WORKSHOP HANDBOOK



STATE-LEVEL CONSULTATIVE WORKSHOP

AT SAHYADRI ON FEBRUARY 2, 2019

Workshop Handbook

for

State Level Consultative Workshop

on

Swachh Bharat Mission

Compiled by: ERAF Environmental Research Foundation **Designed by:** Dr. Ketna Atul Matkar

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We wish to thank organizations, and experts for sharing with us their information and experience.



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CHAIRPERSON



Professor (Dr.) Jyoti K. Parikh Executive Director Integrated Research and Action for Development (IRADe)

Professor Jyoti K. Parikh is the Executive Director of Integrated Research and Action for Development (IRADe), New Delhi. Dr. Parikh was the former member of the Prime Minister's Council on Climate Change –India and is a recipient of Nobel Peace Prize awarded to IPCC authors in 2007. She has more than 40 years of experience in the area of Climate Change and Resilient Urban Development and is heading the Center of Excellence (CoE) for Urban development and climate change designated byMinistry of Housing and Urban Affairs.

She has been appointed as the advisor for Global Commission on Climate Adaptation set up by UN Secretary General and Gates Foundation managed by World Resources Institute. She was also a member of the World Economic Forum's Global Agenda on Decarbonisation of Energy Sector.

She was the Senior Professorat Indira Gandhi Institute of Development Research (IGIDR), Mumbai. She also worked at the International Institute for Applied Systems Analysis (IIASA), Austria; and served as senior energy consultant at the Planning Commission, New Delhi (1978-80). She was visiting professor at the Institute of Advanced Studies (IAS) of UNU, Tokyo 1995-96. She was the Acting Director of IGIDR during 1997-98.

Dr. Parikh has served as energy consultant to the World Bank, the U.S. Department of Energy, European Economic Community, Brussels and UN agencies such as UNIDO, FAO, UNU, and UNESCO, Environment Consultant to UNDP, World Bank and so on. She worked as an advisor to various ministries for Gov. of India

She obtained her M.Sc. from University of California, Berkeley, and Ph.D. in Theoretical Physics from University of Maryland, College Park, USA. She has guided 12 Ph.D. theses in energy, environment and climate change and given lectures in more than 40 countries around the world.

International Appointments

- Member of the Advisory Panel of Executive Director on Biodiversity for, UNEP, 1994-1996.
- Member of the Global Agenda Council World Economic Forum on Decarbonizing Energy (2014-16)
- Member of the Research Advisory Committee of the IGES Japan (2002-05).
- Convening Lead Author Climate change for Millennium Ecosystem Assessment (2002-05).
- Advisory Board of Tyndall Center for Climate Change, University of East Angela, Norwich, UK, 2001-2004.
- Vice President, Indian Society of Ecological Economics (INSEE), 2000-2002
- Scientific and Technical Advisory Panel (STAP) to Global Environment Facility (GEF) – 1995-1998.
 - ✓ Inter-governmental Panel for Climate Change (IPCC)
 - ✓ Convening lead author for the Second Assessment (1993-95)
 - ✓ Reviewing editor for the Third Assessment (1999-2000)
 - ✓ Reviewing editor for the SRES (1998-99)

National Appointments:

- Member of Prime Minister's Council on Climate Change India
- Member, Climate Change and Insurance Task Force (2004), Ministry of Environment and Forests,
- Member Research Council of National Environmental Engineering Research Institute (NEERI), India
- Member, Committee for CDM projects Ministry of Non-Conventional Energy Sources, New Delhi, 2001-03.
- Member, Advisory Group on Energy and Environment, Ministry of External Affairs, Govt. of India, 2001.
- Member of Advisory Panel on Global Environmental Issues, Ministry of Environment and Forests, 1996-1998
- Advisory Committee on AIJ Issues, Ministry of Environment and Forests, 1997-2000.
- Advisory Group on Energy and Environment, Ministry of External Affairs, Government of India, 2001.
- Advisory Committee on AIJ Issues, Ministry of Environment and Forests, 1997-2000.
- Vice President, Executive Committee of Indian Chapter of Society for Ecological Economics, 2000-2001

National Project Coordinator:

- Chairperson of EERC (Environmental Economics Research Committee) of EMCaB Project of the World Bank, 1997-2003 distributing US\$ 1.5 million for 56 projects across India in Universities, NGO and Research Institutes.
- Gender, Pollution and Health: Conducted one of the largest studies that for the first time captures pollution, health, energy, water, housing and socio-economic characteristics for 14000 households in 4 states of India in 12 districts and 100 villages. It involved surveyors, medical doctors, pollution measurement and stakeholder's perceptions. Massive (statistical) analysis exercise is underway.
- Capacity Building for Environmental Governance (1995-2000): UNDP project had four major focal areas: Air Quality; Water Quality; Community Land Regeneration and Biodiversity within the overall framework of sustainable development. It involved government, academic and research organisation, stakeholders, industries, and pollution control boards. Involved 15 organizations across India, 20 workshops - regional, national and international. More than 1000 persons were involved.

Contributions:

Professor (Dr.) Jyoti K Parikh has made pioneering contribution to country's environmental and energy policy analysis through multidisciplinary and system's perspectives and thereby led to better policies for environment, climate change mitigation, adaptation, negotiations and gender sensitive sustainable development. This is reflected in the number of national and international awards and recognition she has received.

She has effectively brought attention to India's and developing countries' perspectives and advanced new view-points into the policy formation, research and analysis, at local, national and international levels. The versatility and multidisciplinary character of her work and its policy relevance is evident below

Climate Resilient Urban Development:

As a member of the Former Prime Minister's Council for Climate Change she suggested to introduce National Mission for Sustainable Habitatin India.

She is actively working on research studies related to climate and disaster resilient cities at Integrated Research and Action for Development (IRADe) and has been advocating for mainstreaming of disaster and climate resilience components into the city developmental plans/smart city plans. One of her book on climate resilient cities is under publication.

Her papers on climate change and agriculture were path breaking and cited and referred many decades

Past and Present Interests, Projects and Activities:

She has carried out a number of national and international projects. Her analytical work spans over areas such as environment and climate change, resilient urban development, climate mitigation, adaptation and climate negotiations, impacts of climate change, natural resource accounting (NRA), sustainable development and restructuring consumption patterns, incremental costs and Global Environment Facility (GEF), supporting globally efficient projects by GEF, North-South issues in IPCC response strategies, Joint implementation of climate change projects: opportunities for North-South cooperation, trade and environment, and large scale survey on rural energy, water and sanitation, environmental economics for sustainable development into decision making process. It covers four major focal areas: Air Quality; Water Quality; Community Land Regeneration and Biodiversity within the overall framework of sustainable development.

Swachh Bharat Mission

The SBM was launched on 2nd Oct. 2014 with the objective to make India open defecation free and to ensure scientific management of solid and liquid waste by 2nd Oct. 19 in 4041 ULBs. The Mission has seen marked progress in this duration, in terms of Door step collection of waste and its scientific processing, construction of large number of toilets and many cities reaching the ODF status. There are issues such as of segregation of waste and waste reduction on one hand and ensuring sustainability of the use of toilets and scientific management of sewage and sludge on the other. There are various implementation issues observed at the level of ULBs, that need to be addressed. Every ULB has its unique ecosystem and it's owns set of challenges, and customized solutions are required to be found at their level. However, there are several policy and implementation issues observed across the cities and states, which deserve a multi-stakeholder consultation approach to understand and evolve guidelines and sustainable solutions. Such issues, if ignored, may become bottleneck in fulfilling the objectives of the Mission. In this background the need to convene a national level and State level consultative workshop was felt.

