
TSS (mg/l)	100-300	800-1200	600-1000	300-500	310-93376	Not more than 20
Fecal coliforms(MPN/100 ml)	10^2-10^3	10^6-10^7	10^5-10^7	10^5-10^6	10^7	Less than 100

** Standards for New STPs Design after Notification Date*

Source: (MDWS. 2015. Technological options for Solid & Liquid Waste Management, Ministry of Drinking Water & Sanitation, Govt. of India); MoUD Advisory on Septage Management for Urban India.

5.3 Standardisation of Norms, Design and Specification of SMInfrastructure, Operations and Services

"Universalize septage management services across all ULBs with uniform quality in standards and efficient administration"

In the specific context of the cities and towns of the state of Uttar Pradesh, policy recommends development, dissemination and enforcement septage management norms, design and specification for the infrastructure construction and O&M of SM infrastructure including the aspects of user interface, evacuation trucks &equipments, treatment technologies covering the aspects of criteria for end-product disposal/reuse.The policy is establishing SM services charter and this provision is will assist towards it to ensure that the ULBs render professionalization amongst both public and private players. The SMService Charter is detailed in Section 4 for compliance and updated from time to time for continuity in the standardization of SM infrastructure and services.

5.4 Rolling Out Septage Policy through ULBs

"ULBs are advised to address and achieve public health and environmental safety outcomes in their cities through integrated and life cycle-based planning in tandem with complementary sanitation services like sewerage systems, solid waste management amongst others"

Under SBM (Urban), ward and city level institutional structures have been establishedto address sanitation issues, create awareness and engage with communities. The Ratings for SWM, ODF+ and ODF++ have become mandatory for ULBs. It is the bottom-up planning through the ward level mechanism that provides the tool for achieving the goals in a sustainable manner. It is with earnest that the ULBs are encouraged to use the tenets of this policy to further the ward level community-based approaches in services provision and its management. It is necessary to increase citizen awareness and demand creation across value chain elements through the ward level interface. For the purposes of ODF++ ratings, the roles of the existing institutions can be extended to complement the planning activities under this policy. The ward, zoneand city level Septage Plans are mandatory to provide the basis of investment for the different elements of the value chain and sustaining SMresults.

Ward level Septage Plans benefits

- Enhanced level of community awareness of septic tank construction & cleaning
- accountable & transparent emptying related costs
- demand creation for new / refurbishment of OSS
- oversight on untreated and unsafe disposal of septage by vacuum trucks

The policy recommends a development of SM Planbyeach ULB with a time frame to match the overall policy milestones and the plan alone shall form the basis for raising funds from different sources.A step by step planning guide for ULBs[1] shall support the SM plan preparation.

5.5 IT-Based State-wide Management System for septage management

"The Department will introduce and use evidence-based decision-making tools at every stage, from planning to service provision and mapping user satisfaction".

An accurate and real-time database of all related SMcomponents is recommended for establishment by ULBs and its integrationwith existing databases/systemscreated under different Missions. It is also directed that ULBs develop I.T. enabled single window system, GIS/GPS aided planning and operations, custom MIS modules to facilitate acompliant, accountable and transparent ecosystem of SMservices provided in association with the private sector, in addition to reporting for different rating exercises such as *Swachh Survekshan* and State initiated *Swachh Ward Pratispardha*.

The Policy recommends to ULBs for assessing the quality of ST/OSS infrastructure (as against standards) using a GIS-basedreal-time CSIS (City Septage Information System) awarded as an innovative

Typical IT platform

- clear database of demand
- continuous supply of service providers
- management system for allocation, including logistics
- co-ordination treatment plants for operations
- provision of disposal points for safe emptying.
- distribution of disposal
- customer interface
- user payments (normal & incentive based)
- wastewater quality implications (input & STP) specifically co-treatment

Benefits

- Equitable services [all households / properties are covered by services]
- Pricing [Services are offered at lower prices, due to efficiency gains]
- Behavior change [Contribution to ODF sustainability as toilet usage can increase]
- Manual scavenging [To strictly enforce the provisions of the Act]
- Infrastructure optimization [More predictable loads for treatment facility, vehicle route optimization]
- Environmental benefits [Likely reduction in BOD and coliform in septic tank effluent, as well as lower likelihood of septic tank overflows]
- wastewater quality implications (input & STP) specifically co-treatment

practice for the city of Agra and Mathura as part of *Swachh Ward Pratispardha 2018*. The database generated by CSIS is a useful evidence to support SM plan preparation. The survey results could also be used to identify and support scheduling of cleaning services.

5.6 User Interface Management

"The Policy mandates ULBs to ensure urban areas to be open-defecation free through universal access to sanitary toilet. The commitment is backed by continued financial investments and top-up incentives and subsidies".

The SBM – U has been prime mover for improving the household level access to sanitary toilet to ensure safe containment of the human faeces. However, a little purpose is served if no arrangements are in place for safe emptying, disposal and treatment of the accumulated septage. Therefore, to further pursue the objective of public health and environmental outcomes, incentivesfor poor and slum dwellers will continue in ensuring that safety of the containment in the On-Site Sanitation (OSS) systems by way of retrofitting and refurbishment of the faulty septic tanksresponsible for septage leakages. The Policy encourages ULBs to provision for an incentive system for both new structures as well as upgrades and replacement, equivalent to sewerage system connection costs. Given that uniform citywide systems and processes are envisaged, financial support may be provided for poor, slum dwellers and other vulnerable groups such as female headed households.

A lack of fuller understanding of the quality of septic tanks in terms of technical design and performance has significantly affected the choice of treatment impacting a proper estimation of cost to services. A following actions are being suggested for follow-up:

- Provision of septic tanks / upgradation of faulty septic tanks or twin pits or OSS
- Shifting of septic tanks those sited below toilets and other inaccessible locations
- Incentives for poor, slum dwellers and vulnerable communities
- Use of prefab systems for easy cleaning & consistency, thereby fostering private sector manufacturing

5.7 Scheduled Emptying Services

"The Policy encourages ULBs to ensure safe, timely collection and transport of septage through scheduled emptying services. This shift in processes would ensure complete containment of waste with no direct human contact."

The efficacy of scheduled emptying systems depends on robust database of demand, a reliable and uninterrupted availability of service providers, a good management system for coordinated emptying process end to end (disposal at designated locations for treatment). It is important to compliment newly created real-time database with the existing ones already created under different missions for harnessing the synergies of the data-fields. This database shall guidethe treatment systems in terms plant size determination, technology choice and disposal points for safe emptying, amongst others. This evidence-baseddecision-making system willhelpULBs to undertake reform towards an accountable and transparent ecosystem of services provision, particularly when PPP models are envisaged. This will also support the ULBs' preparedness for different rating processes.A summary of the cleaning scale across different ULB types is presented in Table 6.

Table 6: Scheduled Emptying Services (3 and 5 years): A Comparison[2]

[2] *Estimates for calculation - 300 days of emptying services, 4 scheduled emptying per day from 6 m^3 capacity trucks. The department instructs the ULBs to plan the SM system with a mandatory 5-year cleaning cycle for septic tanks.*

	Cleaning once in 3 years			Cleaning once in 5 years		
ULB Category	**ST / OSS cleaning per year**	**Daily septage to be cleaned KL/day)**	**Average Septage per ST / OSS (KL/ST)**	**ST / OSS cleaning per year**	**Daily septage to be cleaned KL/day)**	**Average Septage per ST / OSS (KL/ST)**
NNs	1006758	3356	1.63	604055	2014	2.72
NPPs	884128	2947	1.77	530477	1768	2.95
NPs	499068	1664	1.82	299441	998	3.04
	2389954	**7967**		**1433973**	**4780**	

* Assumptions for computation- 300 days of emptying services in a year, assuming 6 cum vehicle is used with 4 emptying's per day

The Policy recommends ULBs to plan for the SM system with a mandatory 5-year cleaning cycle for septic tanks. The state-levelestimatedtargets to be realizedunder this component is ~ 72 lakh septic tanks / OSS in the State ~ 1750 to 3000 MLD of septage treated annually ~ 14 to 24 lakh emptyingsannually ~ 600 Vacuum trucks operating daily.

5.8 Technical Options for Vehicles and Cleaning

"Primacy will be accorded to occupational health & safety of the workforce engaged in the full sanitation value chain especially for the instances of contact with human waste. The mechanization and automation are non-negeotiable requirement from ULBs and service providers across the value chain. The state-of-the-art IT and mobile applications will be deployed to track and monitor septage from point of generation until its safe disposal".

