

National Action for Mechanised Sanitation Ecosystem

(Plan for mechanised cleaning of sewers septic tanks eliminating manual scavenging)

1 Introduction

- 1.1 “The Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013 (MS Act, 2013)” which has come into effect from 06.12.2013 prohibits construction/maintenance of insanitary latrines, and employment of any person for manual scavenging or hazardous cleaning of sewers and septic tanks.
- 1.2 Hazardous cleaning of sewers and septic tanks has been defined under Section 2(d) of the Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013 (MS Act, 2013) as under:
“ ‘hazardous cleaning’ by an employee, in relation to a sewer or septic tank, means its manual cleaning by such employee without the employer fulfilling his obligations to provide protective gear and other cleaning devices and ensuring observance of safety precautions, as may be prescribed or provided in any other law, for the time being in force or rules made thereunder;”
- 1.3 Government have notified Prohibition of Employment as Manual Scavengers and their Rehabilitation Rules, 2013 (MS Rules, 2013) in the Gazette of India dated 12.12.2013. Under these Rules, Manual cleaning of sewers and septic tanks with safety precautions including protective gear and devices can be undertaken under exceptional cases only with the permission of Chief Executive Officer of the Municipality for reasons to be recorded.
- 1.4 Engaging any person for hazardous cleaning of sewers and septic tanks by any person or agency is punishable with imprisonment upto 5 years or fine upto Rs. 5 lakhs or both.
- 1.5 Despite the above provisions, persons are still being engaged for manual cleaning of sewers and septic tanks without proper safety gear and safety precautions. As per the information received by the National Commission for Safai Karamcharis (NCSK) from 20 States and Union Territories, 882 sewer and septic tank related deaths have taken place since 1993 upto 06.11.2019. 13 States and Union Territories have sent a nil report. Jammu and Kashmir, Ladakh and Daman & Diu have not furnished any report in this regard.

2 Problem Scenario

National Action for Mechanised Sanitation Ecosystem

- 2.1 Sewer systems exist in urban areas only. However, a major part of Urban India is yet to be provided with sewer systems. In areas where there are no sewer lines, or even where there are no ancillary lines connecting households to the main trunk line of the sewer, septic tanks are used for receiving the septage from individual households. Cleaning of septic tanks is mostly an un-regulated activity and individuals resort to deploying private labour who neither have the skills, nor provided with necessary safety gear, required for this work. Manual cleaning of the septic tanks without safety gear and devices is the major cause for death of workers.
- 2.2 The toilets constructed under Swachh Bharat Abhiyan (Rural) implemented by the Ministry of Drinking Water and Sanitation are based on the 'twin leach pit' technology, and therefore do not require to be emptied. The focus of this action plan is on urban and semi-urban areas which are still having septic tanks.
- 2.3 The deaths in sewers/septic tanks occur mainly due to non-observance of safety precautions by the local authorities and the contractors. Treatment, disposal and reuse of sewage are taking place without proper regulation and care. Unlike in the developed countries where cleaning of sewers is mechanized, cleaning of sewers and septic tanks in India is still being done mostly manually. The workers enter the sewer lines, manholes and septic tanks without proper safety gear and are exposed to toxic gases.
- 2.4 Though the MS Act, 2013 provides for stringent action against the persons/agencies responsible for engaging persons for hazardous cleaning, no conviction under the provisions of the Act has been reported from any State.

3 Need for a National Action Plan:

Since the existing measures have not succeeded in elimination of hazardous cleaning of sewers and septic tanks a more serious, stringent and focused strategy framework is required to be put in place.

The cleaning of the sewers and septic tanks is linked with developing facilities for transportation, disposal, treatment and utilization of the sullage and is therefore closely linked with the Municipal administration.

4 Goals to be achieved by 2024:

National Action for Mechanised Sanitation Ecosystem

A National Action Plan was devised with the following Goals. The Goals may be classified as under:-

4.1 Modernisation:

- (i) Modernization of existing sewage system and coverage of non sewerred areas;
- (ii) Setting up of faecal sludge and septage management system for mechanized cleaning of septic tanks, transportation and treatment of faecal sludge;
- (iii) Equipping the municipalities, Panchayats and Private Sanitation agencies with appropriate technology and machinery for mechanized cleaning;
- (iv) Setting up of Sanitation Response Units with help lines

4.2 Prevention:

- (i) Eliminating human entry in sewer systems and septic tanks
- (ii) Amendment of Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013 and Prohibition of Employment as Manual Scavengers and their Rehabilitation Rules, 2013;

4.3 Rehabilitation:

- (i) Rehabilitating persons previously engaged in manual cleaning.
- (ii) Training and certification of sanitation professionals;

5 Strategies for achieving the goals:

- 5.1 **Modernisation of existing sewage systems and coverage of non-sewerred areas:** Efforts to be made to modernise the existing sewage systems so that they are not prone to blockages and more suitable for mechanised cleaning. Further, wherever feasible, the areas serviced by septic tanks need to be covered by sewer lines, in a phased manner.
- 5.2 **Tackling non-sewerred areas:** In such areas which continue to be non-sewerred and are dependent on septic tanks and/or open drains, 'Faecal Sludge and Septage Management Systems' be set up for mechanised cleaning of septic tanks and collection, transportation and treatment of the faecal sludge.
- 5.3 **Equipping the Municipalities/Local Bodies:** Each local body/Municipality, and private sanitation agencies, if any, to equipped with appropriate technology, machinery, etc. (mechanised solution) and ensure that only trained professionals are allowed to enter the sewer/septic tanks.

National Action for Mechanised Sanitation Ecosystem

- 5.4 **Setting up of Sanitation Response Unit (SRU):** To take care of emergency situations of blockage of sewer systems and septic tanks, the major municipalities in each districts shall set up a Sanitation Response Unit (SRU). The proposed structure and responsibilities of such an SRU are detailed in **Annexure-I**.
- 5.5 **Training and Certification of sanitation professionals:** SRU shall develop facilities for training and certification of the sanitation professionals either in-house or through reputed institutions.
- 5.6 **Compulsory licensing of private cleaning agencies:** Most municipalities/local bodies are engaging private agencies for cleaning the sewers and septic tanks as well as transporting of the septage from septic tanks to the septage treatment plants. In some cases, the septage treatment plants are also being operated by private agencies. Compulsory licensing for such agencies is necessary to avoid mishaps. Only such agencies which have facilities for total mechanized cleaning and handling of septage and professionals/trained personnel should be given licences.
- 5.7 **Amendments to MS Act and Rules:** Certain provisions of the Act need to be amended to include new definitions to enhance its scope and strengthen existing provisions to make it more coherent, meaningful and forceful. However, it is evident that the purview of the amendment of the Act should increase not only for incorporating finer nuances of definition, award of compensation to the families of the persons killed in fatal accidents while cleaning sewer or septic tank, quantum of punishment, provisions relating to appointment of RSA and its duties, setting up of SRUs. Therefore, the Department of Social Justice and Empowerment is of the view that amendment of MS Act, 2013 should be more effective to achieve of elimination of manual cleaning of sewers and septic tanks.

