



Ministry of Urban Development
Government of India

SWACHH BHARAT MISSION EXPOSURE WORKSHOP



FINAL REPORT: (MAY-OCTOBER, 2016)

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ACKNOWLEDGMENT

Swachh Bharat Mission Exposure Workshop project implemented by NIUA and supported by the Ministry of Urban Development under Swachh Bharat Mission (Urban), comprised of twelve workshops conducted at Delhi from May to October 2016, which included site visits to plants and other locations besides classroom sessions for building capacity among ULB officials regarding Solid Waste Management approaches and technologies.

We acknowledge and wish to thank the Ministry of Urban Development and Ministry of Environment, Forests and Climate Change, Govt. of India, Municipal Corporations of East, North and South Delhi, NDMC, Environment Department at Delhi Secretariat for sharing with us their valuable experience and insights and all state and UT governments and ULBs for deputing officials for the workshops.

We wish to thank organizations like Infrastructure Leasing and Financial Services Ltd. (IL&FS), National Building Construction Corporation (NBCC), Green Planet Eco-solutions, Green Bricks, Jindal Ecopolis, Excel Industries, Ramky Enviro Engineers Ltd., The Energy and Resources Institute (TERI), Development Alternatives, Chintan, Green Bandhu, Centre for Science and Environment (CSE), Toxics Link, Miranda House, Action in Community and Training (ACT), Trash to Cash, Daily Dump, SAM Foundation, Gulmeher, RWAs of Defence Colony, Vasant Vihar, DLF Phases I & IV and several organizations and experts for sharing with us their information, insight and experience.

We are deeply indebted to Ministry of Urban Development, Government of India for supporting us financially and technically and in making this project a success.

Director, NIUA

BACKGROUND NOTE

Swachh Bharat Mission Exposure Workshops for ULBs conducted by National Institute of Urban Affairs along with Ministry of Urban Development

Swachh Bharat Mission (SBM) was launched by the Hon. Prime Minister of India on October 2, 2014. The main objectives of SBM Urban is to address both elimination of open defecation and solid waste management in all 4041 ULBs of the country by 2019.

SWM in SBM – A multipronged approach

To address mainly Solid Waste management issues, the Swachh Bharat Mission has launched a multipronged approach to counter the cyclical effects of de-motivation and poor performance by infusing enthusiasm, financial support, a feeling of accountability among ULB staff towards cleanliness and massive awareness campaigns among citizens who are the primary generators of solid waste in the cities.

To help ULBs in various states develop capacity and motivation to modernize, incentivise, innovate and achieve compliance in municipal solid waste management, NIUA organized a set of 12 exposure visits-cum-training programmes at Delhi in 2016 for ULB officials of the cities that have been selected for survey and evaluation under SBM. Several other cities also showed tremendous interest in this programme and participated in the workshops.

Exposure cum training programme

NIUA organized **12 exposure visits cum training programmes** in New Delhi. The participants were drawn from the list of **ULBs in 29 States and 7 Union Territories (UTs)**. The exposure-cum-training workshops were conducted for **12 batches** of about 20 participants each, with **each batch comprising 3-4 senior and mid-level officials from about 10 cities and officials from state-level SBM directorates** at United Service Institution of India, New Delhi.

The workshops mainly included exposure visits to different SWM locations in Delhi with some classroom sessions on first and last days.

The purpose of the SWM Exposure Workshops was to:

1. Recognize the issues, challenges and constraints of SWM
2. Understand the Solid Waste Management Rules 2016,
3. Be aware of the various approaches, technologies and their financial implications
4. Plan to implement solutions in their city.