Given an overwhelming magnitude of engagement of the unorganized sector in the delivery of SM services especially emptying and conveyance, it is necessary to accord primacy to occupational health & safety of workforce under different value chain elements. The Governent e-market place (GEM) Portal has empaneled vehicles of different sizes to help ULBs in procurement for reference.

- Suction-cum-jetting machines are the higher end of the band for the similar volume
- Most economical vaccum tankers are from 6 CUM category
- 6cum (Rs. 30 lakh) for large cities and 3 cum (Rs. 20 lakh) for small cities proposed

The average size of a septic tank or an OSS is 2m X 2m X 1.5-2m an equivalent volume of ~ 6 to 8 cum [Source: CSIS – Agra & Mathura ~1000 samples].

An estimation of the total truck requirement for the emptying business is 572 to match the current demand. The estimation does not include the current stock of vehicles held by the private sector and rendering services and requires to accounted before finalizing the demand for vaccum trucks.

It is recommended that all ULBs should always have basic minimum number of septage cleaning and conveyance equipments in functioning condition based on their size. This will ensure emergency preparedness with the ULB. It is also understood that risks to private sector participation require to be mitigated through this basic mechanization process, more so when scheduled cleaning is mandated.

Under this policy setting - 72 lakh septic tanks / OSS - 1750 to 3000 MLD per annum septage treatment - 14 to 24 lakhs scheduled emptying annually - a target of 600 vacuum trucks per day.

Table 7: Septage Cleaning Mandate

Category of Towns	Number	Septage generation 2018 (KL/year)#	Septage Generation - 2018 (KL/Day)	Septic tank cleaning per year (assuming once in 3 years)	No. of STs emptying in 1 day (assuming 6 cum vehicle is deployed)	Number of 6 cum trucks required (assuming 4 cleanings per day per truck - the working time between 06 AM to 06 PM)
NN	17	2000970	5482	1006758	914	228
NPP	197	1900917	5208	884128	868	217
NP	438	1107219	3033	499068	506	126
Total	**652**	**5009106**	**13724**	**2389954**	**2287**	**572**

5.9 Treatment, Resource Recoveryand Disposal of Septage

The significant determinant for selection of the treatment option is the characteristics of septage.The treatment facility would maximize the reuse of treated wastewater and septage for various public and commercial purposes. This will contribute in part towards nutrient &cost recovery and even profit generation. The major focus must be on:

- Treating the effluent for the disposal or for secondary use
- Reducing the moisture content in the sludge and treating it for secondary use
- Pathogen reduction
- Nutrient recovery
- Operation, maintenance and energy requirements of the treatment technologies

The volume of septage to be treated as well as possibilities of dependence on existing STPs is detailed in Table 8.

Table 8: Septage Generation and Possibilities for Co-treatment

Category of Towns	Number of ULBs	Septage generation 2018 (KL/year) #	Septage Generation 2018 (KL/Day)	No. of ULBs where treatment capacity exceeds septage addition limits for co-treatment (@1.5%)
NN	17	2000970	5482	14
NPP	197	1900917	5208	28
NP	438	1107219	3033	6
Total	**652**	**5009106**	**13724**	**48**

- **Co-treatment feasibility**
  - 48 ULBs have STPs and allowthepossibility of co-treatment
  - Require disposal points constructed in all STPs in the 48 ULBS to facilitate septage disposal on priority
- **Co-treatment with STP**
  - Septage addition directly to STP
  - Septage addition to a manhole near STP
  - Septage addition to pumping station connected to STP
  - Septage addition to sludge digesters/sludge drying beds
  - Septage addition to waste stabilization ponds
- **Co-treatment with SWM Treatment plant**
  - Waste to Energy
  - Sand drying bed and co-composting with MSW

	– Vermicomposting

The Municipal Bodies with the presence of STPs are being impressed upon to urgently undertake the feasibility of the treatment options amongst exclusive septage treatment, co-treatment with wastewater,co-treatment with solid waste,reuse for energy generation and production of products. Additionally, these Municipal Bodies are required to properly document the lessons learnedduring the implementationprocessto allow for the knowledge generation that shall be useful in advising on the designing new STPs,disposal points and related STPs processes modification.

A profile of recently constructed septage treatment units across India is presented in Annexure 2 for ready reference of ULBs depending on the scale while they have been summarized in the the Table 9.

Table 9: Exclusive Septage Treatment Options (mechanized / non-mechanized)

Containment	Conveyance	Treatment			Reuse
		Solid/ Liquid Separation	**Dewatering**	**Further Treatment**	
Twin pit	Gulper system	Imhoff Tanks	Mechanical	Co-composting	Soil conditioner
Septic tank	Portable Pump	Settling /Thicken-ing Tanks	Unplanted drying beds	Deep row entrenchment	Irrigation
Aerobic bio-digester	Vacuum (Truck)	Geobags	Thermal Drying	Sludge incineration/pyrolysis	Building Material
Anaerobic bio-digester	Vacuum(Tractor)		Solar Drying	Anaerobic digestion	Biofuel
	Dung Beetle		Planted Drying beds	Black soldier flies/Vermicomposting	Proteins
	Vacuum Tanker		Centrifuge	Lime/Ammonia addition	Disposal to river
	Human Powered		Screw Press	Co-treatment with wastewater up to 3% FS of current STP load	
	Transport Capacity - Small (1.5 – 3 KL) / Large (3 – 10 KL)			Waste activated sludge (liquid effluent)	

(*Source: SM- An Orientation Module – Part A, NIUA, 2017 and Septage Management Leader's Guidebook, Oxfam, 2016*)

As regards the new treatment site, it is advised that the following parameters should be taken into consideration before finalization:

- The land parcel (either government or private) for treatment facility should be explored near existing STP, as the land acquisition could increase thecapex for setting up a treatment plant. A land leasing arrangement could also be explored.
- The location of the treatment site may be explored not very far away from the population served. This helps in offsetting high fuel costsdue to long distance transportation by the vaccum tankers as this may result into higher cost to service. The typical distance to treatment unit shall be factored in the pricing for services.
- A fair assessment of the size and dimensions of the land parcel should be undertaken considering the technology choice of th
- e treatment.
- The treatment plant location needs to be appropriately distanced from the residential area. A Rapid Environment Impact Assessment (REIA) of the potential sites and rehabilitation plan shall be assessed.

- The treatment plant will require a reliable power supply and uninterrupted water supply for its efficient functioning if the treatment unit has mechanical parts for its operation.
- The geological parameters such as soil type, depth of groundwater table and low-lying areas.
- An assessment of space for future expansion.
- The cost of the land parcel in terms of the purchase price or lost future revenue for alternative uses.
- Climate resilience and flooding risk for the site.
- Other aspects: The location should maintain a safe distance to surface water sources such as pond/river ordrinking water sources such as open wells/ bore wells etc.

5.9 [A]To further promote carbon absorption and mitigate climate change resulting from the treatment of the septage and SM related services, tree plantation will be carried out at the treatment facilities and also encourage the local use of the treated waste in form of compost and other products to offset the carbon generation and mitigate the climate change impact. The state of Uttar Pradesh is already carrying out large scale tree plantation and these efforts will further enhance those goals and also contribute to the sustainable development goals related to carbon absorption and climate change besides generating additional financial resources.

5.9 [B] A long-term plan will be developed with regards to the use of treated waste from STPs and FSSTPs so that the unit receives additional financial benefits as well as to ensure the valuable use of waste generated from the unit.

5.10 Tariff Mechanisms

"The Policy recommends a septage tax in line with the sewerage tax currently followed in ULBs. A separate head of tax may be created as part of the property tax collection system. This direction is propounded to enable ULBs an uniform and equivalent payment system for wastewater management systems by ensuring a stable funding source to facilitate operations, maintenance and refinancing for new assets. A single point payment system for users to facilitate easy payments to all stakeholders rendering services".

Different payment methods are available for ULBs to set forth charging for septage services rendered by ULBs or by the private sector. While setting up the process of tariff fixation, the cost to cleaning and payment mechanismsshall be kept in mind.