6 **Implementation system-(activity wise):**

- 6.1 **Identification and adoption of a mechanised solution:** There are reportedly about 15 innovations developed across the country to replace manual cleaning. Some of these are illustrated at **Annexure-II**. A Global Technology challenge was organized by Ministry of Housing and Urban Affairs (MoHUA) in July, 2018. Three innovations viz. Kamjet GR from M/s Kamavida, Pune; Bandicoot, from M/s Gen Robotics, Thiruvananthapuram and MTU by Wash-I, Dindigul,

National Action for Mechanised Sanitation Ecosystem

Tamil Nadu were awarded. Details of these are at **Annexure-III**. Some of these innovations like Bandicoot are already being used by the Municipalities in Tamil Nadu, Andhra Pradesh and Kerala. Delhi Government has also recently introduced a fleet of 200 sewer cleaning machines. Each local authority should identify the technological solution most suited to their city/town depending on the design of sewerage system, use of septic tanks and geography of the area etc.

- 6.2 **Constitution of Responsible Sanitation Authority (RSA):** A new institution, Responsible Sanitation Authority shall be constituted in each Districts, which shall be headed by the District Magistrate, or an officer not below the rank of Sub Divisional Magistrate nominated by him. The RSA have jurisdiction over the urban and rural areas in the districts. RSA shall be legal authority for Sanitation Response Units (SRUs), and also cause issue of licences to Private Sanitation Service Organizations (PSSOs).
- 6.3 **Setting up of Sanitation Response Unit (SRU):** The RSA shall cause setting up of a Sanitation Response Unit (SRU), in the major municipality in the district. SRU shall have adequate machinery for mechanized cleaning and trained Sewer Entry Professionals (SEPs) for handling emergency blockages. A common help line shall be set up for providing services in an emergency either by SRU or PSSOs. Ministry of Housing Urban and Affairs would take up with the States to ensure setting up of the SRU and constitution of Responsible Sanitation Authorities in all Districts by March 2021.
- 6.4 **Empanelment of Private Sanitation Service Organisations (PSSOs):** Each SRU shall have a panel of Private Sanitation Service Organisations (PSSOs) who have been issued licenses by the Responsible Sanitation Authority of the area. PSSOs shall employ only trained and certified personnel and necessary equipment for mechanized cleaning and prescribed safety gear for manual cleaning and attend to the jobs assigned by the SRU.
- 6.5 **Regular Periodic preventive maintenance of sewers and septic tanks:** The Municipalities/ ULBs/local authorities shall lay down, and strictly follow, schedules and systems for preventive maintenance of the sewer lines to prevent emergency cleaning. The ULBs shall develop an action plan for modernization and expansion and sewer systems suitable for mechanized cleaning.
- 6.6 **Septage management in non-sewered areas:** In areas which are serviced by septic tanks, a septage management system shall be set up, including a Faecal

National Action for Mechanised Sanitation Ecosystem

Sludge Management Plant. A schedule for regular collection, transportation and treatment of faecal sludge (FSSM) should be ensured. The local authority shall standardise the design of septic tank also ensure that all the new septic tanks are constructed as per the prescribed design and specifications to facilitate mechanized cleaning and reduce blockages.

- 6.7 **I.E.C. campaigns for publicising the availability of mechanised solutions and the SRU:** Campaigns would be undertaken by the RSA for publicity of services available through the SRU and related matters. Electronic and Print Media and hoardings at prominent locations shall be used for the campaign in local language and English/Hindi. Outreach programs will also be undertaken to educate households/citizens to utilize the services of SRU/PSSO for getting the blockage of sewers/septic tanks cleared, and not to engage any unauthorized agencies or untrained personnel for this purpose. Awareness campaigns should also educate the people about the penal provisions under the Act for engaging persons for manual hazardous cleaning of sewers and septic tanks. Similar campaigns would be organized by Panchayati Raj institutes in rural areas.
- 6.8 **Setting up of a Help Line:** Each SRU shall have 24X7 helpline/Contact Number for lodging complaints regarding blockage of sewer/septic tank and to provide service for its cleaning.
- 6.9 A **data base** of sewers and septic tanks shall be prepared by the Local Bodies and Geo-tag them for identification. The Local Bodies shall also prepare a data base of PSSOs, sanitation workers trained in the maintenance of sewers and septic tanks and the data of casualties in the sewers and septic tanks.
- 6.10 **Amendments in the MS Act and Rules for stricter implementation of provisions (Annexure-IV)**

The following amendments are proposed in the MS Act, 2013 for its better implementation:

- (i) Section 2 (d) would be amended to include septage treatment plant and such other spaces emitting toxic gases or effluent in the definition of ‘hazardous cleaning’.
- (ii) A new sub-section 4 (1) (a) would be added to facilitate survey of septic tanks by the local authorities to facilitate effective supervision over the maintenance of septic tanks.
- (iii) A new sub-section 4(1) (d) would be added to ensure that the septic tanks are constructed as per the prescribed specification for mechanized cleaning.

National Action for Mechanised Sanitation Ecosystem

- (iv) Section 7 would be amended to include sewage/septage system and any other system emitting toxic gases or effluents.
- (v) Section 9 would be amended to provide more stringent penalties for violation of provisions of Section 7 (prohibits engagement of persons for hazardous cleaning of sewers and septic tanks).
- (vi) Amendment of section 13 to provide payment of compensation to the families of the persons who die while cleaning sewers and septic tanks.
- (vii) Amendment of Section 21 by adding new sub-section 21(3) regarding appointment of District Magistrate or an officer not below the rank of Sub-Divisional Magistrate as Responsible Sanitation Authority for the District. The powers and the responsibilities of the RSA shall be as specified in the Rules.
- (viii) A new sub-section 21(4) shall be added by which RSA shall ensure filing of First Information Report through the concerned Superintendent of Police of all accidents in sewer, septic tank or any septage treatment system which result in injury or death of the person engaged for its cleaning or maintenance.
- (ix) Amendment of Section 33(1) so as to ensure that the local authority responsible for providing service for mechanised cleaning of sewers/septic tanks.
- (x) Amendment of Section 33(2) to ensure that State Government provides financial assistance to local authorities required for mechanised cleaning of sewers and septic tanks.