Challenges to Solid Waste Management

As regards Solid Waste Management, most cities in India face some typical challenges. These are:

- a) Excessive littering by citizens and lack of pride among the city dwellers for cleanliness
- b) Inability of ULBs to provide appropriate bins in public places for waste deposition and collection, personnel for regular cleaning and enforcement of fine instituted by ULBs
- c) Inability of ULBs to establish systems and technologies required for segregated collection transportation and processing of different categories of solid waste from households, commercial establishments and institutions. Lack of coordination among departments exacerbates the problem
- d) Outdated systems of primary and secondary collection and inefficient transportation
- e) Inability to meet revenue expenses including salaries of staff, consumables, safety equipment and personal protective equipment (PPE)
- f) Lack of motivation among staff and lack of will and skill among staff to implement
- g) Financial crunch for modernizing SWM and for adopting innovative and appropriate technologies
- h) Poor or no collection of user charges because of poor services and hence cannot meet day to day expenses leading to a vicious cycle of poor performance and poor revenue.

Solid Waste Management Rules and Manual

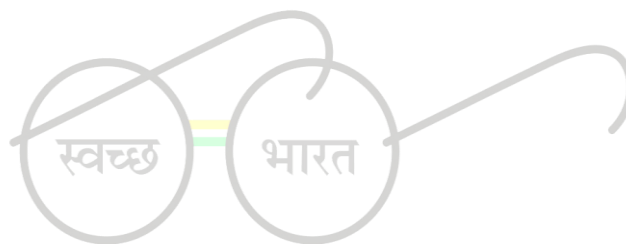
Ministry of Environment, Forests and Climate Change (MoEFCC) notified the Solid Waste Management Rules 2016 in April 2016, which has made citizens more accountable for their actions. The Rules require them to be more responsible towards their environment by reducing generation of waste, segregating what they generate into various categories and handing them over as such to door to door waste collectors so that the different categories can be reused, reprocessed and recycled. The Rules strive to achieve diversion of garbage from dumpsite/landfill outside the cities. To operationalise the SWM Rules, the MoUD manual finalized in October 2016 has incorporated the necessary specifications and actions for ULBs to implement them in their cities.

Need for Capacity Building

To draw maximum advantage of these changes and the financial support being infused into the system by the Central Government, it is also necessary for state governments and local self governments to develop capacity and the will to implement the Rules so that by 2019, all cities are able to bring about visible changes in the solid waste management and improve their environment. The Exposure cum Training workshops conducted in 2016 aimed to fulfill this need. The Exposure Workshops will continue in 2017 since many more stakeholders require it.

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SWACHH BHARAT MISSION EXPOSURE WORKSHOP PROJECT

(MAY- OCTOBER, 2016)

Introduction

The project Swachh Bharat Mission Exposure Workshop is an initiative taken by National Institute of Urban Affairs (NIUA) with the support and guidance of Ministry of Urban Development (MoUD), to do capacity building of different ULBs in India and build their understanding about solid waste management.



NIUA Team of SBM Exposure Workshop at USI

Under this training cum exposure workshop project, Municipal officials from different states and UTs were invited for a four day workshop where they were exposed to innovative ideas related to solid waste management and were imparted practical knowledge on various technologies by taking them on an exposure visit to different waste management plants and activity centres in Delhi NCR. This project was carried out in 12 different batches over the course of six months with each batch having about 20 participants with an average of 2-3 senior officials from one ULB.

The main objectives of the workshop were:

1. To recognize the issues, challenges and constraints of SWM
2. To understand the SWM Rules 2016
3. To be aware of the various approaches, technologies and their financial implications
4. To plan to implement solutions in their city
5. To achieve capacity building of ULB staff for implementing the plans

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Progress Report

As of October 20, 2016, twelve workshops were conducted successfully. For each workshop, about 15-20 participants were registered. During each workshop, the participants were taken to different sites like a landfill site, Waste to Energy plants, CSR funded facilities, Material Recovery Facilities and decentralized waste management units to increase their solid waste management (SWM) related knowledge and empower them with knowledge of better alternatives to SWM than mere open dumping, which was what has been hitherto practiced in most parts of the country.

On the last day of each workshop, participants were involved in group activities where they first listed out challenges and issues they faced in their municipalities and thereafter made plans for addressing the challenges and improving the situation in the form of flow charts during the second half of the group activity.

Furthermore, there were some specific sessions that were organized on the first and last day of the workshop where speakers from different organizations/firms/NGOs talked about how they are dealing with solid waste related issues and what solutions and technologies they can offer. One special presentation was kept on the last day for the participants to get a basic idea about business and financial issues that can be used during formulation and implementation of plans to improve the system.