Cost to service in UP: An example

An estimation is made on comparing the cost of septage services as against existing sewer tax in a Nagar Nigam (NN) as a case in a situation of - integration of SM treatment facility at an existing STPs.TheULB invests in vacuum trucks and runs operations, including administration and planning costs. In the NN, it is observed that septage evacuation cost can be matched with the equivalent sewer tax. Currently the average rates of evacuation by private VTOs ranges widely between Rs. 900 – 2200 depending mostly on the distance to pick up point and disposal point. The price mechanism requires to be detailed to account for subsidies and incentives for Economically Weaker Section (EWS) and other disadvantaged groups to completely meet OMEX to start with and further to CAPEX, including land acquisition charges where incurred.

5.11 Financial Sustainability of Septage Services

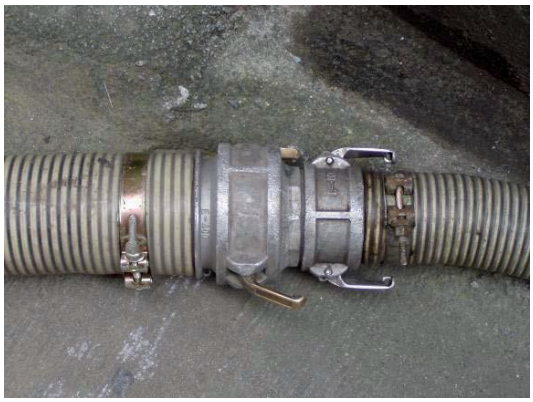
"The Policy recommends financial sustainability as a critical parameter for septage managementwhile designing activities under this policy and commits to financial support forSM on par with other infrastructure".

An indicative mix of options to reach financial sustainability is detailed below.

[A]On the lines of sewer tax, Urban Development Department, GoUP shall develop a septage tax with a separate accounting head. Currently, 4% ARV (Annual Rental Value) for residential houses is being charged as sewer tax. Given that treatment costs are on par, an equivalent amount can be explored as septage tax. The use of the funds shall be provisioned for CAPEX and OMEX of FSTPs / co-treatment as applicable; payment of scheduled emptying and transportation services;subsidies for new / rehabilitation of old septic tanks, offset for incentives for the urban poor, etc.

[B]The part funding can be sourced from different flagship programs (for asset creation / Viability Gap Funding [VGF]), private sector investment through PPP models and CSR funding. Where possible, extending the scope of existing projects to some SM elements can be explored. For example, STPs provided with septage disposal points; HHs provided with additional subsidies to construct STs (prefabricated); health, economic and social benefits extended to for staff working in SM, amongst others. Some of the avenues for fund sourcing are SBM for ODF++, AMRUT, Smart Cities, NamamiGange, NULM, Ayushman Bharat, Deen Dayal Adarsh Yojana, 14th FC devolutions and other State Schemes.

[C]Another source of funding is chargingfines for punitive actions like septage discharge into drains (on households), illegal discharge of septage on VTOs, pollution control board fines. In addition, license/permit fees including renewals; disposal fee at discharge points, additional cleaning requests beyond one-time cleaning; cleanings undertaken for non-residential or commercial customers could also contribute.



[D]Other options include those accruing from PPP arrangements for cleaning, treatment, recycle & reuse and sale proceeds from resource recovery (compost, other products, energy, etc.).

[E]Revenues from other service providers for the use of SM linked elements for advertising, providing telecom services, proceeds from other co-treatment with SWM, amongst others.

5.12 Legal Framework for SM

"All ULBs to adopt rules, regulations and legal instruments required to operationalize the policy, prior to planning".

All developmental initiatives need legal backing and moreso when active private sector involvement is envisaged. The upfront endorsement of state policy by the ULBs will provide aframework for pursuing all improvements and activities identified in the SM Plan.

5.13 Enabling Institutional Environment and Capacity Enhancement

"To sustain the SMinitiatives, the Policy recommends creation of appropriate institutions, management & monitoring systems and standard procedures at state and city level that will incrementally strengthen SM operations in urban areas".

The mandate, roles & responsibilities of all government departments and other stakeholders would be clearly defined and necessary steps will betaken for augmenting their capacitiesatthe state, city and community level for municipal functionaries, service providers, residents, amongst others. The institutional framework will be evolved for greater participation of the private sector.

On the lines of Swachh Survekshan, all Municipal functionaries working on SM and related themes are expected to benefit from a periodic in-service

orientation and training. The certification processes like the MoHUA's e-learning modules will be developed and initiated under this policy.The training will be extended to all stakeholders. Given that SM is in the nascent phase in Uttar Pradesh, a dedicated training facility is established for providing services during the policy period. The existing coordinating structures created under SBM (U) may be used for SM policy roll out.

5.14 Role Clarity of Different Stakeholders

A clear guideline on the rolesand responsibilities of different stakeholders are required to issued at the first instance for an effective policy rollout.It is equally important for the seamless coordination and timely action by different agencies. For example, Urban Development Authorities (planning & building sanction for new buildings supports in data generation of septic tanks and property register for data integration), *Jal Kal* (operations of STPs / co-treatment facilities, including record keeping), Jal Nigam (technical advice on the different co-treatment options, adopt co-treatment in existing and proposed STPs, monitor performance of STPs), Police Department (monitoring of vacuum truck operators compliance), Labor Department (employee/labor welfare and safety), Health Department and Flagship ProgrammeMissions (livelihoods and rehabilitation, health benefits and monitoring), Urban Development Department (rationalization of user charges in line with property taxes, financing for capex for ULBs),amongst others. A broad overview of the responsibilities is presented in Annexure 5.

5.15 Awareness Creation for enhanced Citizens'engagement in SM

"Awareness on SM and septic tank cleaning requirements among citizens is critical to create demand and solicit their active participation".

It is critical to foster "Polluter Pays Principle" to the point closest to the generation of pollutants. Given this construct, awareness creation is critical to ensure households construct septic tanks as per tehnco-legal requirements, periodically empty septic tanks (or similar infrastructure), pay for cleaning services upon demand. The ward level institutional structures available in form *Ward Swachh Vatavaran ProtsahanSamity*will help create awareness within their neighbourhoodamongst citizens and consequently trigger demand for cleaning services. On similar lines, awareness is also deemed critical for accountability and transparency in services, from a value for money perspective.

5.16 Furthering Empowerment alongside SM Implementation

"The Policy envisions empowerment and equity (including aspects of gender, children, senior citisens, differently abled, vulnerable) as cornerstone principles while fostering SM in the State. The existing guidelines/policies on women, barrier-free environment, livelihood opportunities shall be followed where applicable under SM roll out".

At the national level, generic guidelines and schemes are already under implementation. A due emphasis is to be given to gender equity, where women are encouragedasan active change agents and participants. This will help to mitigate gender-based sanitation insecurity arising due to lack of safe sanitation facilities and practices by reducing health, nutrition,andcare giving burdens.

5.17 Inclusion and Incentives

"The Policy recommends SM sector to address last mile connectivity, obviate any barriers to access and include all disadvantaged population into the overall system by way of graded financial subsidies and other financial modes at every stage".

This is to ensure access to services is universal (including a low income or BPL families and slums). In this regard, different options can be explored like:

- Existing incentive mechanisms for sewer connections and IHHL construction will also be extended for septic tank upgradation / construction.

- While new septic tanks can be integrated with new IHHL constructions, refurbishments / upgradation can be taken up based on the septic tank surveys as provisioned earlier.
- An incentive mechanism may be developed to increase the uptake of septage services. For example,
    - Households of RWAs adopting decentralized treatment services could be provided septage tax rebates.

5.18 Engagement Models for Different Elements of the SM Value Chain

The role of ULB is predominantly on ownership of assets, contract management & monitoring, cost recovery and sometimes that of a regulator. The engagement models outline the relationships between different entities contractually or otherwise. The service charter will form the basis for engagement. The models will detail costs and return on investmentswithin the designed ecosystem. The returns are not necessarily quantified as money but accounts for benefits accrued out of health improvements, social infrastructure andenvironmental improvements.

The typical engagement models also include employment of personnel for specific elements of the value chain, use of private agencies for service contracts (individually elements or end-to-end) or PPP arrangements.