Consultative Workshop on Swachh Bharat Mission

ERAF Environmental Research Foundation and **Maharashtra Pollution Control Board (MPCB)** have organized a one-day State-Level Consultative Workshop on Swachh Bharat Mission (SBM) on 2nd February, 2019 at Mumbai. The workshop aims to help in bridging the gap between planning, and implementation, and evolve sustainable strategies and technological options through interactive consultation among stakeholders.

The workshop seeks engagement of Senior Government Officials of the Union and State Government Departments in charge of Swachh Bharat Mission, State Pollution Control Board, Environmental Research Institutions, and Experts in the domain with the Officials of Local Bodies, and Technology Solution Providers and Organizations working across waste management value chain.

Supporting Partners

The workshop is being supported by the Swachh Maharashtra Mission office of the Urban Development Department, Govt. of Maharashtra, the NITI Aayog and CSIR-NEERI.

Expected Outcome

The workshop will provide a platform for sharing some of the best practices in decentralized Solid Waste Management, and Sanitation specifically - Fecal Sludge Management from Maharashtra and other states. The participants are expected to learn about -

- 1. Issues, challenges and constraints in the implementation of SBM and probable options to overcome them at various levels.
- 2. Different technologies for integrated solid waste management and fecal sludge management.
- 3. The Regulatory Perspective of various technological solutions.
- 4. Financial sustainability in terms of costing and cost recovery of waste management services.
- 5. Alternative strategies to review the existing practices, through cross learning.
- 6. Technology service providers and institutions who could support, procurement process and in Project planning and handholding support in implementation of the waste management support.

About ERAF

ERAF Environmental Research Foundation (ERAF) is a nonprofit entity, registered under Section-8 of the Companies Act 2013. It has been set up by a group of professionals from the fields of science, technology, administration, finance and business. ERAF has the advisory support of eminent researchers and administrators with long experience in environment management and municipal governance at both policy and field levels. It is working in tandem with the government, city managers, citizen groups, scientists, and technology providers and also corporate houses to channelize their support to make our cities, towns and villages more livable.

ERAF promotes and low-cost sustainable solutions keeping in view the limitation of revenue resources with the ULBs and competitive demands of other services on the same. ERAF is also focusing on developing ICT and GIS tools to facilitate better planning, management and monitoring of environment services.

Article 1: Swachha Bharat Mission - Sustainable Sanitation Waste Management

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India is facing a challenge to provide quality infrastructural and basic services to its burgeoning urban population. According to 2011 census, the population of the India was 1.2 billion, out of which 31 percent lived in cities and towns. It is projected to touch fifty percent mark by 2250. As the economy grows and consumption and lifestyle changes, more waste would be generated and would further demand much greater chunk of limited resources of the Urban Local Bodies (ULBs), for its management. A study report by Vishwanathan et al. (2003) mentions that for every Rs. 1000/- increase in the income of an individual, results in an approximate increase of 1kg of waste per month. Waste management has emerged as challenge not only to the environment and public health concerns, but also in terms of making cities livable and competitive.

Census of 2011 recorded 377 million as urban population in 7935 urban centres, including 4041 ULB governed cities and towns. The report estimated that 1,70,000 Metric tonnes per day (TPD) or 62 million tonnes per year of solid waste is generated in these cities. There are different estimates of the quantity of waste generated. CPCB (2013) reported 1,33,760 TPD of MSW generated in India. According to a recent report of Ministry of Housing & Urban Affairs (2018), MSW generation is 1,43,000 lacs TPD. On the sanitation front, nearly 18.6% houses in urban India do not have access to toilets within the residential premises, 38.2% have water closets attached with the septic tanks while 37.7% have water closets connected to sewer systems (Amrut SOP, 2018). Besides, 816 Municipal STPs are catering to treatment of only 37% of the total human waste generated (FSSM Policy, 2017).

Swachh Bharat Mission was launched on 2nd October 2014 with an objective of universal sanitation by 2nd October 2019 as a fitting tribute to the Father of the Nation. The mission aimed at elimination of Open Defecation (OD) and scientific Solid Waste Management (SWM). A committee of Chief Ministers, appointed in March 2015 to review the status of sanitation, gave recommendations on the financial requirements for comprehensive implementation of Swachh Bharat Mission (SBM), measures for technological support for different components of SBM and suggested institutional mechanism, including participation of the private sector for effective implementation of the objectives of the mission. The committee estimated a requirement of Rs. 4041 cr. to meet the target of 100% door to door collection of waste and scientific management of SWM in urban areas.

The Ministry of Environment, Forest and Climate Change notified Solid Waste Management Rules 2016 in April 2016, laying down a comprehensive framework for Integrated Solid Waste Management in urban centres.

The issue of SWM became a national debate in the 1990's in the aftermath of the epidemic of plague in the cities of Surat and consequential intervention of the Supreme Court through a public interest litigation. Recommendations of Barman Committee set up by the Supreme Court in that PIL, and Municipal Solid Waste Management Rules 2000, laid the foundation of reforms in the management of solid waste in cities and towns.

Solid Waste Management projects were included under JnNURM for capital funding. Several waste to compost and a few waste to energy plants came to be set up. Daily collection of waste generated reached 68% but its treatment remained as low as 19% until 2014.

SWM Rules, 2016 brought a paradigm change in terms of casting responsibility on the waste generators to segregate the waste at source and prohibiting littering and burning of waste. The rules also mandated decentralized waste management, engagement with the community, setting material recovery facilities to minimize waste and move towards sustainable management of solid waste. A salient feature of the new rules is the enabling provision of user charges and fines through mandatory bye laws. The new policy regime creates an enabling environment for participation of private sector in capital investment and operations and management of such projects.

The new rules have been made applicable to areas such as ports, railways, special economic zones, private townships etc. All such authorities are required to develop their own waste management plans in line with the directions of the concerned local authorities. The key component of the Swachh Bharat Mission and the SWM Rules 2016, is the emphasis on IEC and public awareness and capacity building for bringing a behavioral change in community towards sanitation.

National Urban Sanitation Policy (2008) was drafted with a goal to transform Urban India into community driven, totally sanitized, healthy and livable cities and towns. The guideline for NUSP was provided in the CPHEEO Manual (2013). The FSSM policy (2017), the Amrut-SOP (2018) for cleaning of Sewers and Septic tanks and the Compendium of best Fecal Sludge treatment technologies were published to provide the guidelines for implementation of safe and sustainable sanitation practices. The emphasis in the initial phase of the SBM was on ODF but it gradually shifted to ODF+ and ODF++ in the last lap. According to the report of the Ministry of Housing and Urban Affairs (MoHUA)-SBM (Urban), on 14th January 2018 (http://swachhbharaturban.gov.in/dashboard/), door to door collection of waste has reached in 67085 wards out of 82842 wards, 40% of the waste that is collected is processed with 52% of wards doing source segregation (PIB, 19th Nov.'18). Nine Waste to Energy plants and 148 Waste to Compost plants are operational across country. Additionally, 50 WTE and 300 WTC plants are under development. 88.4 Mega Watt of energy is produced from W-T-E plants and 1506501 MT of compost is produced from the Municipal waste.

SMB (Urban) targeted to construct 66 lakh toilets IHHL out of which 60.53 lakh toilets (91.7%) has been achieved, and out of the target of 5.07 lakh toilets (CT/PT) 4.7 lakh (92.7%) have been constructed. A total of 19 States and Union Territories covering around 3379 cities have been declared ODF. Another major achievement is that 33,000 toilets across 800 cities have been cited on google maps.

Article 1: Contd..