Participants

As the word about this project spread, the number of participants increased after the first workshop. The first workshop had only 9 participants and with a gradual increase in the number, the twelfth workshop had 36 participants. A reduction in the number of participants during the months of August and September was majorly due to monsoons.

Batch	No of participants
Batch 1 (2-5 May)	9
Batch 2 (16-19 May)	15
Batch 3 (6-9 June)	17
Batch 4 (20-23 June)	14
Batch 5 (4-7 July)	17
Batch 6 (18-21 July)	32
Batch 7 (8-11 Aug)	8
Batch 8 (22-25 Aug)	12
Batch 9 (5-8 Sept)	7
Batch 10 (19-22 Sept)	37
Batch 11 (3-6 Oct)	20
Batch 12(17-20 Oct)	36
Total	224

Table 1: Gradual increase in the number of participants

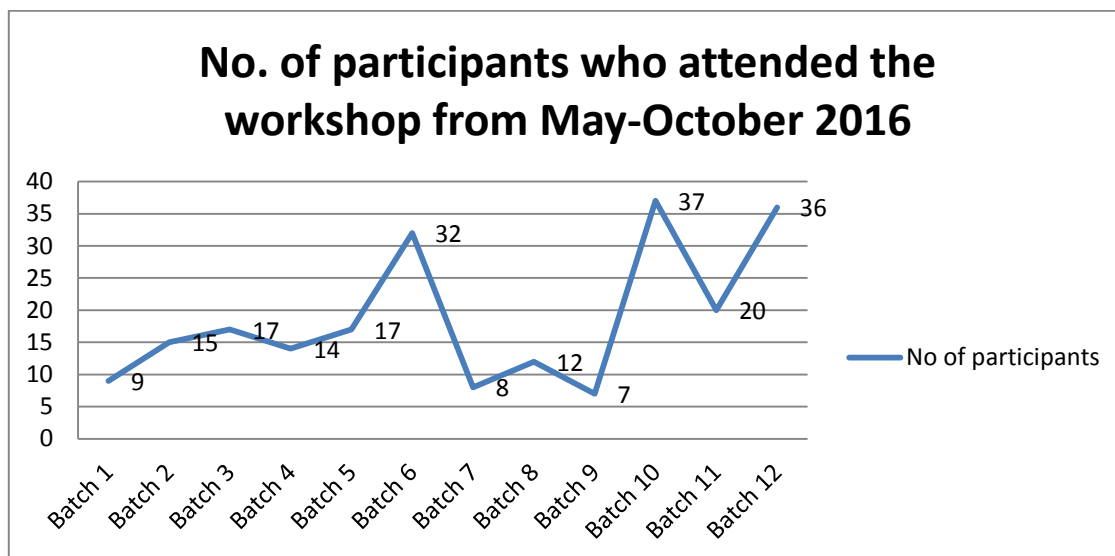
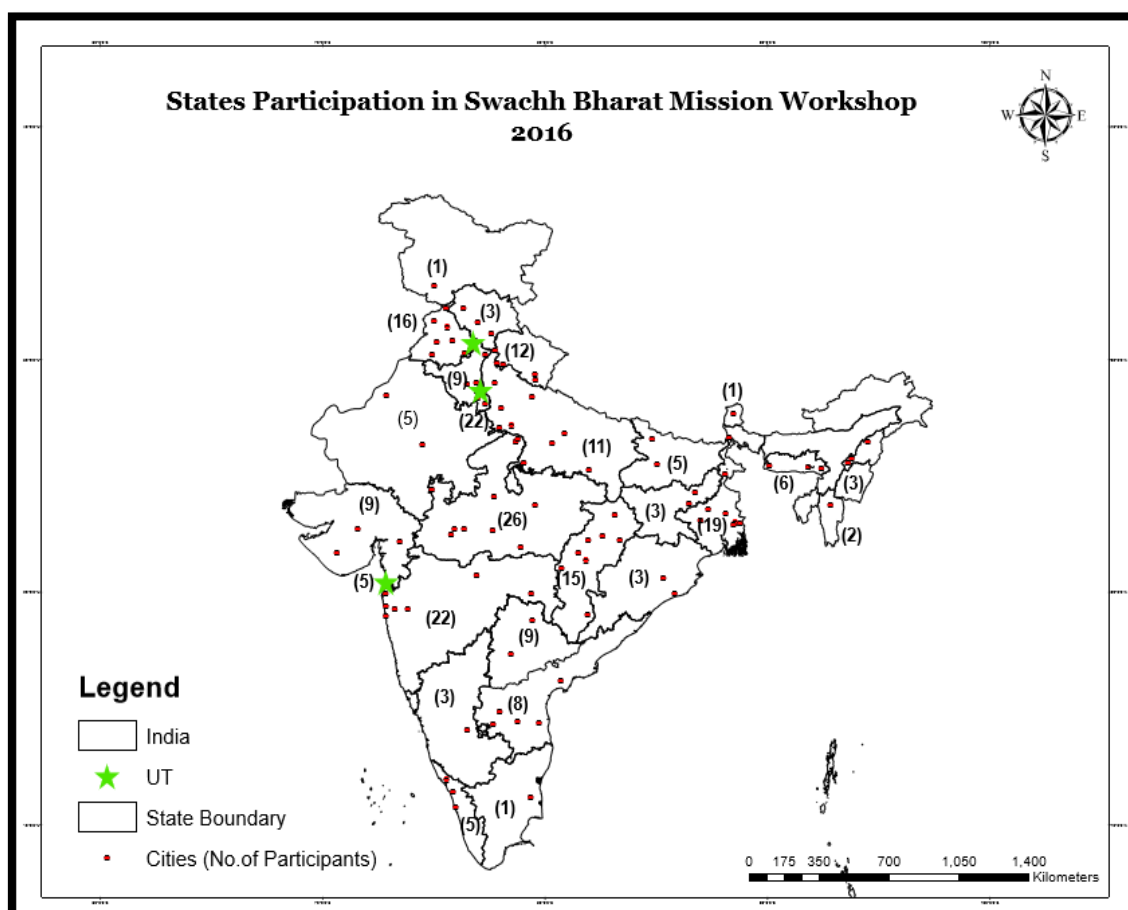