Table 10: Different Engagement Models with Private Sector

Value chain elements / contracting types	User Interface (Toilet)	Containment (OSS)	Emptying & conveyance	Treatment	Reuse & disposal	Others (cross-sectoral)
Individual (employment)	Construction, maintenance					
Individual (contract / permit)	Construction, maintenance	Construction, maintenance	Emptying, Emptying + transport			
SC / SLA	Construction (along with house)					Cost recovery (private); Data management + scheduling
OM Contract (Existing)	Maintenance		Emptying + transport *	Operation	Operation	
ROM Contract	Rehabilitation	Rehabilitation		Rehabilitation	Rehabilitation	
Procurement Contract	Prefab Toilet	Prefab ST	Vehicles (new / modification)			
EPC Contract				Construction		
DBO Contract (ULB investment)				Construction, operation, maintenance		Cost recovery (ULB)
DFBO Contract (private sector invests few services)				Construction, operation, maintenance	Construction, operation, maintenance #	Cost recovery (ULB)

Value chain elements / contracting types	User Interface (Toilet)	Containment (OSS)	Emptying & conveyance	Treatment	Reuse & disposal	Others (cross-sectoral)
DFBO Contract (private sector provides all services)	Construction, Rehabilitation	Construction, Rehabilitation	Emptying + transport	Construction, operation, maintenance	Construction, operation, maintenance #	Cost recovery (private + ULB)

Note: * Engineering, Procurement, Construction (EPC); Design, Build, Operate (DBO); Design, Finance, Build, Operate (DFBO); Rehabilitation, Operation & Maintenance (ROM); Service contract / level agreements (SC / SLA)

5.19 Commitments for SDG and Climate Change Missions

"Resource management and circular economy principles will be considered while planning for SM services. Towards this, Policy recommends formalizing institutional and programmatic arrangements with other departments/agencies with whom products and processes will be jointly developed within the framework of this policy, from time to time".

Government from time to time will formulate necessary actions for ULBs to abide and contribute towards these commitments.

Government aims to further implementation, by:

- **Commitment to preparation and implementation of SM plan for each city**
- **Make available funds and incentives, where required, to fasttrack achievement of project outputs**
- **Confirm to undertake reforms in taxation and tax collections, to further the financial sustainability and fiscal prudence**

6 Standards, Regulations & Quality Assurances

"ULBs to follow standards and norms available from time to time and compliances".

a. Attention shall be accorded on adopting and enforcing effluent and sludge standardsfor municipal wastes.
b. Extensive and comprehensive monitoring programs shall be developed ranging from influent, effluent from the plants and subsequently on downstream reuse to ensure that the public health objectives and treatmentefficiency goals are attained.
c. A periodic monitoring will be followed, if reuse from STPs for agriculture and crops irrigation is undertaken.
d. The observation wells shall be installed near STPs to monitor groundwater qualitywhere necessary, and to mitigate adverse impacts where and when needed.
e. UPPCB/ CPCB regulations for disposal norms shall be mandatory.
f. Industrial wastesshall not be allowed to be disposedofor treated in STPs. ULB can issuenotification for penalties to be imposed on such industrial units.
g. Laboratories shall be maintained and properly equipped to provide services and reliable dataneeded to ensure enforcement of and adherence to standards and regulations.
h. The compliance to the following provisions by the Septage Treatment Facility/s will be necessary as per the Act, Rules and Guidelines issued by Central Pollution Control Board / UP Pollution Control Board from time to time:

(1) According to the relevant rules of the Water (Prevention and Control of Pollution) Act, 1974 and Air (Prevention and Control of Pollution) Act, 1981, it will be mandatory for the Septage Treatment Facility/s to establish prior to establishment / expansion.

(2) It will be mandatory for the Septage Treatment Facility/s to operate according to the relevant rules of The Water (Prevention and Control of Pollution) Act, 1974 and The Air (Prevention and Control of Pollution) Act, 1981.

(3) The compliance of the charter issued by the Central Pollution Control Board (CPCB) will be ensured by the Septage Treatment Facility/s.

(4) Online Continuous Emissions and Effluent Monitoring System will be installed by the Septage Treatment Facility/sand it will be linked to the Central Board and UP Pollution Control Board servers before the Septage Treatment Facility/scan start operation.

(5) The Pan, Tilt, Zoom (PTZ) rotating camera with open access system at the appropriate locations will be installed at the Septage Treatment Facility/s to carry out online monitoring of the pollution control systems and will be linked to the control room set up at the UP Pollution Control Board headquarters.

(6) - The Septage Treatment Facility/s will ensure compliance with the provisions of the Corporate Environment Responsibility Office Order dated 01.05.2018 issued by the Ministry of Environment, Forest and Climate Change, Government of India.

(7) - The Orders issued by the Central Pollution Control Board / Uttar Pradesh Pollution Control Board and Ministry of Environment, Forest and Climate Change, Government of India and Government of Uttar Pradesh will be followed by the Septage Treatment Facility/s.

(8) - The following steps will be taken by all Septage Treatment Facility/sto ensure sharing of benefits, facilities and concessions as per the principles of Green Productivity and Green Good Practices, namely:

(a) Encourage 7-R principles, namely proper utilization of resources by refuse, reduce, reuse, recycle, redesign, refurbish and recovery.

(b) Undertake Green productivity measures in the continuous production and its regular audit in accordance with environmental principles.

(c) Certification by Bureau of Energy Efficiency.

(d) Adherence to "Energy Conservation Building Code" in new buildings related to Septage Treatment Facility/s units as per rules.

(e) Increase the use of alternative energy.

(f) Reduction in emission of greenhouse gases and carbon offsetting.

7 FinancingSeptage Management Interventions

To advance the achievement of the policy goals and targets, a dedicated fund named "UP State Septage Management Fund" will be set up".

The Septage Management Fund shall be used to support the creation of public infrastructure, cross-subsidy for ensuring reach of services for disadvantaged groups, conducting pilots and innovations, training and capacity building of personnel, building private markets to support service delivery, procurement/acquisition of land for setting up treatment units;amongstothers.This fund shall consolidate resources from multiple sources such as centrally sponsered schemes and programs;national/state government grants;Finance

Commission devolutions;CSR;bilateral/multilateral grants & loans; Social & Development Impact Bonds; alternative Investment Funds, amongst other.

To manage this task, a dedicated fund management agency may be designated at the State level. The Project plans and proposals shall be aggregated by this agency and funds will be directed based on performance linked criteria. On similar lines, ULBs are encouraged to set up / pool funds under similar budget heads to supplement city-level project implementation.

8 Legal and Regulatory Support

8.1 State Laws, Rules and Regulations

All the stakeholders involved in SMacross the sanitation value chain henceforth shall adhere to the requirements of this policy and modify the respective rules and regulations to harmonize them in the best interest of public health and environment outcome of this Policy. The Model Building Bye-Laws (MBBLs), 2016 framed by the Town and Country Planning Organization (TCPO), GoIas adapted for Uttar Pradesh,will be updated.

The suggested themes of support are:

a. Advise on enforcement and / or regulation of septage services and promote the policy objectives.
b. Lead the formulation and amendment of regulations related to different elements of the value chain.
c. Lead and recommend reforms to further achievement of state vision for SM.
d. Guidance on the choice of treatment systems for disposal, recycle and reuse.
e. Further, the building and improvements to the septage services industry, including monitoring of operators' compliance with stipulated standards, contractual obligations,and relevant laws and guidelines.
f. Lead efforts towards improving the operational efficiency of the SM sector, in particular, occupational health & safety, environmental and public health safety through short-term, medium-term and long-term programmes.
g. Monitor the collection, treatmentand discharge of Septagein compliance with the requirements including reporting on the quality of treated effluent; impact on the environment and performance of treatment plants (co-treatment with STPs &others).
h. Towards long-term sustainability of the septage services, strive to identify continued investments in infrastructure development.
i. To serve as platform and account for all reasonable demands for various stakeholders (including private sector), in consultation with the relevant authorities.
j. Advise on the VTO permits/licenses and other contracting and / or private sector engagement arrangements across the value chain.
k. Advise on dispute resolution and pricing of services.

9 Institutional Structures for Operationalizing Septage Management

Septage Management for cities includes both residential and non-residential/commercial waste, but not industrial waste. The implementation guidelines are to be formulated to provide direction, generate knowledge, procedure and facilities for efficientand effective SM practices.

The **ULB is responsible and shall be accountable** for delivering the services and results under SM. It will manage the overall implementation, make available funds, enter into contracts with different stakeholders, have oversight as per the implementation plan. The ULB shall also ensure clear understanding is available for all stakeholders and maintain a balance of functions (addressing technical, financial, institutional, regulatory and social dimensions) amongst its staff to the best possible manner. Where technical advice and support is required, the services of the State Level PMU shall be enlisted.