Swachh Sarvekshan has highlighted several success stories of waste segregation, door to door collection, integrated solid waste management, safe and sustainable sanitation practices at centralized and decentralized levels. Indore, Bhopal, Navi Mumbai, Mysore, Vishakhapatnam, Navi Mumbai, Ambikapur (Chhattisgarh), Panjim are the examples, which could provide directions to other cities for implementation of SWM Rules, 2016. While, cities like Devanahalli, Nashik, Surat, Vengurla, Sinnar etc., are showcasing the examples of best practices for sanitation.

Swachh Bharat Mission provides a capacity building support system for the Urban Local Bodies. Centrally driven high voltage public awareness campaign has elevated sanitation and waste management to primetime attention of all concerned. This however has to be complemented with door to door outreach to the community, capacity enhancing through an appropriate IEC strategy and interactive workshops. While responsibility of waste segregation has been cast upon the waste generators, it is now the responsibility of the local bodies to ensure that their collection and transportation plans are convergent with segregation and waste minimization at the ward levels. The SWM Rules 2016 mandate decentralized approaches following the waste management hierarchy, as against the traditional centralized systems.

According to an estimate, out of Rs. 500-1000/- spent on SWM by a ULB 70% is used for collection and 20% on transportation (Kumar S. et al., 2018), there is very little left for processing or treatment of solid waste. Waste processing at the community and ward levels is imperative of sustainable system.

There is a need for the waste managers to go back to the drawing board and prepare a new solid waste management and sanitation plan suited to local situation and in accordance with the provisions in the rules and the guidelines in the manual of the MoHUA. Waste audit and characterization and gaps analysis are the crucial first step in that direction.

Integrated solid waste management and sanitation initiatives need to be institutionalized for sustainability. The practice of 3R's should be promoted with dissemination and acceptance of national and international best practices as also mentioned in the Indore 3R Declaration of Asian Mayors on achieving Clean Land, Clean Water and Clean Air in Cities (2018).

Defining the roles and responsibilities of the waste generators, various stakeholders and urban local bodies in a transparent legal framework of municipal bye laws, could help articulate the roles and responsibilities of various stakeholders. Bye laws may also facilitate the levy and recovery of waste management charges to supplement the revenue base of the ULBs.

Way forward

Swachh Bharat Mission has provided a powerful platform to take waste management to level of excellence. The Government has launched aggressive awareness drive, liberally providing financial and technical support to the ULBs to upgrade their waste management systems. It is high time for the local bodies to identify the gaps in implementation and identify technology solutions, in consonance with ground reality and resources availability in order to have a lasting value.

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The increasing concern during the last decade of both governments and municipal bodies with the Swachh Bharat Mission, Service Level Indicators and SWM Rules, 2016 have family placed the solid waste management on the urban agenda.. The proper disposal of urban solid waste is not only absolutely necessary for the preservation and improvement of public health but it has an immense potential for resource recovery in urban centres.

Solid Waste Management is an obligatory duty of every municipal body. Their responsibilities have been increased on account of 74th Constitutional Amendment Act, 1992, wherein its 12th Schedule stated Public Health, Sanitation, Conservancy and Solid Waste Management' as one of the main functions to be performed by the municipal body. On 5th April, 2016, the Ministry of Environment, Forests and Climate Change introduced new rules in waste management sector, viz. solid waste management, construction & debris waste management, plastic waste management, bio-medical waste, and e-waste management.

In connection with SWM Rules, 2016, the jurisdiction now includes Municipal and other authorities. The SWM Rules, 2016 are applicable to every domestic, institutional, commercial and any other non-residential solid waste generator except industrial waste, hazardous waste, hazardous chemicals, bio-medical wastes, E-waste; lead acid batteries and radioactive waste.

As per Solid Waste Management rules 2016

Waste generators are required to segregate the waste generated by them in three separate streams viz.

- 1. Bio-degradable,
- 2. Non Bio-degradable and
- 3. Domestic hazardous wastes

The waste generators are required to store the segregated waste in separate bins and further handover separately to authorized ragpickers or waste collectors.

SWM Rules, 2016 assigns specific duties and responsibilities to local authorities.

- 1. Arrange for door to door collection of segregated solid waste.
- 2. Integrate informal waste collectors in solid waste management
- 3. Direct waste generators not to litter and to segregate the waste at source and hand over the segregated waste to authorized waste pickers the waste collector authorized by the local authority.
- 4. Setup Material Recovery Facilities (MRF) or secondary storage facilities and provide easy access to waste pickers and recyclers for collection of segregated recyclable waste.
- 5. Provide training on solid waste management to waste-pickers and waste collectors.

6. Involve communities in waste management and promotion of home composting, bio-gas generation, decentralized processing of waste at community level subject to control of odour and maintenance of hygienic conditions around the facility.

7 Incentives may be provided to recycling initiatives by informal waste recycling sector.

A solid waste management in cities is a complex system of various strongly interrelated activities such as primary and secondary collection, transport to processing plants and waste disposal sites, recovery and recycling activities. In India there is a large urban informal sector of waste pickers mainly women who earn their livelihood from waste-picking from the streets, community garbage collection bins and waste disposal sites. It is estimated that these waste pickers pick up about 5% to 10% of the total waste generated in large urban centres. These waste pickers thus reduce the burden of municipal bodies by several million rupees a year in solid waste collection, transport and disposal costs, as well as resultant saving of landfill space in cities.

Aspects of the dependence of the underprivileged on discarded garbage and role of all these stakeholders are so important for big cities that they deserve to be better understood than they are at present. It is beyond the capacity of most municipal bodies to eliminate these informal networks in waste recycling sector should they wish to. It remains isolated from socio-economic initiatives that are changing the urban service delivery system.

The waste recovery and recycling return us to the situation of waste recyclers - waste pickers, which number in thousands throughout big cities in India. There are several NGOs/CBOs initiatives in waste recycling sector. These institutions disseminate the knowledge about segregation of waste recycling and enhance the appreciation of the positive contribution made by various groups of waste recyclers in city solid waste management. However, the extreme unhealthy environment in which all these waste recyclers live and work often in the vicinity of the municipal dump sites or communal waste collection bins remains a critical problem. Thus to alleviate the working conditions of these people, their work activity should not be simply treated as informal or nuisance, rather they should be incorporated as useful partners in the city solid waste management, i.e. segregation of waste, houseto-house collection prior to final waste disposal and waste recycling.

Partnering with various groups of waste recyclers requires a proper understanding among municipal officials and citizens towards organizing waste pickers and waste collectors for houseto-house waste collection and clean city programme. Whatever the innovative alternatives that may be worked out, solid waste management must evolve a positive approach to regard informal waste recovery, reuse and recycling as an integral component of solid waste management in cities.

Article 3: Status of Swachh Maharashtra Mission Author: Mission Director, SMM | director.smau@gmail.com

Government of India launched Swachh Bharat Mission nationwide to make India Open Defecation Free by October, 2019. On the same basis Government of Maharashtra launched Swachh Maharashtra Mission with tagline 'SaptpadiSwachhtechi'. There are two components of Swachh Maharashtra Mission.

- 1. To make Urban Maharashtra ODF.
- 2. To make urban Maharashtra clean by proper Solid Waste Managment.

Though the implementation of Swachh Maharastra Mission will be in place till 2nd October 2019, it was decided to make urban Maharashtra "Open Defecation Free" till 2nd October, 2017 and on 1st October 2017, Urban Maharashtra was declared "Open Defecation Free" in presence of Hon. President of India. At that time, 384 cities were declared ODF by the state level validation committees. Till today 379 cities are certified as ODF by the third party assessment agency appointed by the central government.

(Swachh Maharashtra Mission - Revised Targets)				
Central Mission	State Mission Target,			
Target, As per	As per Actual			
Guidelines	Survey			
Individual Household	Individual Household			
Toilets, As per	Toilets, As per			
Census 2011, Nos.	State, Nos.			
8,99,741	6,29,819			

Each city had to undergo a three-level validation process for gaining ODF status. In the first step, the city had to self-declare itself as ODF and submit a proposal to the collector office.