Figure 1: Number of participants in every workshop from batches 1-12



Map 1: Cities covered under SBM Exposure Workshop (May to October 2016)

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State	City	No. Of Participants/city	No. Of Participants/State	Male	Female
Andhra Pradesh	Dharmavaram	1	9	9	0
	Kadapa	1			
	Nellore	2			
	Tadipatri	3			
	Tenali	2			
Bihar	Motihari	2	5	4	1
	Patna	3			
Chattisgarh	Bhakhara	1	15	15	0
	Bhilai	1			
	Bilaspur	2			
	Birgaon	1			
	Jagdulpur	1			
	Korba	1			
	Kurud	1			
	Raigarh	1			
	Raipur	2			
	Rajnandgaon	2			
	SUDA, Chattisgarh	2			
Delhi	Delhi	9	22	16	6
	New Delhi	11			
	Delhi-NCR	2			
Gujarat	Jetpur	3	9	9	0
	Surendranagar	5			
	Vododara	1			
Haryana	Faridabad	2	9	8	1
	Gurgaon	4			
	Rohtak	1			
	Sonepat	1			
	Yamuna Nagar	1			
Himachal Pradesh	Dharamshal	1	3	3	0
	Mandi	1			
	Shimla	1			
Jammu & Kashmir	Udhampur	1	1	1	0
Jharkhand	Deoghar	2	3	3	0
	Dhanbad	1			
Karnataka	Chitradurga	3	3	1	2
Kerala	Kannur	1	5	5	0
	Kerala	1			
	Kozikhode	2			
	Ponnani	1			
Madhya Pradesh	Bhind	1	26	26	0