To support the rollout of the policy, institutional structures are envisaged at three levels – State, District,and ULB.

a. **At the State level**, a PMU shall be created to act as a Technical Secretariat and support the statewiderollout and management of policy actions. Periodic meetings to review the progress may be worked out. Review of the progress made shall be undertaken quarterly. In addition, a dedicated State level fund management agency shall be created to identify, acquire and manage funds for implementation of the policy and initiatives thereof.
b. **At the District level**, under the Chairmanship of the District Collector form a Committee to monitor the progress of achievement policy outputs and coordinate city and regional level activities. The DPMs currently positioned at the districts shall extend technical support and coordinatedistrict-level meetings. The quarterly meetings shall be carried out, the results of which will form the basis of a review of the policy at the State level.
c. **At the ULB level**, to support the rollout, four support structures are required with clear role definition. Their roles can be extended from time to time depending on the policy needs. These institutions are:
    i. Create an exclusive **Septage Management Cell** (SMC) within the city or extend the role of such an institution already created under SBM-U to support the overall implementation of activities emerging out of the policy. The Cell will comprise of expertise for different themes and projects.
    ii. Currently, **Ward Protsahan Committee** (WPC) is institutionalizedunder SBM-Uand placed with the responsibility of various themes related to urban sanitation. Their role may be further extended to cover septage related activities and accordingly, their capacities built to support the policy rollout at ward level. Their key roles are to support ward level planning to create demand, awareness,and mobilization. The WPC shall meet on a fortnightly to monthly basis.
    iii. **Septage Management & Co-ordination Committee** (SMCC), an inter-departmental co-ordination committee constituted under the chairmanship of the Commissioner with a representative from various line departments to coordinate and monitor the city-wide implementation, apart from ensuring linkages with existing schemes/missions. The SMCC shall meet on a monthly basis.
    iv. **City Sanitation Task Force** (CSTFs) shall take up active planning and advisory role in co-operation with an elected council and other city level agencies to dedicate appropriate resources and attention to the challenges of SM. The CSTF shall be convened on a quarterly basis.

10 Timelines

The indicative timelines for the rollout of the policy is as follows:

	Actions	Timelines
0	Endorsement of policy through Cabinet Approval	
1	Studies & research, to be commissioned to support linked activities	-

	Actions	Timelines
2	State level PMU is in place to support the rollout of the policy	Immediate
3	Institutional structures – State, District and ULB	Within 2 months
4	Legal and regulatory requirements and compliances, including templates for ULBs to be formulated	Within 3 months
5	Endorsement of legal requirements for rollout of the SM policy and related activities by institutional structures	Within 2 months of [3] & [4]
6	Preparation of SM plans by all ULBs (aligned to vision achievement and implementation strategy)	Within 4 months for NNs, 3 months for NPPs and 2 months for NPs of [2]
7	Categorization of ULBs as per clause 5.1 of policy	Within 1 month of [2]
8	Categorization of ULBs as per clause 5.2 of policy	Within 1 month of [2]
9	Detailed work plan (annual plan with fortnightly time step) for rollout of policy.	Within 2 months of [2]
10	Documentation of different treatment technologies	Within 2 months of [2]
11	Training& orientation workshop for ULBs to support the roll out, understanding and preparation of SM plans	Within 2 months of [0]
12	Rapid assessment of private sector emptying market (supply and demand)	Along with [6]
13	CSIS surveys and septage characterization (quantity and quality)	Along with [6]
14	Develop SM tools required for use in planning &outreach to ULBs	Within 2 months of [2]
15	Develop IT platform for centralized monitoring of the sector including all elements (planning, database creation, monitoring)	Within 6 months of [0]
16	Incentive mechanism developed for different groups across the value chain	Within 6 months of [0]
17	Survey of existing STPs to assess the quantum of septage that can be accepted or potential sites for implementation of treatment units	Within 1 month of [6]
18	Schedule of emptying services in ULBs	Within 2 months of [6]
19	Review of proposals of proposed STPs / plans to accommodate FS disposal points and preparation of technical designs	Within 2 months of [6]
20	Land acquisition processes initiated and completed for different elements under the SM Plan	Within 6 months of [19]
21	Implementation of disposal points / STPs	Within 6 months of [20]
22	Licensing of private operators in ULBs	Within 6 months of [0]
23	Empanelment of all agencies related to SMrollout	Within 6 months of [0]
24	Procurement of vehicles where the private sector does not exist to provide services	Within 6 months of [23]
25	Assessment of Reuse Market: assess the production of and demand for treated septage – disseminate learning	Within 3 months of [2]
26	Template contract documents for different engagement models	Same timeline as [6]
27	Procurement of PPE equipment for public and private operators	Within 1 month of [22]
28	Preparation of sector investment plan for all ULBs within the 5-year time frame 9from different sources) and disbursement schedule	Within 9 months of [0]
29	Enter into contracts with private sector operators	Within 3 months of [22]
30	Start of scheduled emptying services [Between 9 and 12 months of policy endorsement, at least all towns targeted for end 2019]	Within 3 months of [29]
31	Technology advisory on co-treatment options beyond STPs	Within 2 months of [2]

	Actions	Timelines
32	Monitoring protocol for Septage Treatment Facility (STF) performance	Within 4 months of [2]
33	UP Jal Nigam and other institutions' role scoped out	Within 1 month of [2]
34	Decision and strategy on mechanization of suctions vehicles and emptying responsibility	Within 3 months of [2]
35	Training to all ULBs on SOP for sewer & septic tank cleaning	Within 4 months of [2]
36	Preparatory activities leading to the procurement of equipment for SM, including empanelment of agencies	Within 4 months of [2]
37	Training needs assessment for various stakeholders completed and training plan prepared	Within 6 months of [2]
38	Training conducted for all stakeholders (orientation/training) on different themes	Over a period of 12 months [37]
39	Awareness creation strategy developed including materials	Within 6 months of [2]
40	Awareness creation in all ULBs	Over a period of 12 months of [39]
41	Decision on tariff mechanism	Within 6 months of [2]
42	Endorsement of tariff structure and its deployment in all ULBs	Within 3 months of [41]
43	Performance of the collections reviewed	Within 3 months of [42]
44	Review of policy roll out (every 6 months)	Within 7 months of [2]
45	Infrastructure implementation in different ULBs	From 6 months
46	Progress monitoring of all elements of policy rollout	Monthly
47	Annual plan for the forthcoming year developed	Within 9 months [2]

The timelines for each ULB shall emerge from the SM plans and in alignment with the overall annual timelines as above.

11 Policy Evaluation

This Policy shall come in to force from the date of its issuance. The policy may be reviewed once in a year for assessing its effectiveness and making changes if necessary. A state-level committee under the Chairmanship of The Principal Secretary, Urban Development Department of the GoUP and comprising both Departmental and Mission linked agencies, shall review the progress of the operationalization of the Policy, once every 6 months. The PMU at the state level shall support the processes of policy evaluation and further reporting to Government from time to time.

12 Modification or Amendments to the Policy

The Government shall from time to time under the framework of the policy, issue directions in the form of Government Orders (GOs)and / or circulars amongst other for rollout of the supporting activities.

13 Studies and Research to Advice Policy Roll Out and Implementation

Given the magnitude of the challenge ahead, detailed and continued research is required to finetune the policy and support the roll out to meet the targets set forth under this policy. An indicative list of such works is presented below:

- Review of SM technologies, performance evaluation and success stories by cities in Indian conditions
- Document on solid waste and wastewater treatment technologies and possibilities of technology integration for co-treatment across the state, including a step by step process mapping
- Review service costs for different water and sanitation services for different category of ULBs and the drivers for decision-making
- Research on the technologies and process involved in transitioning infrastructure required between septic tank disposal and sewer connections, including septic tank effluent management
- Life cycle performance of prefabricated systems for SM components (IHHL, PT, CT, SWM, SM)
- Documentation on investment of the private sector in UP state in SM thematic elements
- Review the cost benefits of scheduled versus demand based emptying approaches
- Mechanism for developing PPA with electricity boards/generation or distribution agencies (templates and computations to be developed)
- Partnerships with international knowledge and training partners (Water Operators Partnership, IBNET, International Universities), Climate Change (COP), Water (SIWW)
- Tools for real-time progress reporting (example, Swachh Ward Awards, GVPs, UVPs, ODF)
- Identify innovations and best practices across the state using Swachh Survekshan results and preparing a knowledge box for dissemination during training programmes
- Develop metrics for inclusivity (gender, social, barrier-free access)