The city was then assessed at district level. The proposals were validated at district level and a state level team was deployed for validation by the mission directorate, which visited the city without prior intimation and validated the city's ODF proposal.

In this way, 384 cities in state became ODF on 1stOctober, 2017. Along with toilet constructions, ODF cities will be focused on gaining the status of ODF+ and ODF++. In a similar way, State government has decided to make cities clean under solid waste management by 2nd October 2019. To make cities clean the mission activities were implemented on three stages wiz. ODF, Economic, Administrative & Legal.

Economic::

Provision of Funds (Central Share) (Year 2014-2019)-

IHHL	СТ	SWM	IEC	СВ	Total
359.90Cr	57.	1081.	142.	35.	1677.
ore	57	84	79	70	80
	Cro	Crore	Cror	Cro	Crore
	re		е	re	

- Rs. 4000/- per toilet by Central Government & Rs. 8000 /- per toilet summing to Rs. 12000/- were subsidized.
- It is mandatory to spend 50% of the funds to be spent on Swachh Bharat Mission received under 14th finance commission funding.
- ULB is allowed to give a maximum of Rs. 5000/- per beneficiary from 14thfinance commission funds for construction of IHHL
- A separate fund was given for construction of Community & Public Toilets. Public Toilets are supposed to be used for floating population. Community Toilets are constructed for those families who can't construct IHHL
- For creating awareness in citizens using medias like Radio, Social Media, Short Films, Dramas, workshops, etc. central government has allotted fund for Information, Education & Communication (IEC).
- For felicitating ODF cities, State Government has introduced Incentive fund. This fund is given in three installments after clearing ODF assessments carried out by the third-party agency every 6 months. The incentive funds are distributed as follows:

Munici pal Council	First Install ment 30%	Second Installm ent 30%	Third Install ment 40%	Total Incenti ve Grant
A Class	Rs. 60	Rs. 60	Rs. 80	Rs. 2
	Lakhs	Lakhs	Lakhs	Cr
B Class	Rs.45	Rs.45	Rs. 60	Rs. 1.5
	Lakhs	Lakhs	Lakhs	Cr
C Class	Rs. 30	Rs. 30	Rs.40	Rs. 1
	Lakhs	Lakhs	Lakhs	Cr

Article 3: Cont..

Administrative:

- No N.O.C. required for constructing IHHL on government land.
- No requirement of permission/sanction for plan of IHHL from the ULB.

Legal:

• It is mandatory for elected representatives to have IHHL.

Progress of Swachh Maharashtra Mission:

- According to census 2011, families defecating in open: 8,99,741.
- IHHL constructed till 15th January, 2019: 6.82 Lakhs.
- Maharashtra is on number 2 in uploading construction photographs of IHHLs in country.
- Many of the cities cleared the assessment carried out by the third party agency appointed by the central government for the assessment of city's ODF status.

Swachh Bharat Mission: Solid Waste Management

- It is mandatory to segregate Solid waste. This segregated waste is supposed to be collected and transported by ULB.
- Wet waste is processed at centralized or decentralized plants.
- Dry waste is further segregate for reuse & processing.
- Today, 81% wards in state are covered under door to door collection.
- Daily collected Waste: 82,79,240 TPA
- Waste Processed: 47,07,040 TPA
- Making compost fertilizer using solid waste is a very good option. In order to increase use of compost fertilizer, & for marketing, State Mission Directorate registered "Harit: Maha City Compost" Brand and launched it in presence of Hon. CM. on 13th October, 2016.
- About 55 cities have been granted permission to use "Harit: Maha City Compost" brand.
- SWM DPRs of 254 Municipal Corporations/Councils costing around Rs. 2653.02 Crore have been accredited till the date.
- Till now, admissible Central and State funds have been distributed to all 254 cities by the State Mission Directorate

- It is mandatory for all ULBs to purchase all vehicles and other requisite material which is required for implementation of SWM DPR from GoM portal.
- The state has accepted protocol for Star rating for the cities by GR dated 2nd June, 2018 cities have been permitted to implement them in the city.

Performance of State in Swachh Survekshan 2018:

260 cities in the state participated in Swachh Survekshan 2018. The state was recognised as a second best performer in the country. 28 cities in above 1 lakh category in the country and 58 cities in below 1 lakh category in west zone secured the rank in top 100 in SS18. The state/cities secured following 9 awards:

- 1. CLEANEST CAPITAL: Mumbai
- 2. BEST SOLID WASTE MANAGEMENT: New Mumbai
- 3. INNOVATION- Nagpur
- 4. CITIZEN FEEDBACK: Parbhani
- 5. HIGHEST LEAP: Bhiwandi
- 6. CLEANEST CITY: Panchgani
- 7. INNOVATION: Saswad
- 8. CITIZEN FEEDBACK: Shendurjanaghat
- 9. HIGHEST LEAP: Bhusavalimplementation

Article 4: Role of Prudent financial measures in improving urban waste management

Authors: Mr. V. Giriraj | vgiriraj24@gmail.com



Mr. V. Giriraj, IAS (Retd.) Chairman State Finance Commission

Mr. Giriraj is a graduate in Law, is Chairman, Fifth State Finance Commission, Maharashtra. He retired as Additional Chief Secretary (Finance) GoM. Earlier, he has served as Principal Secretary, Rural Development and Panchayati Raj, and Secretary, Water Conservation and Employment Guarantee Schemes, GoM. He has also worked in the Khadi and Village Industries Commission.His field assignments in Maharashtra include Collector, Yavatmal District, Additional Collector, Pune, Chief Executive Officer, Zilla Parishad - Chandrapur, and Additional Tribal Commissioner. He is working in development of Bamboo sector, his interest includerural development, rural non form sector, watershed development and related areas. There is need to adopt a multi-pronged approach to effectively handle the waste management issues in Urban Local Bodies. Proper and prudent financial and accounting measures will go a long way in improving Solid Waste Management (SWM) , Liquid Waste Management (LWM) and related issues. It is seen that even though Municipal Accounting Code has been prescribed, which suggests keeping accounts for various activities of a ULB separately, in practice it is not happening. Most of the ULBs - especially the smaller Corporations and Municipalities have a single Income and Expenditure statement. No doubt income and expenditure under certain activities are shown separately, but it appears to hide more than disclose.

A separate ring fenced fund for water and sewerage system (including solid waste management) is the first requirement. For getting this done, if required, changes have to be made in the Act and Municipal Account Code.

Further when the Municipal body presents data in the annual budget, they must also give more details - what is called disaggregated data. How much is being spent on transport of SWM? How much on staff? How much on segregation? How much on tools and equipments? What is the cost of solid waste disposal per capita of the town and also per sq. km? All this financial ratios must be prepared. If required a CA/Cost Accounting firm can be engaged at State level to build templates and capacities in the ULBs. There must also be a way to compare the performance of one ULB with another, through financial ratios, as it is being done in the commercial world.

There must also be some incentives and dis incentives regarding waste generation. This could be through user fees and concession for those household groups who do waste segregation at house level.

There is a huge volume of literature in contemporary economics on such financial models of motivation and disincentives leading to desirable outcomes.

We need to invest much more time, energy and attention in understanding the role of financial and accounting measures in improving waste management in Indian context.