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State	City	No. Of Participants/city	No. Of Participants/State	Male	Female
	Chindwara	3			
	Damoh	6			
	Dewas	2			
	Hoshangabad	1			
	Indore	6			
	Mau	1			
	Neemuch	3			
	Pithampur	1			
	Sironj	2			
Maharashtra	Akola	2	22	22	0
	Pimpri Chinchwad	4			
	Chandrapur	1			
	kalyan-Dombivali	1			
	Mira Bhaindar	1			
	Mumbai	8			
	Pimpri	4			
	Vasai	1			
Meghalaya	Baghmara	1	6	6	0
	Jowai	1			
	Shillong	3			
	Tura	1			
Mizoram	Aizawl	2	2	1	1
Nagaland	Diapure	1	3	3	0
	Kohima	1			
	Mokokchung	1			
Odisha	Puri	2	3	3	0
	Rourkela	1			
Punjab	Amritsar	3	16	16	0
	Baghapurana	1			
	Bathinda	1			
	Chandigarh	3			
	Jalandar	1			
	Ludhiana	2			
	Moga	1			
	Pathankot	2			
	Patiala	1			
	Rajpura	1			
Rajasthan	Ajmer	1	5	1	4
	Bikaner	4			
Sikkim	Mangan Nagar	1	1	1	0
Tamil Nadu	Jayankondam	1	1	1	0
Telangana	Hyderabad	6	8	5	3
	Ramagundam	2			

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State	City	No. Of Participants/city	No. Of Participants/State	Male	Female
Union Territory of Daman & Diu	Daman	5	5	5	0
Uttar Pradesh	Agra	1	11	11	0
	Aligarh	1			
	Allahabad	2			
	Bareilly	1			
	Firozabad	1			
	Jhansi	1			
	Kanpur	1			
	Lucknow	2			
	Meerut	1			
Uttarakahnd	Roorkee	3	12	10	2
	Haldwani	1			
	Haridwar	1			
	Kashipur	1			
	Mussoorie	3			
	Nainital	3			
West Bengal	Bankura	4	19	18	1
	Bhatpara	2			
	Durgapur	4			
	English Bazar	2			
	Kalyani	1			
	Kanchrapara	3			
	Nabadwip	2			
	Siliguri	1			

Table 2 : Total number of participants per state and per city under SBM Exposure Workshop

Participants came from different ULBs from Municipal Corporations of mega cities to small municipalities, nagar palikas and parishads from about 84 cities in 25 states in the country. In the twelve workshops, about 26.33% percent were engineers and sanitary inspectors, 9.37% were health officers, about 2.67% were planners and 3.12% office secretaries, about 5.80% Chief officers or Executive officers, 6.20% Commissioners and Deputy Commissioners, about 0.89% revenue officials and 8.03% NGOs.

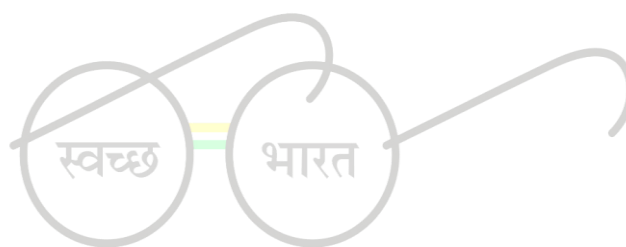


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Category of participant/ officials	Profile pattern of officials (number)
Commissioner/Deputy Commissioner	14
Chief Executive Officer/Executive Officer	13
President/ Vice President/Chairman/ Vice Chairman and Director/CMO	15
Superintendent/ Executive/ Civil/ Deputy/ Assistant/ Junior/ Sub Engineer	59
Tehsildar	1
Revenue Official	2
Urban Planner	6
Assistant Project Manager/SUDA/Consultant	7
Sanitary Inspector / Supervisor/ Food Inspector/ Office Superintendent	46
Defence (NSA/ Zila Sainik Board)	2
Office Secretary/P.A/Assistant/ Clerk/Computer Operator	7
Miscellaneous (P.O,R.O, Draftsman, H.A.)	4
NGO and Organisation/ Research and Training/ Professor/ Knowledge Coordinator	18
Health & Safety / MOH/ PWD	21
Councilor and Municipal Secretary/Member of Municipal Council	9