6.11 Amendment of MS Rules, 2013: consequential amendments due to the amendment of the Act and the action plan shall be carried out by amendment the MS Rules, 2013.

7 Convergence of Departments and the roles expected by each:

- 7.1 Ministry of Housing and Urban Affairs (MoHUA) as the nodal Ministry for sanitation in urban areas shall ensure that States formulate Action Plan for implementation of National Action Plan. It shall also provide financial assistance under AMRUT and Swachh Bharat Mission (Urban) to the urban local bodies for modernization of sewers systems, laying of new sewer lines and procurement of equipment and machinery in SRU for mechanized cleaning of sewers and septic tanks.
- 7.2 The Department of Drinking Water and Sanitation (DoDWS) as nodal Ministry for sanitation in rural areas, shall provide necessary funds under Swachh Bharat Mission (Rural) to the Panchayat Raj institutions for upgradation of sanitation services in rural areas and procurement of necessary equipment and trained manpower for the mechanized cleaning of septic tanks in rural areas.

National Action for Mechanised Sanitation Ecosystem

- 7.3 Ministry of Panchayati Raj would take necessary action for coordination with the Panchayati Raj Institutions and also carryout awareness campaigns regarding the provisions of the Act and Rules relating to hazardous cleaning of sewers and septic tanks and the helplines for accessing the services of Sanitation Response Units.

Responsibilities of converging Departments/Agencies for Implementation of Action Plan.

Sl. No.	Activity/Scheme/ Programme	Implementation Department/Ministry	Timeline	Funding if any
1	Modernization of existing sewage system and setting up of sewage system in new areas	i. Ministry of Housing and Urban Affairs and Department of Municipal Administration of concerned State Government for urban areas.	To start in 2020-21 and complete by 2022-2023.	Ministry of Housing and Urban Affairs under AMRUT/ SBM (Urban).
		ii. Department of Drinking Water and Sanitation and Panchayati Raj Institutions in States.	To start in 2020-21 and complete by 2022-2023.	Department of Drinking Water and Sanitation under SBM (Rural).
2	Setting up of faecal sludge and septage management systems in non sewerred areas	i. Ministry of Housing and Urban Affairs and Department of Municipal Administration of concerned State Government for urban areas.	To start in 2020-21 and complete by 2021-2022.	Ministry of Housing and Urban Affairs under AMRUT/ SBM (Urban).
		ii. Department of Drinking Water and Sanitation and Panchayati Raj Institutions in States.	To start in 2020-21 and complete by 2021-2022.	Department of Drinking Water and Sanitation under SBM (Rural).
3	Equipping Municipalities and Panchayats for mechanized cleaning of sewers and septic tanks	i. Ministry of Housing and Urban Affairs and Department of Municipal Administration of concerned State Government for urban areas.	To be completed by 31 st December, 2020.	Ministry of Housing and Urban Affairs under AMRUT/ SBM (Urban).
		ii. Department of Drinking Water and Sanitation and Panchayati Raj Institutions in States.	To be completed by 31 st December, 2020.	Department of Drinking Water and Sanitation under SBM (Rural).
		iii. NSKFDC to private agencies and sanitation workers including Self Help Groups	By December, 2020.	Under Swachh Udyami Yojana and SRMS.
4	Appointment of Responsible Sanitation Authority (RSA)	State Government and UT Administration	By March, 2021.	No additional expenditure.
5	Setting up of Sanitation Response Unit (SRU)	State Governments and UT Administration through Municipalities and District Administration	By March, 2021.	Expenditure will be borne by State Government/UT Administration.

National Action for Mechanised Sanitation Ecosystem

6	Training and Certification of Professionals	Municipalities	Continuous process	Municipalities
7	Licensing Private Agencies	Municipal Commissioner/CEO of Municipalities designated as RSA	Continuous process.	No expenditure.
8	Constitution of Monitoring Committees at District, State and Central Level	i. Central Level - by the Department of Social Justice and Empowerment ii. State Level - by the Department of Municipal Administration of the State/UT iii. District Level - by the District Magistrate	By December, 2020.	No Expenditure.
9	Holding of National Conference and Regional Workshops	Jointly by the Ministry of Housing and Urban Affairs and Department of Social Justice and Empowerment	As per prescribed schedule	Shared by MoHUA and DoSJE
10	IEC campaign	Ministry of Housing and Urban Affairs and Ministry of Panchayati Raj	Continuous process.	Ministry of Housing and Urban Affairs and Ministry of Panchayati Raj.
11	Setting up of Helpline	Municipalities	By December, 2020	State Government
12	Preventive Maintenance of Sewers and Septic Tanks	Municipalities and Panchayati Raj Institutions	Continuous process.	By the State Government/UT Administration.
13	Amendment of MS Act, 2013 and MS Rules, 2013	Department of Social Justice and Empowerment	By December, 2020.	No Expenditure.

National Action for Mechanised Sanitation Ecosystem

8 **Monitoring Mechanism:**

A coordinated action is required by all the concerned Departments at Central, State and District levels, as well as by other stakeholders, to ensure that by August 2022 mechanized solutions are put in place and fully implemented to eliminate manual cleaning of sewers/septic tanks and/or where such manual cleaning is unavoidable, to restrict such manual cleaning to be undertaken by SEPs equipped with proper protective gear and equipment.

- 8.1 At the Government of India level, the responsibility for giving effect to this Action Plan in the urban areas shall lie primarily with the Ministry of Housing and Urban Affairs. In case of rural areas, the Department of Drinking Water and Sanitation shall take the lead.
- 8.2 The Department of Social Justice and Empowerment, Government of India as be the nodal Department would constitute a Central Implementation-cum-Monitoring Committee as per the composition at **Annexure-V** for coordination with the concerned Ministries/Departments and Organizations.
- 8.3 Implementation of the State Action Plan would require close monitoring at all levels for which the a monitoring mechanism in the form of Implementation cum Monitoring Committees set up at the District and State level. The proposed composition of these Committees is at **Annexure-V**. The District Vigilance Committees and State and Central Monitoring Committees constituted under The Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013 (MS Act, 2013)” would also be utilized to enforce the Statutory obligations.
- 8.4 The Central and State level Committees shall be responsible for ensuring the implementation of the Action Plans and shall conduct half-yearly reviews of the implementation, induction of new technologies, progress of mechanisation of cleaning of sewers /septic tanks, working of SRUs, rehabilitation of sanitation workers etc.
- 8.5 The District level Committees shall be responsible for ensuring the implementation of the Action Plan at the district level and shall conduct quarterly reviews of the progress of setting up and equipping of SRUs, modernisation and introduction of sewer lines, training of sanitation professionals, IEC activities, identification and rehabilitation of the erstwhile sanitation workers etc.