Session II : Solid Waste Management Moderator Perspective - Overview on Solid Waste Management Moderator: Dr Krishna Lala | krishna.lala@gmail.com

In continuation with the issues addressed in the Inaugural Session on Swachh Bharat Mission, the next session - on solid waste management encompasses several issues on this topic to give the participants a holistic view of the subject. A sustainable solid waste management system requires addressing each and every aspect. Integrated Solid Waste Management (ISWM) is complete waste reduction, collection, composting, recycling, and disposal system collection, treatment in an <u>environmentally sustainable, economically</u> <u>affordable and socially acceptable manner</u>. Waste reduction or minimization is the key to a sustainable system and this requires a good understanding of the quantity and quality of the waste generated to put appropriate measures to handle it. Some of the key words are sustainability, economics, and social acceptance and finally waste minimization.

There are several cities in India, which have adopted processes such as recycling, decentralized composting, door-to-door collection system, which may be treated as model, practices to emulate. Such model processes in isolation does not go far. There are a number of eminent persons to speak on this subject and share their experiences and thoughts. The speakers will elaborate some of the good practices adopted by a few ULB's, in Maharashtra, which may be emulated in other cities. To elaborate on this speakers representing Pune, Nashik and Karjat will present a few key features of ISWM as practiced in their cities.

To elaborate on the sustainability aspect of SWM, Mr. V. Giriraj, Chairman, State Finance Commission will talk on the financial perspective of sustainability of SBM. Mr. R.A. Rajeev, Metropolitan Commissioner, MMRDA will share his vast experience on management of SWM projects.

The Ministry of Housing and Urban Affairs conducted Swachh Survekshan 2018, in 4203 cities under the Swachh Bharat Mission. This is a survey conducted every year for assessing the improvements in urban sanitation and solid waste management across the country under the Swachh Bharat Mission. Indore was adjudged in the first position. How Indore went through this transformation, by putting in place some good practices in place?

Mr. Asad Warsi, Director, Eco Pro Environmental Services will talk about how Indore reached the status of being Indian's Cleanest City.

There are many ULB's in Maharashtra that have also put some of good practices in Municipal Solid Waste management in place.

Authentic Data is prime requirement for any planning. One of the technologies available is GIS based methodology. Mr Rahul Deshmukh a GIS expert will deliberate on this subject.



Dr. Mrs. Krishna Lala Sr. Project Manager, IIT Bombay

Dr. Lala holds a Masters (Analytical Chemistry) and Ph. D. in Life Sciences (Mumbai University) and has experience of research at Harvard University USA where she worked at the Department of Chemistry with Dr. Konrad Bloch - a Nobel Laureate for about two years on the role of sterols in membranes.

She is presently working as a Sr. Project Manager e-Yantra Project (MHR), Dept. of Computer Science and Engineering IIT Bombay. She was earlier working as a Technical Officer at the Office of Dean R & D, IRCC, IIT Bombay looking into various aspects of administration of R& D, with special reference to IPR. She has also worked at some of the leading institutions in the world - Harvard Medical School, USA, National Research Council of Canada, Ottawa and in India at the National Environmental Engineering Research Institute (NEERI). She is a highly accomplished trainer and consultant with versatile experience in the field of Waste Water Treatment & Solid Waste Management.

She has conducted a number of workshops on the present subject during her association with AIILSG and during her work on SWM project sponsored by Govt. of Maharashtra. She has several publications in both, international and national journals. She also holds a law degree and is a Mentor to ERAF

Session II: Becoming India's Cleanest City-Indore | Muninipal Corporation Madhya Pradesh Presented by: Mr. Asad Warsi | asad.cleantech@gmail.com



Mr. Asad Warsi Director, Eco-Pro Environmental Services

Mr. Warsi has 23 years of consulting experience in SWM, Sanitation, Urban Development planning, Industrial planning, Environmental Management, Waste water management, Environmental Impact Assessment, Effluent and Sewage Treatment Plants. Have provided consultancy to various Govt. Semi-Govt., Urban Local Bodies, and National and Multinational organizations. Has worked as Team leader for many SWM Projects and Urban Infrastructure Development Projects to various ULBs of M.P.,J&K, Rajasthan, Karnataka and Chhattisgarh.

He is providing consultancy to more than 200 cities in various states for SWM. He is also the pioneer in India in the field of Biomedical Waste Management, he developed India's first Common Biomedical Waste Treatment facility in the year 2001 at Indore with the brand name "Hoswin Incinerator Pvt. Ltd.".

He is appointed as Special Invite Technical Member National Apex Committee on SWM in India formed by National Green Tribunal. He is Member of National Implementation Committee on Plastic Waste Management Rules 2016.

In year 2018, he was awarded –BestPerforming Consultant in House of Lords London, Best Performance in India for SBM in 8th Reginal 3R Forum for Asia and Pacific.

He was also awarded by Govt. of Madhya Pradesh as Swachhata Champion for Best Performance & Practices Technical Services in Solid Waste Management for IMC in SBM. Eco Pro Environmental Services headed by Dr. Syed Asad Ali Warsi have been working in the field of Solid Waste Management since last 15 years. Eco Pro Environmental Services is empanelled with Ministry of Urban Development as Consultant for Solid Waste Management. We "Eco Pro Environmental Services" have been associated with Indore Municipal Corporation as Project design and Management Consultant and has been involved in each and every planning and implementation activity. The scenario in the city of Indore till 2015 was similar to any other city of India with MSW scattered in all parts of the city. After a mission mode implementation of the planned strategies, we at Indore Municipal Corporation have achieved the distinction of a **Cleanest City of India**.

A gap analysis study was conducted by us in 2015, which pin-pointed garbage bins and open spots, with geo-location tagging. Accordingly, a plan was made to make city bin free, Dust free and Litter free. Removal of containers and MS bins was done in phased manner, initially Residential and then commercial areas. Emphasis was given on segregation of municipal waste at source. This helped in processing biodegradable and non-biodegradable waste separately. Door-to-door waste collection of waste was good initiative and provided a solution to garbage problem. It discouraged the people from dumping household waste in and around their locality.

IMC launched a drive to create awareness among all sections of the society about the importance of segregation of waste.

With effective service delivery citizens soon started segregation at home. In fact, the public is so satisfied that households now pay a door-to-door collection fee of Rs. 100 per month. Today, the city of Indore has 600 GPS-linked vehicles undertaking door-to-door collection and 10 ultramodern transfer stations at strategic locations. IMC presently generates about 1100 Ton waste per day. IMC has developed the capacity to Collect transport and scientifically treat this 1100-ton waste on daily basis. Recently Indore has Bio-mined the old dump of more than 12 lakh MT waste (within the duration of 6 months) and have recovered about 100 acres of land. Due to all these efforts Indore was Ranked No. 1 in Swachh Survekshan 2017 as well as in 2018. We are working religiously to maintain the status of city focusing on 100% environmentally safe processing of various streams of waste generated in city using innovative technologies and adopting 3R principles.

Solid Waste management practices in Indore are now known as Indore model. Representatives from more than 600 cities have visited Indore to learn and adopt the solid waste management practices.

In last three years Indore has developed its own end to end system for Collection, Transportation and Processing of Municipal Solid Waste generated in Indore. Now Indore is known in the world for its cleanliness.

Session II: Zero Landfill City [Vengurla/Karjat/Matheran]

Presented by: Mr. Ramdas Tukaram Kokare | ratukokare@gmail.com

Until the 1970s, India had no dump sites for waste because we did not need them. Since Vedic times, household discards which were mostly food wastes and biodegradable organic wastes went back to the soil along with stable wastes via compost pits. Urban discards were competed for and collected by farmers who took them back for on-farm composting after bringing their produce to town. That ended only in the seventies, when plastics entered our lives and were discarded along with kitchen wastes. These plastics blanketed the fields and made them infertile, as less rain could enter, and few seeds could sprout. So, farmers stopped collecting urban mixed wastes and cities were left with an unexpected burden. Initially most towns and cities all India deposited all this unwanted waste outside city limits, along roadsides which are unsupervised no-mans-land. This made highways the garbage map of India. Only in the 2000s did States, under Supreme Court pressure, begin to allot their cities separate sites for composting. But instead of processing wastes there, almost all local bodies simply started uncontrolled open dumping there in ever growing heaps.