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Annexure 1: Septage Generation and Accumulation Rates

Rate	Value	Conditions	Source	Remarks
Septage Generation Rate	27 gm / capita / day	135 L/person/day × 200 mg/L × 10-3	Advisory Note on Septage Management in Urban India [Page 39]	Sludge generation rate from a septic tank where excreta and domestic wastewater are treated together
	230 litres / capita / year	-	Septage Management - A Practitioner's Guide [Page 42]	Based on US EPA manual
	120 litres / capita / year	-	Septage Management - A Practitioner's Guide [Page 42]	Based on the IS Codes
	100-200 gm / capita / day	High-income countries	Septage Quantification, Characterisation and Treatment Objectives Charles B. Niwagaba, MbayeMbéguéré,and Linda Strande	Wet Weight
	250 gm / capita / day	Low income countries (urban)		Wet Weight
	0.300 cum / capita / year	-	Asian Institute of Technology – Bangkok	-
	1 litre / capita / day	-	Sandec Training Tool 1.0 – Module 5, Septage Management (SM)	-
Sludge Accumulation Rate	0.00021 cum / capita / day	-	IS 2470-1985 Part 1	-
	0.04 cum / capita / year	For Pit Under Dry Conditions	CPHEEO Manual: Part A-Engineering, Chapter 9 - On-Site Sanitation [Page 7]	Material used for anal cleansing taken as water
	0.095 cum / capita / year	For Pit Under Wet Conditions with Desludging interval of 2 years		Material used for anal cleansing taken as water
	0.067 cum / capita / year	For Pit Under Wet Conditions with Desludging interval of 3 years		Material used for anal cleansing taken as water
	0.073 cum / capita / year	-	NPTEL Course, IIT Kharagpur Web Course [Page 3]	-
	0.254 litre / capita / day (92.7 litre / capita / year)	For 1st 6 months	The Influence of Sludge Accumulation Rate on Septic Tank Design, N. F. Gray	-
	0.178 litre / capita / day (64.9 litre / capita / year)	For after 60 months		-
	0.234 litre / capita / day (85.3 litre / capita / year)	Mean Value		-

Annexure 2: Considerations for Adoption of Septage Management Treatment Technologies

There are many technology options to choose from across the sanitation value chain for implementation of SM. Technologies available at the user interface, collection, transportation,and treatment of septage from OSS to STP are detailed below.Urban Local Bodies can choose from a range of treatment options available in the market, depending upon their needs and available finances.

Technology options for septage management in developing countries: Benefits and revenue from reuse

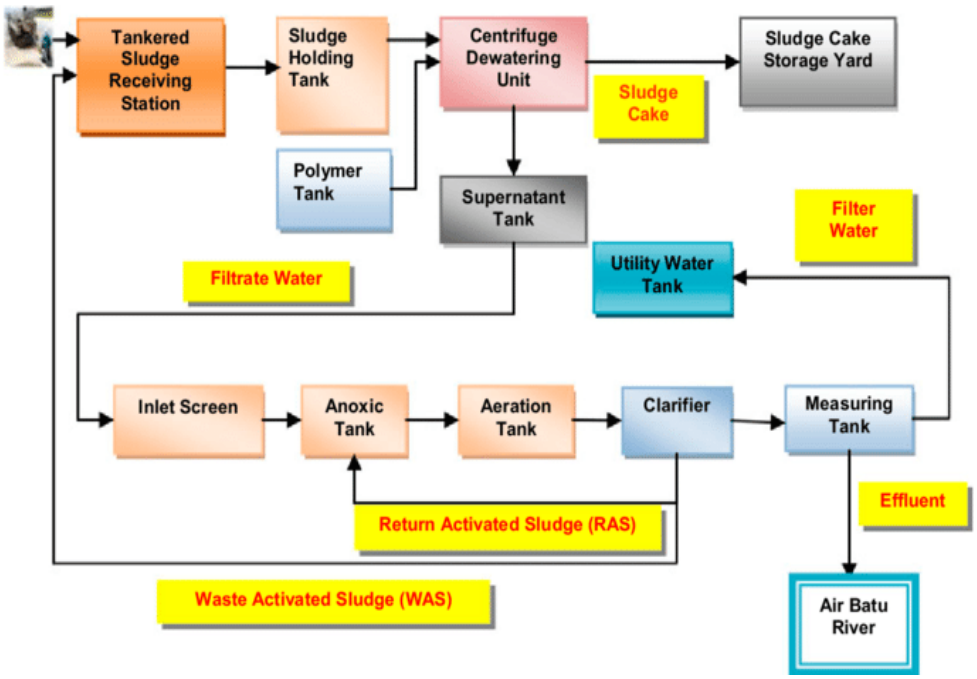
Shubhra Singha,∗ , Riya Rachel Mohana,SujayaRathiA, N. Janardhana Raju [Environmental Technology & Innovation, 2017]

Decision making matrix for sludge treatment technology with respect to constraint.

Constraint	Legend		Co-composting	Deep row entrenchment	Vermicomposting	Anaerobic digester	Solar drying	Shallow trenches	Solar sludge oven	BSFL
Land requirements	+++	High requirement								
	++	Medium requirement	+++	+++	+++	+	+++	+++	+	+++
	+	Low requirement								
Energy required for daily operation	+++	High								
	++	Medium	+	+	+	+	+	+	+	+
	+	Low								
Shallow groundwater table	+++	Not favoured	++	+++	++	++	++	++	++	++
	++	favoured								
CAPEX	+++	High cost								
	++	Medium cost	+++	+	+++	+++	++	+	++	+++
	+	Low cost								
OPEX	+++	High cost								
	++	Medium cost	+++	+	+++	+++	++	+	+	+++
	+	Low cost								
Skill requirement	+++	High								
	++	Medium	+	+	++	+++	++	+	++	++
	+	Low								
Reuse opportunity	+++	High								
	++	Medium	+++	+	+++	++	+++	+	+++	+++
	+	Low								

Annexure 3: Treatment Types and Economics (collated from different sources)

Treatment Technology	Land Requirement	Energy Requirement	Climatic condition	Examples	Est. Capex (Rs. lakhs/ cum)	Est. O&M Cost (Rs. lakhs/ Year)
Sludge drying bed (SDB) + Oxidation pond	High	Nil-low	Low - Medium rainfall	Leh, Punjab, West Bengal	0.75 - 1	10-12
Anaerobic Digester + ABR+PGF	High	Nil-low	Low - Medium rainfall	Devanahalli, Trichy	1.5-2	10-12
Dewatering unit+ co-treatment with SWM (windrow composting/ bio-methanation) + Oxidation pond/PGF for liquid treatment	High-Medium	Medium	Low - Medium rainfall	Nashik, Ganga basin cities (Mughalsarai, Gangaghat), Ghana	1.5-2	12.3-12.8
Pyrolysis	Low	High	All conditions	Wai, Warangal, Narsapur	2.5-3	10-20
UASB/MBBR/SBR	Low	High	All conditions	Sinnar, Kohima, Cochin, Periyar-Aickenpalayam	2.5-5	8-15
Geobag+ Oxidation pond for liquid treatment	Medium	Medium	Medium - High rainfall	Malaysia	2-2.5	10-12
Dewatering + ASP - Centralized Sludge Treatment Facility (250 cum/day)*	Low	Medium	All conditions	Sungai Udang, Melaka, Malaysia	NA	32



A typical treatment process of CSTF (Malcca, Malaysia)