National Action for Mechanised Sanitation Ecosystem

9 **Financial implications:**

9.1 The Ministry of Housing and Urban Affairs have indicated the financial implication in implementing Action Plan in urban areas:

9.1.1 **Expenditure for Setting up of Sanitation Response Units**

The requirement of equipment (Vehicles, plant, safety gear) and manpower to be maintained with each SRU will depend upon the following factors-

- Inventory of Vehicles and equipment to be maintained with the Municipal body of the Host ULB (Where the RSA will have his headquarters).
- Inventory with each secondary ULB within the designated **Area of responsibility (AOR)** of the RSA.

9.1.2 The requirement of funds and the central contribution through SBM-U and AMRUT has been assessed in the respective EFC Notes, which are under circulation. The gist is placed as under-

Under SBM-U (for towns with population below 1 lakh)

Cost of mechanical conveyance for desludging as well as cleaning of sewer/septic tanks for 100% population.

Basis- One septic haulage vehicle which can serve 6 Households per day under a three year septic tank emptying cycle would cost about Rs 28.0 Lakhs). This can be equated to an amount of Rs 100 per capita. This per capita amount is also made applicable to those urban areas which are serviced by sewers and where sewer maintenance vehicles and equipment will be employed. Thus for an Urban population of 15.08 Crore in Class-II to Class VI towns - The total requirement is Rs 1508 Crores (Central share Rs 507 Crores @ 60% funding for only 50% population and for remaining 50% population funding to be mobilized through private participation)

Cost of Providing Wastewater Treatment: Rs 30,960 Crores (Central share Rs 19,505 Crores @ 60% funding)

Under AMRUT (for towns with more than one lakh population)

- i) Cost of mechanical conveyance for desludging as well as cleaning of sewer/septic tanks for 100% population.- Rs 2500 Crores estimated (100% funding to be mobilized through private participation)
- ii) Wastewater Collection and Treatment including house connection: Rs 1,11,607

National Action for Mechanised Sanitation Ecosystem

Crores (Central share Rs 28,217 Crores).

For Sanitation Response Unit

i) **Sanitation Emergency Vehicles (SEVs)** – Two Nos/ SRU which will be provided to Sewer Entry Professional (SEP) teams and which will be duly equipped with state of the art gas detector, blower, emergency breathing system, modular airline kit, CCTV inspection cameras, oxygen mask, safety harnesses, helmets, safety jacket, boots torch lights, fire extinguisher, walkie-talkie and emergency medical equipment). Tentative Cost- Rs 50 lakh per specialized vehicle

ii) **Sanitation Sector Reserve (SSR)**- The SRU may also hold a "Sanitation Sector Reserve (SSR)" of some general use sewer and septic tank maintenance equipment (similar to those held with Municipal bodies and parastatals) - so as to ensure that SRUs are able to effectively provide the minimum essential quick response without being completely dependent on the resources of the municipal body or parastatal. The SSR can be tentatively worked out at 10% of the equipment needs for the AOR.

It was analysed that the Sanitation Operation and Maintenance requirement of any municipal area (Urban) will be a mix of the following-

a) **Suction Equipment**- These equipment are used for septic tank emptying and also for management of sewers/ manholes and open drains. They are available in various capacities (in terms of pumping rates/ volume storage tanks) and modes of mobility (self propelled or towed , mechanical or manual traction. The corresponding costs also widely vary. The requirement of size and mobility is to be locally determined depending upon functional constraints- narrow lanes, hills, inaccessible septic tanks, etc. For the purpose of estimating the requirement of suction equipment for managing septic tanks, it was analysed that the requirement of periodic emptying of septic tanks for a population of 6,000 households (3 year cycle - 6 Households per day) could be met by providing a hypothetical Suction Vehicle Unit costing Rs 28 Lakhs. This corresponded to Rs 28 Lakhs/ 6000 Households or = Rs 100 per person.

(b) **Sewer Maintenance Equipment**- These are of various types and sizes grouped into suction, jetting or rodding apparatus and inspection equipment (Cameras).

The requirement of sewerage maintenance equipment for urban areas will depend upon the length of sewers in a given jurisdiction and the bore diameter /size of the sewers (smaller bore sewers can choke more frequently). These vehicles and equipment will be generally needed in those places where

National Action for Mechanised Sanitation Ecosystem

households are directly connected to sewers. While each town will have a different proportion of sewers and septic tanks, it can be roughly estimated that a combination of sewer maintenance equipment can be procured at a cost of Rs 100 per affected person.

For calculation purpose, the overall requirement of a combination of Septage Haulage Vehicles and various mechanisms for sewer maintenance can be assessed at Rs 100 per citizen. Thus for the combined Rural and Urban Population depending on Sewers and Septic Tanks and excluding the HHs being served with Twin Pits and taking 20% excess for design population growth,

Total Urban Population- 40 Crore - (9 Cr HHs)

- Septic Tank Based- 50%
- Sewer Based - 40%
- Twin Bit Based- 10%

Total Estimated Cost for Sanitation O&M equipment for Urban Areas (Including the equipment already held)

$$= 40 \text{ Cr} * (50\% + 40\%) * \text{Rs } 100 = \text{Rs } 3600 \text{ Cr}$$

Total Net Capital Cost - increased by 20% for future growth = Rs 4320 Cr Estimate for 10 % Sanitation Service Reserve (SSR) with SRU

$$= 10\% \text{ of Rs } 4320 = \text{Rs } 432 \text{ Cr}$$

This averages about $432 / 750 = \text{Rs } 57.6 \text{ Lakhs per SRU} \dots \dots \dots \text{(B)}$

9.1.2 Accordingly, the Capital cost of Setting up an average SRU=

- a) Sanitation Emergency Vehicles (SEVs) –
2 Nos @ Rs 50 Lakh per Veh= Rs 100 Lakhs per SRU
- b) Sanitation Service Reserve (SSR) 5%= Rs 57.6 Lakhs (Average)
Total = 1.576 Crore per SRU
Or for 750 SRUs= Rs 1182 Crore.