After two decades of such neglect, these open dumps have grown higher and higher, becoming point sources of pollution. Waste rotting in these airless heaps produces leachate, a foul dark liquid that kills vegetation around dumps and irreversibly pollutes groundwater, even bore wells, for 2-4 kilometers away. Airless heaps also produce methane, a greenhouse gas that causes 21 times more global warming than carbon dioxide. Along with methane, which is odorless, airless dumps produce foul-smelling landfill gases that make life a misery for those living nearby. Every evening, as the sun sets, the upper air becomes heavier than warm ground-level air. This so-called inversion causes smelly dump site air to spread horizontally for quite a distance.

Dump sites generate about 7% of India's greenhouse gases today. Clearing these mounds of years-old waste, called legacy waste, is the easiest and fastest way to reduce our national emissions, and save surrounding villages from polluted water sources, flies and stench.

We can overcome this this problem easily and at source segregation is the only solution for it. As each and every part of waste have a value if it is separated but it has zero value when it is mixed waste is not a problem, but mixed waste is a serious problem. There is need to educate people regarding cleanliness literacy it includes three points:

- 1. Do not throw their waste in public places
- 2. Segregate their waste
- 3. Avoid plastic

Then we will realize that there is no need of dumping ground and segregated waste is not waste, but it is National resource. At Vengurla, Karjat and Matheran no waste goes for landfill.

Wet waste is processed through Biogas, Composting and Bio composting, Dry waste recovered as material recovery items and become a source for revenue generation plastic and thermacol waste is utilized in road development. Dumping ground of Vengurla and Karjat have no any legacy waste dumping ground is now converted into tourist point, park study center of solid waste management more than one lakh people visited here and more than 100 students have made their study report on it.



Mr. Ramdas Kokrae Chief Officer, Karjat Municipal Council

Mr. Kokare has served at various positions in the Maharashtra Government. As Chief Officer, Dapoli NP he contributed in the Plastic free campaign, setting up of Waste to Energy plant and Solar – Wind Power plant, made the city Litterbin free and introduced the segregation of waste.

As Chief Officer, Vengurla Municipal Council, he has contributed in transforming the city into anODF, Plastic free andZero Landfill City. He was instrumental in getting the segregation of waste at source in 27 category, installation of Waste to Energy (Biogas) plants, Waste to fuel (briquetting), and use of Plastic waste to construct road.

He has achieved several awards and laurels – 1st prize in Konkan Division for Sant Gadgebaba Nagari Swachhata Abhiyan and Vasundhara Award, 2012 - outstanding contribution. He was conferred several awards for his exemplary work viz. Excellent Chief Officer Award, Punyahlok Ahilyaratn award, Vasundhara award, Samajbhushan award, Sindhudurg bhushan award 2017, Five leaves award 2018 (By CSE). His efforts were recognisd and appreciated by UNDP.

Currently as CO Karjat and Matheran Municipal Councils he is continuing these efforts and has made the cities thermocol free along with segregation at source into 36 categories with a day wise segregated collection schedule.

Session II: GIS based Planning for Swachh Bharat Mission

Integrated Technology for Solid and Liquid Waste Management for Rural Areas – A Case Study of Nagaon Village Presented By: Mr. Rahul Deshmukh | rahul@erafindia.org



Fig 1: Location of Nagaon Village (Old Thane Panvel Road)

Due to rapid growth in population, the population of rural area is also increasing. This is true for villages, especially at the outskirts of urban areas. Since population of such villages is on higher side, their requirements are also similar to the urban / peri urban areas, thus such villages require good water supply, effective sanitation and solid waste management too. In this paper, a case study of Nagaon village which is on Thane-Panvel road is discussed. As of 2019, the population of Nagaon is 1996 people. Presently, a bore well supplies water to the village through 6 stand posts. There is no waste water disposal system in the village. Solid waste generated in the village is about 400 Kg/Day. One Medium size vehicle collects solid waste from the 6 community bins and they simply dump this waste into the nearby site.

The objective of this paper is to discuss solid waste management system using advance technology of Drone and GIS Mapping. Advance Network Analyst and Tracking Analyst which are the GIS tools are used in the design of SWM. Presently, there are few septic tanks in this village. Effluent form these septic tanks flows through natural drains towards a central lake thereby polluting the natural water in the lake. Since there is no waste disposal system this big size village also needs liquid waste management (LWM). A small sewerage system is designed for this village using the technology of GIS and Bentley's Watergems Software. It is expected that using modern technology such as Drone, GIS Mapping and Sewer Modeling will help in solving the problem of solid waste disposal and LWM integrally





Fig 2 :Drone Image of Nagaon Village with Dumping Spots (1.6 Cm High Resolution OrthoImage)

Session II: GIS based Planning for Swachh Bharat Mission

Integrated Technology for Solid and Liquid Waste Management for Rural Areas – A Case Study of Nagaon Village Presented By: Mr. Rahul Deshmukh | rahul@erafindia.org



Mr. Rahul Deshmukh GIS Expert – ERAF

Mr. Deshmukh is M.S in Geoinformatics and has expertise in GIS, Remote Sensing & Image Processing and Enterprise Level GIS withmore than 12 years experience and its applications in Water Supply Sector, Sewerage Systems and SWM.

He is a registered faculty of MEETRA (NRTC), and has condusted several workshops for Maharashtra Jeevan Pradhikarn (MJP) on GIS application in 24 x 7 Water Supply and GIS based AssetManagement. He has trained several people on GIS in various government bodieslike MJP, Zilla Parishad, GSDA, ULBs, CIDCO, Irrigation & MIDC etc.

He is one of the key members of the core team for Maharashtra Sujal &Nirmal Abhiyan, reform works in Water Supply Sector.

He is a Founder Member and Director of Geoinfo Services, a Consultancy firm.He has provided GIS based DGPS with Drone Survey services for Shimla 24 x7 water supply scheme, executed by SMC and funded by the World Bank. He has also provided GIS based services to Surat Smart City Project.

He is Sr. Executive Officer (GIS) with ERAF.

Session III – Sanitation Moderator Perspective – An Overview on Sanitation Moderator: Mr. Satish Narkar | satish.narkar@gmail.com



Mr. Satish Narkar Ex-Chief Engineer MCGM

Mr. Narkar is a Mechanical Engineer having PG degree in Ecology and Environment from Indian Institute of Ecology and Environment and PG Diploma in Management (University of Mumbai). He joined the MCGM as Sub-Engineer and has a rich experience of working in the areas of Waste Water Treatment and Disposal.

He has worked on the O & M of Dharavi STP and sewage pumping stations. He was involved with the design of Appurtenances, Flood gate systems, Storm water entrance gratings, study and procurement of desilting equipment, rehabilitation of storm water drains in the Storm Water Drain Department. He has been involved with rehabilitation of old sewer lines and rising mains, construction of storm water pumping station and STP's, planning of major works under the sewage disposal project. He has expertise in operation, management, execution, planning, tendering, procurement, construction, execution, safety, dispute resolution, arbitration GIS, sewerage system, storm water drains, pumping stations, treatment plants, antiflooding measures and machinery, preparing project report and DPR, negotiations, tendering, monitoring, MIS tools and techniques, etc.

Swachha Bharat Mission is a cleanliness campaign for the health of every citizen of the country with healthy environmental conditions throughout. It essentially is a management of solid waste and liquid waste, including sludge disposal.