Annexure 4: Roles and Responsibilities of different Stakeholders in SMLandscape

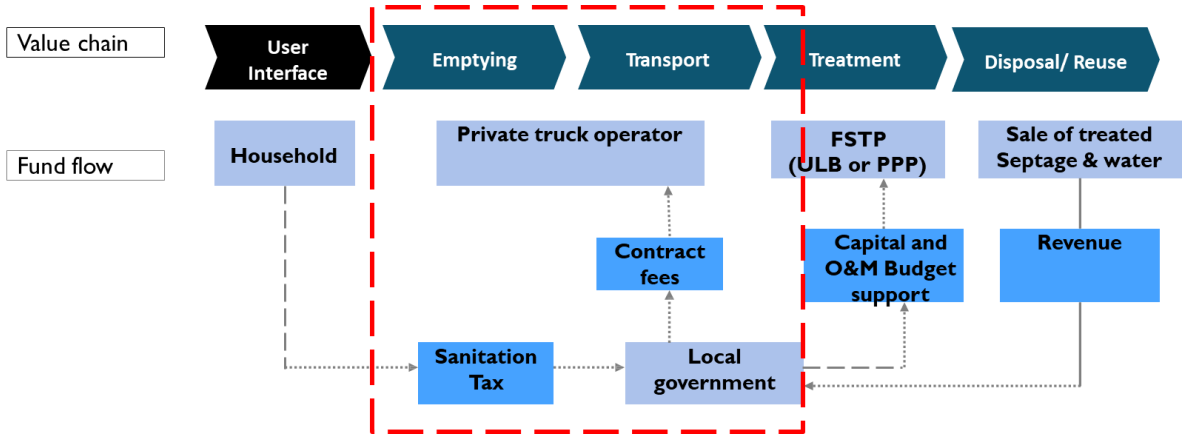
Stakeholders	User Interface	Collection & containment	Emptying & conveyance	Treatment	Reuse & disposal	Others
State Urban Development Department						Policy formulation, roll out, financing
ULBs (completely responsible for SM)	User surveys	WW infrastructure surveys	Scheduling	Emptying of septage (quality & quantity control)	Revenue generation on sale proceeds	Prepare SM Plan and implementation, incentive/subsidy administration
Urban Development Authorities	Planning & building sanction for new buildings	Supports in data generation of septic tanks and property register for data integration				
Jal Kal				Operations of STPs / co-treatment facilities (NNs), including record keeping	Operations of STPs / co-treatment facilities (NNs), including record keeping	
Jal Nigam				Implement co-treatment in existing and proposed STPs, monitor performance of STPs	Operations of STPs / co-treatment facilities (all districts except NNs), including record keeping	Pricing for services, technical advice on the different co-treatment options in all districts except NNs
Police Dept.			Monitoring of vacuum truck operator's compliance			
Labor Dept.		Employee/labor welfare and safety	Employee/labor welfare and safety			
Health Dept. and / Mission			Livelihoods and rehabilitation, health benefits and monitoring	Health benefits and monitoring		
UP Board for Development of Municipal Financial Resources			Rationalization of user charges in line with property taxes			Financing for capex for ULBs
Private sector (render different services)	Refurbishment	Refurbish after cleaning, collect information	Cleaning, collection of charges, a deposit of charges to ULB			

Stakeholders	User Interface	Collection & containment	Emptying & conveyance	Treatment	Reuse & disposal	Others
Citizens	Construction / refurbishment	Construction / refurbishment, provide information	Payment of charges			Planning @ ward level
State Pollution Control Boards				Monitoring & compliance	Monitoring & compliance	Treatment regulator
Ward Protsahan committees	Clarifying toilet demand, channelingincentives/subsidies	Clarifying cleaning demand, channelingincentives/subsidies for STs	Oversight on untreated emptying			Awareness creation
Motor vehicles Dept.			Clarification & issue/ratify licenses or permits for cleaning & operation			
Training Institutions						Capacity building on all themes

Annexure 5: Engagement Models for Levy of Charges for Septage Services

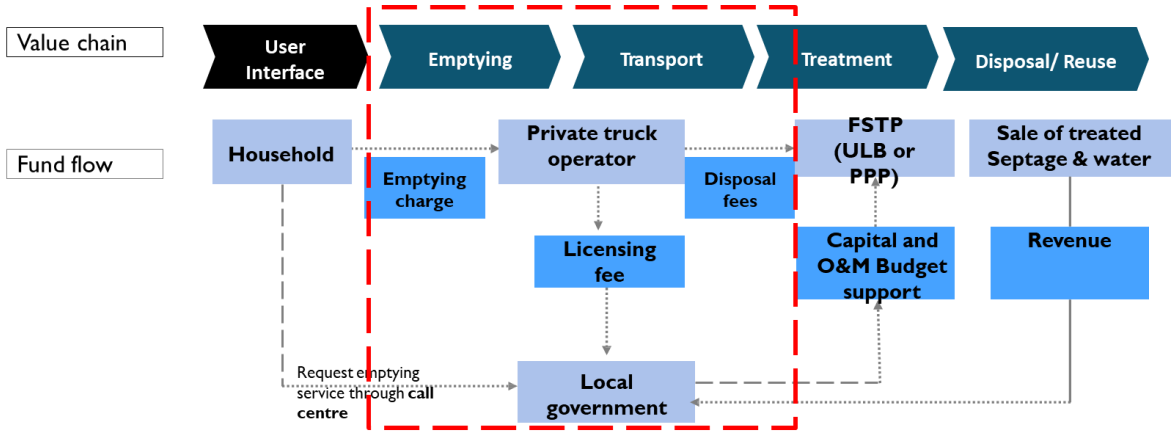
Option 1

When scheduled emptying is envisaged on predefined time frame (5 years), sanitation tax can be collected from owners of OSSs, on the lines of sewragetaxe. Septage tax is collected by the local authority either as a percentage of property tax or by the public utilities as a surcharge on water bills or sewerage bills. The relationship and fund flow, in this case,are as follows (Source: Adapted from Maharashtra PAS project):



Option 2

Another option would be to set up a call center or a customer help center managed by ULB or outsourced. The purpose is to link OSSs seeking cleaning with VTOs (public or private), typical of demand based cleaning. The truck operators register with the call center for a fixed annual fee which can also double up as a license or permit. Users of OSSs call the help center when their septic tanks or pits are full OR alternately informed that VTOs shall come to clean. Irrespective of the arrangement, the principle of fund flow is applicable for scheduled emptying.



Annexure 6: Typical Costs of Suction Vehicles (extracted from GEM Portal)

S No.	Machine Name	Tank Capacity (sludge tank+water tank) litres	Cost (Rs. lakh)
1	**Sewer Suction Machine (QUALITY ENVIRO ENGINEERS)** (QEEVAC- 2LT)	2000	20.70
2	**Truck Mounted Suction Machine (AMAN CLEANING (ACE))** (SPEED & TMSM-2000L)b	2000	22.60
3	**Truck Mounted Suction Machine 2000 LTR (HYDROTECH)** (HYDROTECH INTERNATIONAL HI -SM/2)	2000	NA
4	**SEWER SUCTION MACHINE 3000 LITER CAPACITY MOUNTED ON TATA 407 CHASSIS (NATURE GREEN) (Nature Green)**(SEWER SUCTION MACHINE 3000 LITER CAPACITY MOUNTED ON TATA 407 CHASSIS (NATURE GREEN)	3000	13.80
5	**SEWER SUCTION CUM JETTING UNIT TRUCK MOUNTED(Automeck)** (VACJET 3000)	3000	23.40
6	**TRUCK MOUNTED SUCTION MACHINE 3000 LTR. CAPACITY(HYDROTECH)** (HYDROTECH INTERNATIONAL HISM3)	3000	25.11
7	**MINI SUPER SUCKER MACHINE ON TATA LPT 407 BS-IV CHASSIS(GENESIS)** (GENESIS MAKE MINI SUPER SUCKER MACHINE ON TATA LPT 407 BS-IV)	3000	38.50
8	**SEWAGE SUCTION TRUCK - 3000 LTR (NA)** (U S ENTERPRISES)	3000	18.75
9	**Truck Mounted Suction Machine (NA)** (Unbranded)	4000	32.40
10	**Sewer Suction cum Jetting Machine (Nature Green)** (Nature Green NG-SCJM-4.0)	4000	28.15
11	**ALITY ENVIRO ENGINEERS SEWER SUCTION MACHINE (CAPACITY 4000 LTR) (QUALITY ENVIRO ENGINEERS)** (QUALITY ENVIRO ENGINEERS SEWER SUCTION MACHINE (CAPACITY 4000 LTR))	4000	24.50
12	**Mini Super Sucker 4000 Litter on Tata 709 BS-IV (Usha)** (Usha make Mini Super Sucker 4000 Litter on Tata 709 BS-IV)	4000	39.49
13	**Truck Mounted Suction Machine of 4000 Liters capacity mounted on Ashok Leyland Chassis (Kam-Avida)** (KAMVAC 4 L-AL-C-2H-4 (Without Derrick Arm))	4000	29.86
14	**JETTING CUM SUCTION MACHINE 6000 LITERS (IOTA)** (TOTA JSM 6000 LITER)	6000	
15	**Truck Mounted Suction Machine 6000 LTR. CAPACITY(HYDROTECH)** (HYDROTECH INTERNATIONAL HISMH6)	6000	31.05
16	**SEWER SUCTION CUM JETTING MACHINE 6000 LTR (QUALITY ENVIRO ENGINEERS)** (QEESSJM - 6LCH	6000	45.50
17	**Sewer Suction Cum Jetting Machine Capacity 8000 Liter**	8000	63.00
18	**JETTING CUM SUCTION MACHINE 8000 LITER (MARUTI SALES CORPORATION)** (MARUTI)	8000	52.00