Central Assistance/ Contribution = 50% = Rs 591 Crore

The estimated funds requirement under Swachh Bharat Mission (SBM) 2.0 and Jal Jeevan Mission (JJM) Urban are tabulated hereunder-

S. No.	Particular	Total fund requirement	Proposed Central Share	Source
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National Action for Mechanised Sanitation Ecosystem

A.	For ULBs with less than one lakh population	Rs 32,468 Crores	Rs 20,012 Crores	SBM 2.0 EFC
B.	For ULBs with more than one lakh population	Rs 1,14,107 Crores	Rs 28,217 Crores	EFC for AMRUT / JJD(U)
C.	Cost of setting up 750 SRUs	Rs 1182 crores	Rs. 591 crores	To be included in the EFC under SBM 2.0 of HUA.

9.2 The Department of Drinking Water and Sanitation have indicated the following financial implication in implementing the Action Plan in rural areas:

9.2.1 Sanitation is a State subject. It is worthwhile to note that the complete chain in the faecal sludge management has following stages:

- (i) Toilet
- (ii) Containment
- (iii) Emptying
- (iv) Transport
- (v) Treatment
- (vi) Reuse.

9.2.2 Department of Drinking water and Sanitation is mandated to supplement the efforts of the State Governments with regard to the sanitation activities in the rural areas and is targeting on ODF attainment and specifically on toilets, Containment, Treatment and Reuse.

9.2.3. Under Swachh Bharat Mission (Grameen) the preferred toilet technology option for rural areas is the twin leach pit toilet technology, in which the faecal matter is automatically converted to manure in 1-2 years which can be emptied safely and reused, and no sewerage system or manual scavenging is required. While in the cities/towns most of the toilets have septic tanks, hence the requirements of emptying and transportation is a major challenge in urban areas wherever sewage systems don't exist (which is the case in major towns and cities) rather in rural areas.

9.2.4. As per Central Pollution Control Board (CPCB) Report 2015, there are 816 Sewage Treatment Plants (STPs) in about 500 statutory towns all over the

National Action for Mechanised Sanitation Ecosystem

country. While in total there are about 4041 statutory towns in the country (Census 2011). Metros and big cities have larger number of STPs.

- 9.2.5. As per baseline survey data of 2012-13, there are about 18 crore rural households in the country. There is no accurate data available about the total no. of toilets (septic tanks and single pits) that would require periodic desludging. However, considering the total number of toilets constructed under SBM(G) as twin pit toilets, it is estimated that at the most 50% households i.e. about 9 crore households may have septic tanks/single pits which may require periodic desludging. Hence, for rural areas, the emptying and transportation have been envisaged to be done by the States/districts through private entrepreneurs/business models through local bodies.
- 9.2.6. If a septic tank/single pit toilet is desludged every five years, on average, every district would require desludging of about 100 toilets every day. For this, at least 25 desludging trucks would be required per district if each truck makes 4 trips provided if there are adequate number of STPs/FSTPs. Each smaller desludging truck costs approx. Rs.10 lakh. Thus for 25 trucks in a district, the approx. cost would come about Rs.2.50 crore.
- 9.2.7. To support the private entrepreneurs to purchase the trucks, loan may be provided to such entrepreneurs through the priority sector lending. Otherwise, interest subvention or subsidy may be provided. If 50% subsidy is provided, the total approximate subsidy amount requirement comes to Rs.850 crore. It can be provided through Swachh Bharat Programme of the Department of Drinking Water and Sanitation.

- 9.3 Department of Social Justice and Empowerment would modify the Self Employment Scheme for Rehabilitation of Manual Scavengers to include a component for funding NSKFDC to provide subsidy to the sanitation workers, self help groups of sanitation workers and private agencies to procure sanitation equipment and vehicles under Swachhata Udyami Yojana (SUY). Projected Financial implication for implementation of Swachhta Udyami Yojana (SUY) during next 3 years i.e. 2020-21, 2021-22 and 2022-23 are as under:

Year	No. of Municipal Corporations (MCs) / Gram Panchayats (GPs) to be provided loan assistance			Expected Amount of loan (Rs. In Crore)		
	Urban Areas	Rural Areas	Total	Urban Areas (@	Rural Areas (@	Total

National Action for Mechanised Sanitation Ecosystem

				Rs. 75 lac each MC)	Rs. 10 lac each GP)	
2020-21	40	05	45	30.00	0.50	30.50
2021-22	45	10	55	33.75	1.00	34.75
2022-23	50	10	60	37.50	1.00	38.50
Total	135	25	160	101.25	2.50	103.75

9 Timelines for implementation:

Sl. No.	Activity	Timeline	Ministry/Department Responsible
1	Finalization and launching of National Action Plan	January-February, 2020	Social Justice and Empowerment/MoHUA
2	Finalization and launching of State Action Plans	February-March-2020	MoHUA, DoDWS and Panchayati Raj
3	Working out the financial requirement	March-2020	MoHUA, DoDWS and Social Justice and Empowerment
4	Appointment of Responsible Sanitation Authority	March 2021	States and UTs
5	Setting up of SRUs	March, 2021	Municipal Commissioners, CEOs of Municipality, District Magistrate and CEO of Zila Parishads
6	Constitution of implementation-cum-Monitoring Committees	April, 2020	Ministry of Social Justice and Empowerment, Department of Urban Affairs in States

ORGANIZATIONAL STRUCTURE OF SRU

Sanitation Response Unit (SRU) will be set up one in each district. The SRU shall be responsible to meet sanitation emergency requests from the towns and the adjoining areas as may be designated as area of responsibility of the Responsible Sanitation Authority (RSA).

2. The Emergency Response Sanitation Unit shall be generally based on structure of the Fire Services/ Fire Brigade, and shall have all necessary equipment required for mechanized cleaning of sewers and septic tanks.

3. State/UT may designate District Magistrate or Local Authority as the appropriate Responsible Sanitation Authority as provided under Sec. 18 of the PEMSRA Act, 2013. The District Magistrate or Municipal Commissioner of the major town (designated as the base town) shall be nominated as **Responsible Sanitation Authority (RSA)** with a clearly specified Area of Responsibility (AoR). For cities/towns, where a significant proportion of sewers are to be maintained by any entity other than the municipal authority, such as the Jal Board, the CEO/Regional Head of such authority may be designated as RSA for a particular jurisdiction. .

4. SRU shall be equipped with sanitation emergency vehicle, two in each SRU, which shall be provided to the Sewer Entry Professional Teams. SRU would also hold a Sanitation Sector Reserve (SSR) to ensure minimum essential fix response without the completely dependent on the resources of municipal body for the maintenance of sewers/septic tanks Staff for SRU will be organized by the RSA. It shall consist of a headquarters and a 24x7 response contact number. Necessary number of **Sewer Entry Professionals (SEPs)**.