The Sewerage Management is an essential service under public health and sanitation, and it is entrusted to local bodies under state government. The sewerage management is management of sewerage infrastructure consisting sewage collection at point source, conveyance, treatment and its disposal. With continuous migration of rural/ semi urban population to cities and towns, there is a continuous pressure on infrastructure including sewerage infrastructure. The challenge starts from non-availability of toilets for households and open defecation. In a city like Mumbai, due to dense slums, community toilets are being provided. As such, for us sanitation starts with provision of toilets for every household either on individual basis or community basis. The Swachh Bharat mission therefore has rightly set the target of ODF community. Further it is targeted for 100% coverage by providing proper collection, conveyance and treatment of sewage and sludge before disposal. Hence it is necessary that every town and city has its plan for present as well as future needs for safe sanitation and healthy environment.

There will be many challenges, and these may be different at different places. This workshop is providing a platform to share the experiences for benefit of all and discuss the concerns/ problem areas to find out short term & long term solutions as also to understand the need of regulatory framework where there is a need.

Mumbai started planning for sewerage infrastructure since long back. The history of development of sewerage infrastructure in Mumbai dates back to the year 1860 to 1900 since when there exist separate systems for storm water and sewage collection and disposal. The one of the storm water drain then constructed with bricks (horse shoe shape) is of size 14'(h)x 20'(w) and triple barrel brick sewer lines each of Ovoid (Egg) shape are of size 9'(h)x6'(w). The first sewage treatment plant in Mumbai was constructed at Dharavi in the year 1905. This was activated sludge process plant with anaerobic sludge digestion and bio gas production facility. This plant was refurbished in 1953 and was in operation till 1985. The bio gas was used as cooking gas for residents and municipal hospital. The sludge was sun dried and sold to farmers from western Maharashtra as fertilizer/compost. I joined MCGM in 1981 and I was in-charge of this plant from 1981 to 1985. A similar plant was constructed at Dadar in 1935 which was operational till 1999.

Recently in the international conference on holistic sludge management in Sweden, one of the participant shared literature on "History of Anaerobic Sludge Digestion in world", where in India is credited for having anaerobic digester in 1897, in the "Matunga Leper Asylum in Bombay (Mumbai)" where human waste was used to meet lighting demand.

Post-independence the sewerage infrastructure was developed in Mumbai suburbs. Looking at rapid growth of Mumbai, high level committee and consultants prepared proposal for developing sewerage infrastructure. Metcalf and Eddy were appointed as consultants for review of these proposals who in turn prepared first "sewerage master plan for 2005" for city in 1979. This plan was implemented in phases and completed in 2003.

Simultaneously, by 2002, second master plan (for 2025) was prepared and presently MCGM is implementing the same. The objective of this second master plan is to rehabilitate the existing sewer line, lay new sewer lines and provide 100% collection of sewage from point sources & upgrade pumping stations.

More focus is on upgrading sewage treatment facilities with appropriate sludge treatment & sludge disposal and plan for recycle/reuse of treated waste water. For a city like Mumbai there are many challenges in terms of land, coastal zone regulations, presence of mangroves, selection of proper technology etc. being main issues. Presently MCGM is planning and implementing these works under Mumbai Sewage Disposal Projects (stage II) priority works. As a part of this project MCGM has planned to construct sewage treatment plants meeting environmental standards set by CPCB/ MPCB. These plants will have anaerobic digestion of sludge and energy recovery in the form of biogas and power generation for captive consumption. The digested sludge will be class 'A' sludge free from any pathogens and final to be used/ disposed-off as fertilizer or fuel or incinerated or land fill in quarries or such permitted routes as defined in manuals. Another important aspect of management of sewerage system of Mumbai is the entire sewerage network and system is mapped on GIS since 1997 and is updated on real time basis.

Session III: Faecal Sludge Management (FSM) in Devanahalli, Karnataka Pioneering model for Municipalities

Presented by: Mr. Manas Rath | manasdrath@gmail.com

Most small towns of India do not have a sewerage system. It is also unviable for them to build sewerage systems due to high cost and complexities of construction and maintenance, as well as other issues like inadequate water supply etc. Most large towns also have sewerage network coverage of 40-70%, so many areas, especially peri-urban areas are unserved. Therefore, homes, buildings, hospitals, schools, hotels etc. have septic tanks, soak pits or holding tanks to collect and manage wastewater, and the overflow goes into the soil, water bodies or open drains.

Faecal Sludge Management (FSM) is therefore an important basic service that municipalities should provide or facilitate, to improve local sanitation and health and achieve ODF+ status.

CDD Society with the support of BORDA, designed and built India's first dedicated Faecal Sludge Treatment Plant (FSTP) in Devanahalli, near Bangalore, in 2015. Designed to meet the town's requirements with a population of 35,000, the FSTP can treat up to 9,000 liters of faecal sludge every day.

The FSTP uses anaerobic biological treatment processes with unplanted drying beds that are very easy to maintain and low cost to operate, as very little electricity and labour is required. This is critical so that the system remains affordable even for a small town. While CDD maintained the FSTP for two years after construction, the Town Municipal Council (TMC) of Devanahalli has now contracted the O&M to a private party, as it does not have the technical knowledge and resources to manage the FSTP. Further, to improve quality of service, the TMC has also instructed the private player to operate its de-sludging truck and respond to all calls to clean septic tanks. A GPS system has to been fitted to monitor movements and compliance of the truck.

Thus, services are now provided effectively in an integrated manner under a single contract. Other private de-sludging operators are also allowed to operate in the town provided they discharge the collected sludge at the FSTP, and not in unauthorized, open locations.

The town has also passed other resolutions for all de-sludging truck operators to be registered with the TMC, though this has not been enforced yet.



Mr. Manas Rath Sr. Advisor, CDD Society, Bangalore

At BORDA and CDD, Mr. Manas focuses primarily on developing business and financing models for increasing coverage of sanitation services in under-developed communities (including Public Private Partnerships and Hybrid Annuity Structures), overseeing projects and developing partnerships particularly with the private sector. With 18 years' experience in management, investment banking, the social sector and sanitation, he is also founder of Blue Water Company, which aims to deliver worldclass FSM (Faecal Sludge Management) and Wastewater Treatment and Re-Use services to smaller cities and neighbourhoods, to reduce environmental pollution and water shortages. Earlier, he was a Director at Dasra and helped social enterprises to become more effective and scale. At Avendus Capital, he helped growth companies to raise equity from global private equity investors and advised on cross-border M&A transactions. He was also COO of a high-end electronics manufacturing and exports firm. Mr. Manas is a graduate of MIT and the Sloan School of Management and has attended programs at the University of Chicago-Booth School of Business. He serves on the Indian Governments' Swachh Bharat Task Force and is advisor to social start-ups and non-profit organizations including Fitternity.com, Shelter Associates, Football Link and the Yunus Corporate Action Tank. He is a Reiki Master and teacher.



Mr. Aasim Mansuri Sr. Program Lead (C-WAS) CEPT University

Aasim Mansuri has almost ten years of experience in diverse fields of civil construction, planning, project management, urban water supply and sanitation, municipal finance and private sector participation. He is a civil engineer and Urban (Infrastructure) Planner by profession. He has worked as a Senior Program Lead at C-WAS in the field of urban sanitation for the last 9 years.