Septage Conveyance Equipment Details

Type	Purpose	Tank Capacity (sludge tank + water tank) litres	Quotes listed	Avg. rate (Rs. Lakh)	Range (Rs. Lakh)
Truck mounted	Suction	2000	2	21.7	20.7 - 22.6
Truck mounted	Suction / Suction-cum-jetting	3000	5	23.9	13.8 - 38.5
Truck mounted	Suction / Suction-cum-jetting	4000	5	30.9	28.2 - 39.5
Truck mounted	Suction / Suction-cum-jetting	6000	2	38.3	31.1 - 45.5
Truck mounted	Suction-cum-jetting	8000	2	57.5	52 - 63

Annexure 7: Technical Options for Septage Treatment

The technical options for Septage Treatment can be broadly divided based on the technologies involved in them, namely - Mechanised and Non-Mechanised Technologies.

Mechanized technology involves automated handling and dewatering of septage with minimal intervention of operators and is designed to optimize solid-liquid (bio-solids and filtrate) separation and enhance pollutant removal in the downstream process. The preliminary treatment for this process involves removing inert solids using septage acceptance units (screening and grit removal), followed by mechanized de-watering using screw or belt press. The de-watered solids may be used as soil conditioner or landfill cover, while the filtrate is further treated biologically using a high-rate aeration system, which is a process used for sewage treatment prior to disposal into a receiving body of water.

Non-mechanized technology generally involves pond systems requiring relatively large footprints. The preliminary treatment involves the removal of non-biodegradable inert components of the septage (i.e., mostly plastic materials). The septage is then allowed to stabilize in ponds for 30-45 days to further remove organic contaminants. The accumulated sludge at the bottom of the pond is usually pumped out and dewatered using drying beds. When sufficiently dried, the sludge may be used as soil conditioner or landfill cover. The dewat technology or use of plants, microorganism and drying beds is also a low capex and low opex system.

There are obviously pros and cons to the two technical options, most notably the land area required, efficiency and ease in operation. Mechanized plants require smaller footprints compared to non-mechanized systems (for example a plant with a 70 cubic meters capacity per day require a 1,100 square meter lot for a mechanized system and 4,000 square meters for the non-mechanized system). Mechanized plants have more reliable and consistent process in meeting effluent standards but require higher capital outlay for the equipment compared to the mainly civil works component of the non-mechanized system. In terms of ease in operation, mechanized plants require less human handling and intervention but will have higher operating costs (e.g., for power, chemical, spare parts replacement).

1. Fully-Mechanized Septage Treatment Plant Components

Septage Acceptance Unit

The hose of the desludging truck is hooked to the septage acceptance unit (SAU), where the solid waste and sludge are automatically separated.
For semi-mechanized systems, the SAU is replaced with mechanical screens.

Screw Press for de-watering/ separation of sludge and filtrate

The screw press is one example of a de-watering equipment. Other options include centrifuge decanter, belt press or filter press

Conventional Activated Sludge system is perhaps the most popular and widely-used for wastewater treatment.

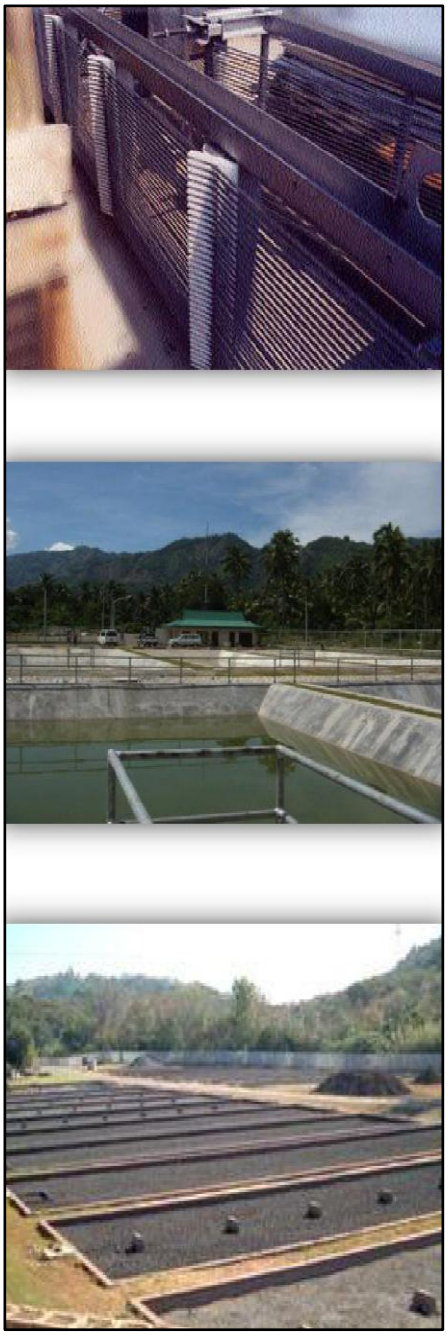
Activated Sludge/Aeration Tank

Oxidation Ditch is a modification of the Conventional Activated Sludge.

Sequencing Batch Reactor (SBR) combines the operation of aeration and solid settlement in a single system.

2.Non-Mechanized Septage Treatment Plant Components

Mechanical Screens



The mechanical screens are used to separate the solid waste from the sludge. This is a cheaper alternative to the septage acceptance unit, but will involve manual handling of the solid waste

Ponds

Pond systems typically comprise a treatment train, which involves a series of ponds: anaerobic – facultative – aerobic – maturation, to achieve BOD and pathogen reduction prior to discharge to the environment.

Drying Beds

The drying beds are used for the treatment of the bio-solids, before these can be used as landfill cover. The bio-solid can also be used as soil conditioner but this will require further treatment prior to land application, alkaline stabilization or composting.

Treatment and disposal facility for septage can be fully mechanized or non-mechanized.

Mechanized technology involves automated handling and dewatering of septage with minimal or no intervention of operator and is designed to optimise solid-liquid (bio-solids and filtrate) separation and enhance pollutant removal in downstream process. The preliminary treatment for this process involves removing inert solids using septage acceptance units (screening and grit removal), followed by mechanized de-watering using for example screw or belt press. The de-watered solids may be used as soil conditioner or landfill cover, while the filtrate is further treated biologically using a high rate aeration system, which is a process used for sewage treatment prior to disposal into a receiving body of water.

Non - mechanized technology generally involves pond systems requiring relatively large footprints. The preliminary treatment involves the removal of non-biodegradable inert components of the septage (i.e., mostly plastic materials). The septage is then allowed to stabilize in ponds for 30-45 days to further remove organic contaminants. The accumulated sludge at the bottom of the pond is usually pumped out and dewatered using drying beds. When sufficiently dried, the sludge may be used as soil conditioner or landfill cover.

Fully Mechanized Septage Plant Components	Non-mechanized septage plant components
Septage Accepting Unit: The hose of the desludging truck is hooked to the septage acceptance unit (SAU), where the solid waste and sludge are	The mechanical screens are used to separate the solid waste from the sludge. This is a cheaper alternative to the septage acceptance unit, but will

automatically separated.	involve manual handling of the solid waste.
Dewatering Unit: The screw press is one example of a de-watering equipment. Other options include centrifuge decanter, belt press or filter press.	Pond systems typically comprise a treatment train, which involves a series of ponds: anaerobic – facultative – aerobic – maturation, to achieve BOD and pathogen reduction prior to discharge to the environment.
Waste Water Treatment Unit: Conventional Activated Sludge system is perhaps the most popular and widely-used for wastewater treatment. Oxidation Ditch is a modification of the Conventional Activated Sludge. Sequencing Batch Reactor (SBR) combines the operation of aeration and solid settlement in a single system.	The drying beds are used for the treatment of the bio-solids, before these can be used as landfill cover. The bio-solid can also be used as soil conditioner but this will require further treatment prior to land application, alkaline stabilization or composting.

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