5. Such SEPs may preferably be selected from traditionally employed sanitation workers. They must be comprehensively trained on their job and safety/security measures so that they do not risk their lives in cleaning of sewer/septic tanks.

6. It is not necessary to employ all the SEPs on permanent government rolls. SEPs can be kept on assignment/contract basis. In addition, professionally trained and equipped **Private Sanitation Service Organizations (PSSOs)** duly licensed by RSA may also be empanelled by respective SRU to provide an assured number of **private SEPs (PSEPs)** and equipment sets.

7. On receipt of a service request, attempt shall be made to attend the problem through mechanized cleaning. In case manual intervention is unavoidable, it may be ensured that RSA will only be responsible to provide

services for human entry in sewer/ septic tank. As per the PEMSRA Act, 2013, the RSA will take due permission from CEO wherever manual cleaning has to be undertaken. RSA should procure adequate full sets of protective gear (both personal and institutional) and maintain them at optimal efficiency. Whenever, a SEP is tasked to carry out the job, he may be issued the protective gear and equipment and should be allowed to do the job under observation of an officer of RSA.

8. Entry of any individual other than Member of a trained team of SEPs specifically deputed from SRU into sewers or septic tanks without permission of SRU shall be deemed contravention of the PEMSRA Act, 2013, such individuals and the principal entity/ person allowing such entry directly or indirectly, may be held criminally liable under the Act. RSA will take necessary action in this regard.

9. The RSA will notify charges/ fees for services provided by SRU, which shall be binding on the cluster towns.

10. **Training and Equipment**-The RSA will be responsible to provide basic training, periodic upgradation, and necessary equipment, vehicles, other logistics and proper functioning of SRU. RSA will also prescribe conditions and eligibility of PSSOs, procedure for empanelment, guidelines and protocols to be followed by PSSOs in carrying out assignment, equipment and safety gears to be kept, training of PSEPs and procedure for de-empanelment, etc.

11. Normal cleaning/ suction of sewer/ septic tanks which does not require entry of a person into sewers/septic tanks/nallahs may be undertaken by contractors/ vendors as well as by the empanelled PSSOs (without any effect on their primary task with SRU).

There are reportedly about 15 innovations developed across the country to replace manual scavenging. The Hyderabad Metropolitan Water Supply and Sewerage Board is using 70 mini jetting machines that can access narrow lanes and smaller colonies to clear the choked sewer pipes, while in Thiruvananthapuram, a group of engineers has designed a spider-shaped robot that cleans manholes and sewers with precision. A few of these innovative mechanized solutions to manual cleaning of sewers include-

1. Bandicoot

An Indian start-up called Genrobotics, founded by young engineers in Thiruvananthapuram, has designed a spider-shaped robot called 'Bandicoot' that cleans manholes and sewers with precision.

Municipalities such as those in Thanjavur, Madurai and Tiruchirappalli in Tamil Nadu, Anantapur in Andhra Pradesh, and Thiruvananthapuram and Kochi in Kerala are already using the Bandicoot robot for cleaning their sewers.

The four-legged robot weighs 50 kg and cleans a manhole in a mere 20 minutes, which would take three workers 2-3 hours. The robot has a magnetic mechanism to lift the manhole lid on its own, while a technician can also lower it into a manhole to clear blockage.

Once inside the manhole, the robot spreads its arms and scoops out the solid and liquid filth that can lead to blockages inside sewers. Its movements are remote controlled by a device attached to it. The robot can also detect and warn against toxic gas inside a manhole. Currently, one unit of 'Bandicoot' costs Rs 12 lakh and the innovators are working on reducing the cost.

2. Ajantha Technologies

A Bengaluru firm has recently created a set of devices that have the potential to completely clean sewers and even narrow sewer pipes that the Bandicoot cannot enter.

Dr K. Balakrishnan and Geminiya Ongolu, two retired Hindustan Aeronautics Limited (HAL) engineers from Bengaluru, have designed and developed four devices that can detect poisonous gas inside the sewer line, clean blockages and obstructions and even alert authorities in case of overflow. Their most popular design is Sewer Croc-

- **Sewer Croc and Robotic Camera System:** It is a water jet-powered device that cuts through blockages in sewer pipes of varying diameters. The water jet spins the turbine at high speed and propels the device forward along the length of the sewer pipe. The cutting blades of the turbine clear out blockages and sediments. The device has been designed for pipes with diameters as small as 200, 250, 300 and 400 millimeters. The system consists of robotic camera for identifying debris, blockages, roots, sediments etc, and displays on the monitor, the same data can be extracted and reported for reference.

The devices have been tested in Telangana where the government has shown an interest in the Sewer Croc.

Ajantha Technologies works with a manufacturing agency called Sanitor. "We design and develop, Sanitor manufactures the devices," Balakrishnan said. Sixty-five percent of Sanitor shares are owned by Dalits. The company has signed memorandum of understanding for manufacturing transfer of technology with Ajantha Technologies.

3. Sulabh International Social Service Organisation

Sulabh International Social Service Organisation, a non-profit voluntary social organisation founded in 1970 by Dr. Bindeshwar Pathak, is dedicated to Gandhian ideology of emancipation of scavengers. Sulabh has been working for the removal of untouchability and social discrimination against scavengers.

Its environmental friendly two-pit, pour-flush compost toilet known as Sulabh Shauchalaya is socially acceptable, economically affordable, technologically appropriate and does not require scavengers to clean the pits. It has been implemented in more than 1.5 million houses all over India that has helped liberate over a million scavengers.

Sulabh has suggested house-to-house contact and campaigns in local languages for liberation of manual scavengers as part of the methodology. This was adopted by the Government of Bihar, and now many State Governments are adopting this methodology.

Sulabh has also initiated a vocational training center with the name, Nai Disha. About 109 women have been imparted training on vocational aspects such as stitching, tailoring, etc.

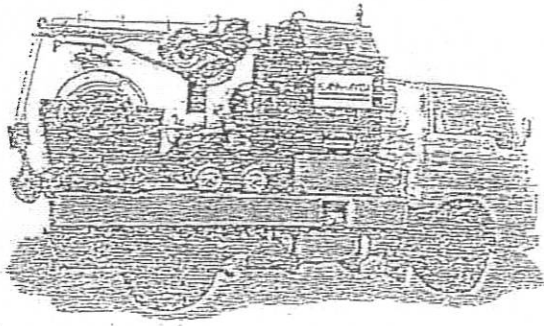
4. Delhi Government

The Delhi government on February 28, 2019 flagged off a fleet of 200 sewer-cleaning machines, with the aim of eradicating manual scavenging in the Capital. Following a model in operation in Telangana, Delhi wants to make manual scavengers the owners of the machines.