He is actively engaged in supporting implementation of city sanitation plans in small-medium towns of Maharashtra and has focused his work on implementation of Faecal Sludge and Septage Management (FSSM) plans in towns of India. He is part of team at state and national level for developing policies, guidelines and frameworks related to FSSM. The past few years have witnessed emerging recognition of faecal sludge and septage management (FSSM) nationwide. While many Indian cities and states have been declared open defecation free (ODF) under SBM, there have been significant infrastructure gaps in conveyance and treatment of wastewater and faecal sludge. Sinnar, a class B Municipal Council of Nashik district in Maharashtra has taken steps to fill these gaps and move beyond ODF status by implementing a city-wide faecal sludge and septage management (FSSM) plan. Sinnar is a fast growing industrial town with an estimated population of 72,000 (in 2017) spread over an area of 51.4 sqkm. The town lies on the northern banks of Saraswati river and is located on the 'golden triangle' of Mumbai-Pune-Nashik.

Sinnar is being supported for citywide sanitation planning since 2013 by CEPT University through its Center for Water and Sanitation (C-WAS), in partnership with All India Institute of Local Self Government (AIILSG). This partnership with Sinnar began with the preparation of City Sanitation Plans after which implementation support was also provided in making the city ODF and adopting a non-sewered approach to wastewater management. These activities were later converged with Swachh Bharat Mission (SBM), under which various interventions for attaining ODF status has been undertaken by Sinnar municipal council and the city has attained the ODF status. Since then, the status has been verified and revalidated by the Government of India periodically.

The city has now focused on sustaining this ODF status by achieving higher coverage of toilets and also on fecal sludge management for becoming ODF++ with continued support from CEPT and AIILSG.

A city council resolution was passed for implementing FSSM plan which included scheduled emptying of septic tank services on a 3-year cycle and the collected waste to be treated at a dedicated faecal sludge treatment plant (FSTP). The council has entered into a performance based contractual agreement with private sector to provide the emptying and treatment services for FSSM.

Sinnar Municipal Council (SMC) has decided that FSSM is a public service and would therefore be financed out of local taxes through city government own funds, hence, the city levied a sanitation tax on all properties as a part of property tax to finance the FSSM services. The amount that properties have to pay as a tax is much less than what they were earlier paying for emergency desludging of septic tanks. SMC has also invested funds received under the Center's 14th Finance Commission in the capital costs of the FSTP. For ensuring regular payments to the private sector, SMC has also entered into an escrow agreement with the private sector and bank; this will ensure that funds are available for regular payments to private sector, once the bill is approved.

The FSSM plan ensures inclusiveness, affordability and equity in service delivery for all the residents as well as financial and operational sustainability. Implementation of this first-of-its-kind plan in India is already underway in Sinnar.

Session III: Vermicomposting technology for Fecal Sludge Management at Vadodra Presented By: Dr. Suneet Dabke | conceptbiotech@gmail.com

Sewage sludge is generated as result of sewage treatment process. India is still short of many sewage treatment plants and mostly all the Nagarpalika are not having sewage treatment plant thus in that case the generation of sludge is negligible or is not generated. The major challenge is first to treat the sewage and then we see the efficiency in treatment of Sludge.

Sludge generated from STP is normally having higher moisture content with almost 97% moisture if not passed through any Filter press or Squeezer. This sludge goes to Sludge Drying bed which helps separate moisture. Since last few years there is tremendous awareness and now, we have thought of treating the sludge generated from STP.

Vermicomposting is the best technology as it generates more income then the Composting plant as Vermicompost has more Value than Compost and is more popular. Further to add, Vermiremediation can be done directly with sewage but same cannot be done in composting process.

Through the presentation of "Vermicomposting of Fecal Sludge", we will look into the aspects of using earthworms for Sludge treatment and also see how Composting process can help in large Volume of sludge composting.

The presentation will also look into the Vermifirltraion/Dewatering Process as well as Norms we can attain through Processing and how we can attain integrated waste processing plant.



Dr. Suneet Dabke Proprietor-Concept Biotech, Vadodara

He has a Ph. D in Environmental Science and has worked on Air pollution with NEERI. Presently he is the proprietor of Concept Biotech, Vadodara. Concept Biotech takes up the projects on Biosludge processing using composting and vermicomposting technology. They have developed a novel idea for clean village as part of Gram Kalvan wherein they take projects on decentralized waste management system, managing waste at source and treatment of sewage using low cost vermifilteration technology. Dr. Dabke has previously worked with NEERI as a JRF, He has coordinated a research program stressing on Impact Assessment study covering socio economic factors, health study, Soil analysis, Water Analysis, Air analysis in Village Muthia under USAID voucher program. He has provided technical assistance to Ahmedabad Textile Industry Research Association (ATIRA) in project "Management of Solid Waste using Vermitechnology" with special emphasis on Sludge generated from textile industry and oil refinery.

Session III – Regulatory Perspective to Waste Management Moderator: Mr. N. Gurav | rohq@mpcb.gov.in Dr. Y.B. Sontakke | jdwater@mpcb.gov.in



Mr. N Gurav Regional Officer, HQ MPCB

Mr. Gurav has Worked as Environment Engineer in EIA, Center, Thane, he joined MPCB as Field Officer in 1991 and was promoted as Sub-Regional Officer in the Year 1997 and worked as Sub-Regional Officer at Tarapur Office, H.Q., Ratnagiri Office. At present working as Sub-Regional Officer, Kalyan-1.

His area of expertise is Handling of industrial estate in the field of water, air pollution and Hazardous solid waste management. Management and administration of sub-Regional Office as head of the Sub-Region he has handled the area of Dahanu in District Thane, which was declared ecologically fragile by Ministry of Environment and Forests, Govt. of India.



Dr. YB Sontakke Jt. Director Water Pollution, MPCB

Working with MPCB since 1997. Worked with Occupational Health Specialist and Environmentalist of Indian Association of Occupational Health, India. Worked as Environmental Scientist and Executive Officer in the field of pollution Control (Air, Water & Noise).

Worked as a lecturer in various colleges on environmental related subjects. His has an expertise in Regulatory implementation of various Acts & Rules of Environmental Pollution Control, Noise monitoring & its control and Environmental toxicology. The current scenario of Solid Waste Management in India is alarming, a total of 1.43 lakh tons of MSW is generated daily, of this 82% is collected, however, only 28% of this collected waste is processed and disposed while 72% is dumped unscientifically. 18% of the MSW is littered (CPCB MUD data 2015-16 compiled for Standing committee of Energy). There are various Laws, Rules and Acts in place for effective management of waste, the new Rules (2016) have clearly defined duties and responsibilities for the waste generators and all the stakeholders in the system. Also, periodic amendments are done in these Rules and Acts to overcome the loopholes. The institutionalization of policy instruments like Extended Producer Responsibility (EPR) in the Rules for Plastic waste and Electronic waste management helps in product stewardship, the concept of 3R. The EPR confers responsibilities to the Producers and Manufacturers.

Various initiatives have been taken by the ULBs of Maharashtra for Management and Handling of Waste and Sewage, some have made success stories while many have encountered challenges in its optimal management and sustainability. The major reason contributing to these is variability in composition of waste with the seasons and as per the geographic location, thereby influencing the kind and type of treatment and technology selection.

Technology selection is a very important step in meeting the environmental regulations and standards. Technology which is not suitable as per the local requirements and characteristics of waste may contribute to emissions and leachate generation thereby leading to pollution of air, water and land. This is where the role of Pollution Control Boards become important, it sets up the standards, permissible limits, threshold values for the emissions, pollution control and abatement based on which the appropriate technology selection becomes easier.

Maharashtra Pollution Control Board (MPCB) has taken various initiatives to facilitate the management of Solid Waste and Sewage. The strategy involves sensitization of local body members, scrutinization of treatment technology and the grant of authorization. The Board has taken responsibility to guide the local bodies in this regard. It has also filed complaints upon violation of Rules for STP and MSW facilities and issued directives under section 5 of the EPA Act, 1986 to all the local bodies and is putting its best efforts to ensure effective implementation of the Rules, Acts and Bye laws



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