A detailed analysis of the products/ processes examined through the technology challenge is available with the Ministry at <https://smartnet.niua.org/amrut-tech-challenge>.

Winner Products

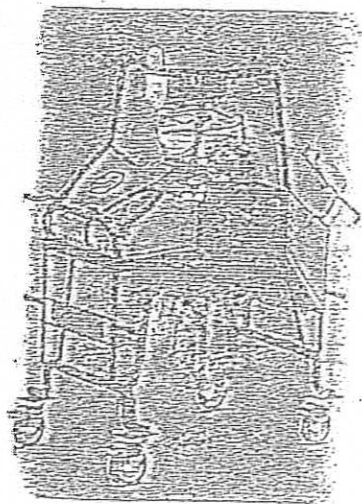
KAMJET GR from M/s Kam Avidia, Pune



It is a compact, hydraulically driven, electro mechanically operated sewer cleaning and maintenance machine without any physical contact with sullage/ waste water and man-entry. KAMJET GR is designed for:

1. De-choking of sewer lines through Power Rodding.
2. Flushing and de-silting of sewer lines through High Pressure Water Jetting.
3. Removal of silt and debris from manholes through Mechanical Grabbing.

Bandicoot from M/s Gen Robotics, Thiruvananthapuram

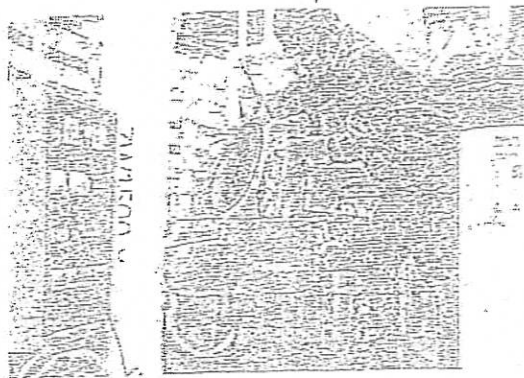


It is a towable apparatus which gets placed on top of a sewer manhole and drops a robotic arm cum grabber arrangement into the sewer manhole. This arm and grabber are

electronically controlled by the operator at ground level. A low light camera attached to the arm is also dropped into the manhole, which provides the view of the condition in the manhole on the operator's display panel.

The operator is thus able to remotely grab silt and debris from inside the manhole without entering the manhole.

MTU by WASH-I, Dindigul, Tamil Nadu

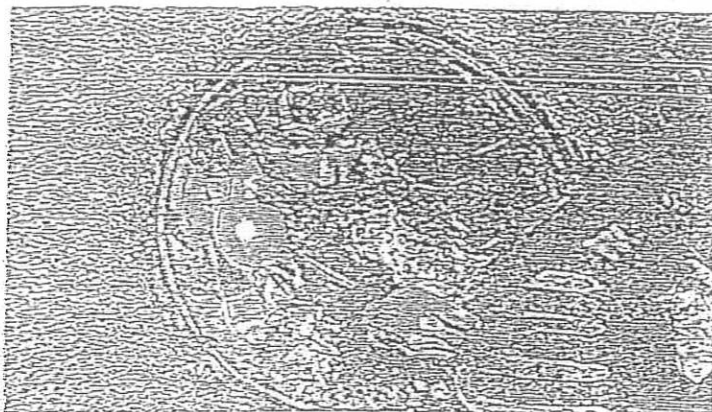


It is a septage treatment system mounted on the bed of a small truck and treats the effluent of septic tanks onsite.

- The operational capacity of the on-site Mobile septage Treatment Unit (MTU) varies from 3000 to 6000 lts/hr.
- The unit works on the concepts of solid-liquid separation, sludge thickening and effluent treatment processes.
- While liquid is separated from the solid, the effluent passes through the treatment process and disposes the treated effluent. Sludge thickening process helps to further reduce the moisture content in the sludge.
- The MTU treated septage effluent meets India's disposal standards.
- The total cost of each mobile treatment unit is considerably lower than septage-emptying trucks.

Regular use of MTU will prevent any choking of septic tanks and thus there will be no need to enter the tanks.

1. Hazardous Cleaning of Sewers



2. Professional Sewer Management in Developed Nations



GET IN GEAR

What gear does a
field technician need
to inspect a sewer?



Global Technology Challenge

Goal - The Technology challenge invited solutions that address the cleaning of choked sewer drains and septic tanks without any need for human entry in the most efficient and cost-effective manner. Elimination of human entry into sewer drains and cleaning of the septic tank was the ultimate goal of this Challenge.

Aim and Objectives of the Challenge

The challenge aimed to scope, scale and catalyze – technological and business solutions to eliminate human entry into septic tanks and sewers. The objectives of the challenge were as follows-

- Identify technological as well as business process innovations.
- Endorse viable business models that are suitable for a different size, geographies, and class of cities.
- Pilot test and handhold to scale the shortlisted technologies/solutions in select project cities.
- Bridge the gap between innovators/manufacturers and beneficiaries- i.e. ULBs & citizens

Duration of the Challenge

The challenge was launched on 4th July 2018 and closed on 14th Aug 2018. 85 entries were received of which 34 were shortlisted and reviewed by the experts.

Scoring Criteria

S. No.	Weightage Criteria	Weightage (%)
1	Operational effectiveness* (In Sewered and Non-sewered Septic Tank Systems)	25
2	Durability	25
3	Ease of Use	20
4	Ease of Availability / Economics of scale	15
5	Adaptability / Versatility	5
6	Made in India	5
7	Environmental Sustainability	5
Total		100

These 200 machines would be handed over to family members of those who have died while cleaning drains or septic tanks, sanitation workers engaged in manual scavenging currently and those from the Scheduled Caste communities.

The machines will enable cleaning up to 30 feet underground, with sewerage and silt being brought out with a trolley.

The model has been criticized for again allotting the responsibility of cleaning and maintaining sewage with the Dalit community. Along with technological solutions, it is important to break the relationship between caste and the profession of sanitation work.

5. Hyderabad Metropolitan Water Supply and Sewerage Board

Aiming to eliminate manual scavenging in Telangana through technology, the Hyderabad Metropolitan Water Supply and Sewerage Board (HMWS&SB) today deployed 70 mini jetting machines in the city.

HMWS&SB, in association with the DICCI (Dalit Indian Chamber of Commerce and Industry) inducted the 70 mini jetting machines at a cost of Rs 20 crore and the machines were handed over to the 'scavenging labour turned entrepreneurs'.

HMWS&SB was previously using 58 air-tech machines to clean the city's 4.7 lakh manholes, with a major drawback that these machines could not enter narrow lanes. The new machines would be able to enter narrow lanes, which will make the process of cleaning the sewage easier.

Subject:-Amendment of “Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013” (MS Act, 2013).

Sl. No.	Section	Existing Provision	Proposed Amendment
1	2 (d)	“hazardous cleaning” by an employee, in relation to a sewer or septic tank, means its manual cleaning by such employee without the employer fulfilling his obligations to provide protective gear and other cleaning devices and ensuring observance of safety precautions, as may be prescribed or provided in any other law, for the time being in force or rules made thereunder;	(d) “hazardous cleaning” by an employee, in relation to a sewer or septic tank either existing or under construction, and sewage septage system or any other system emitting toxic gases or effluents, means its manual cleaning by such employee without the employer fulfilling his obligations to provide protective gear and other cleaning devices and ensuring observance of safety precautions, as may be prescribed or provided in any other law, for the time being in force or rules made thereunder;
2	2 (1)	Add to new subsection (t) under Section 2	(na) "Responsible Sanitation Authority" shall mean the District Magistrate of the district, or any other authority as notified by the State Government empowered to enforce the provisions of this Act.
3	4 (1)	Add New Sub-Section 4 (1) (d)	(c)(d) ensure that no sewage system or septic tank is constructed except in accordance with the specifications prescribed under this Act, which inter alia shall contain provision of access for mechanical cleaning.
4	7	No person, local authority or any agency shall, from such date as the State Government may notify, which shall not be later than one year from the date of commencement of this Act, engage or employ, either directly or indirectly, any	No person, local authority or any agency shall, from such date as the State Government may notify, which shall not be later than one year from the date of commencement of this Act, engage or employ, either directly or indirectly, any person for hazardous cleaning of a sewer or

		person for hazardous cleaning of a sewer or a septic tank.	a septic tank or any sewage or septage system or any other system emitting toxic gases or effluents.
5	13	Add new sub section 3	The State Government shall be responsible for payment of compensation as may be prescribed to the family of the person in the event of death of a person engaged in a hazardous cleaning activity.
6	18	Add new sub Section 18 (A)	<p>The appropriate Government may by notification appoint the District Magistrate of the district or any other authority modified by the appropriate Government as Responsible Sanitation Authority (RSA) who shall exercise the powers and carry out such responsibilities as prescribed under this Act, or Rules made thereunder which shall include:</p> <ul style="list-style-type: none"> a) Implementation of the Act in the given jurisdiction. b) Ensure prompt filing of the First Information Report in case of incidents of death or injury of persons while undertaking hazardous cleaning. c) Ensure payment of compensation prescribed under the Act to the family of the person died while undertaking hazardous cleaning activity, within fifteen days from the date of occurrence of death.

7	20(1)	The appropriate Government may, by notification, appoint such persons as it thinks fit to be inspectors for the purposes of this Act, and define the local limits within which they shall exercise their powers under this Act.	The responsible sanitation authority by notification, appoint such persons as it thinks fit to be inspectors for the purposes of this Act, and define the local limits within which they shall exercise their powers under this Act.
8	33 (1)	It shall be the duty of every local authority and other agency to use appropriate technological appliances for cleaning of sewers, septic tanks and other spaces within their control with a view to eliminating the need for the manual handling of excreta in the process of their cleaning.	It shall be the duty of every local authority and other agency to use appropriate technological appliances for cleaning of sewers, septic tanks or septage system and any other system emitting toxic gases or effluents and other spaces within their control with a view to eliminating the need for the manual handling of excreta in the process of their cleaning.
9	33 (2)	It shall be the duty of the appropriate Government to promote, through financial assistance, incentives and otherwise, the use of modern technology, as mentioned in sub-section (1).	It shall be the duty of the appropriate Government to promote, through financial assistance, incentives and otherwise, the use of modern technology, as mentioned in sub-section (1) resulting in complete mechanization of the hazardous cleaning operations.

Composition of Central, State and District Level Implementation cum Monitoring Committees

(a) **At Central Level:** A Central Level Implementation cum Monitoring Committee shall be set up with the following composition:

- | | |
|---|------------------|
| i. Secretary, Ministry of Housing and Urban Affairs | - Chairperson |
| ii. Secretary, Department of Social Justice& Empowerment | - Co-Chairperson |
| iii. Secretary, Ministry of Rural Development | - Member |
| iv. Secretary, Ministry of Panchayati Raj | -Member |
| v. Secretary, Department of Drinking Water and Sanitation | - Member |
| vi. Two academicians dealing with the subject of sanitation, from reputed institutions | - Members |
| vii. Representatives of two Voluntary Organisations working for the welfare of sanitation workers | - Members |

(b) **At State level:** A State Level Implementation cum Monitoring Committee shall be set up with the following composition:

- | | |
|---|----------------|
| i. Principal Secretary of the Department of Urban Affairs
(or the concerned department in the State) | - Chairman |
| ii. Principal Secretary of the Department of Social Welfare
(or the concerned department in the State) | - Co- Chairman |
| iii. Principal Secretary, Department of Revenue | -Member |
| iv. Principal Secretary-Drinking Water and Sanitation/
Rural Development | - Member |
| v. Principal Secretary, Panchayati Raj | -Member |
| vi. Municipal Commissioners of the cities and towns
in the State | - Members |
| vii. Chief Engineer of the Works Department | - Member |
| viii. Two academicians dealing with the subject of
sanitation, from reputed institutions | -Members |
| vi. Representatives of two Voluntary Organisations working
for the welfare of sanitation workers | -Members |

(c) **At District level:** A District Level Implementation and Monitoring Committee shall be set up in each district with the following composition:

- | | |
|---|------------|
| i. District Magistrate/Municipal Commissioner/RSA | - Chairman |
| ii. District Social Welfare Officer | - Member |
| iii. Chief Executive Officer of Zila Parishad | -Member |
| iv. Representatives of District Swachh Bharat Mission- Gramin | -Member |
| v. Representatives of local bodies, including Gram
Panchayats of areas covered by the RSA | - Members |
| vi. Representatives of two Voluntary Organisations
working for the welfare of sanitation workers | - Members |