Table 3 : Profile pattern of ULB Officials



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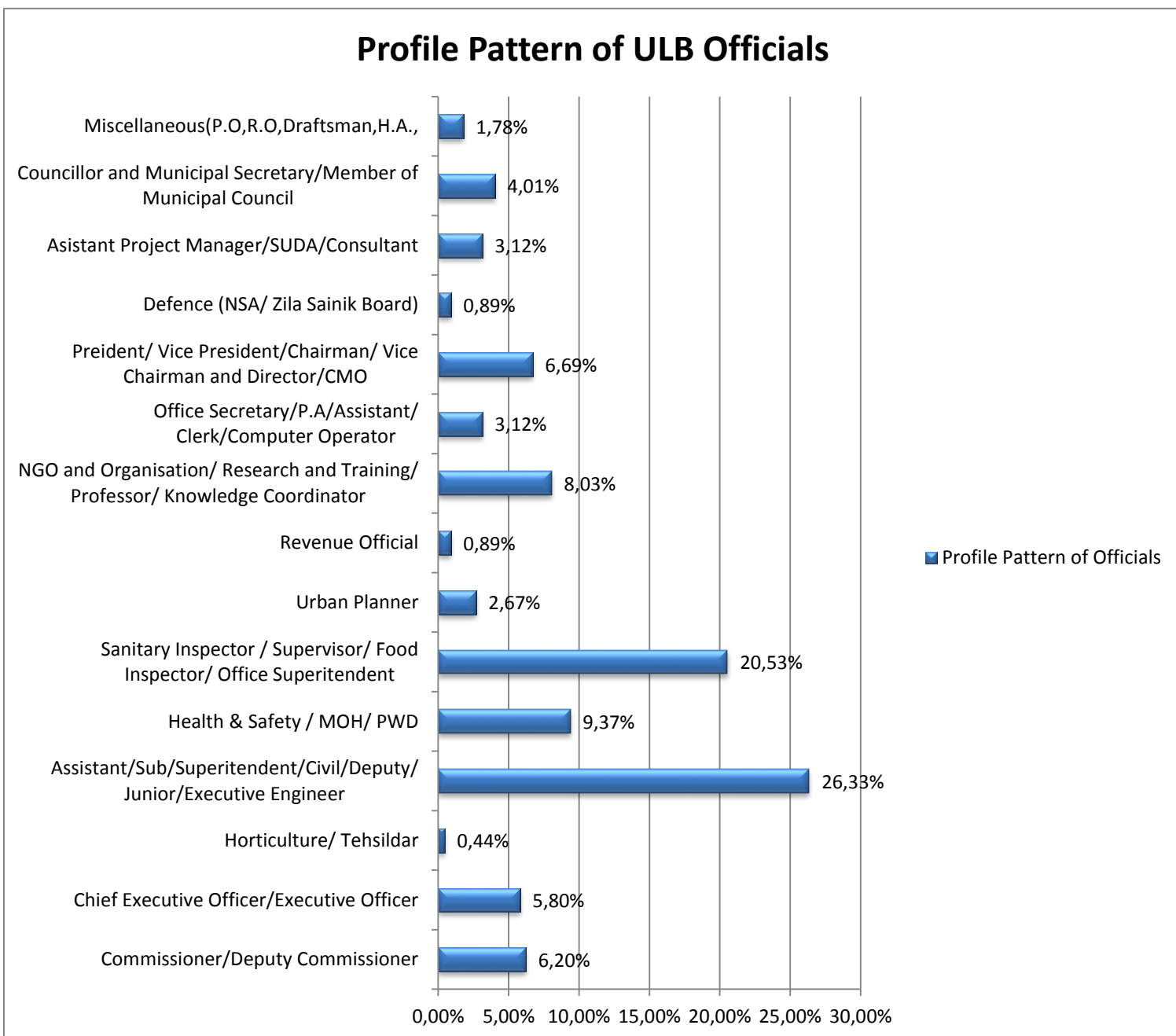
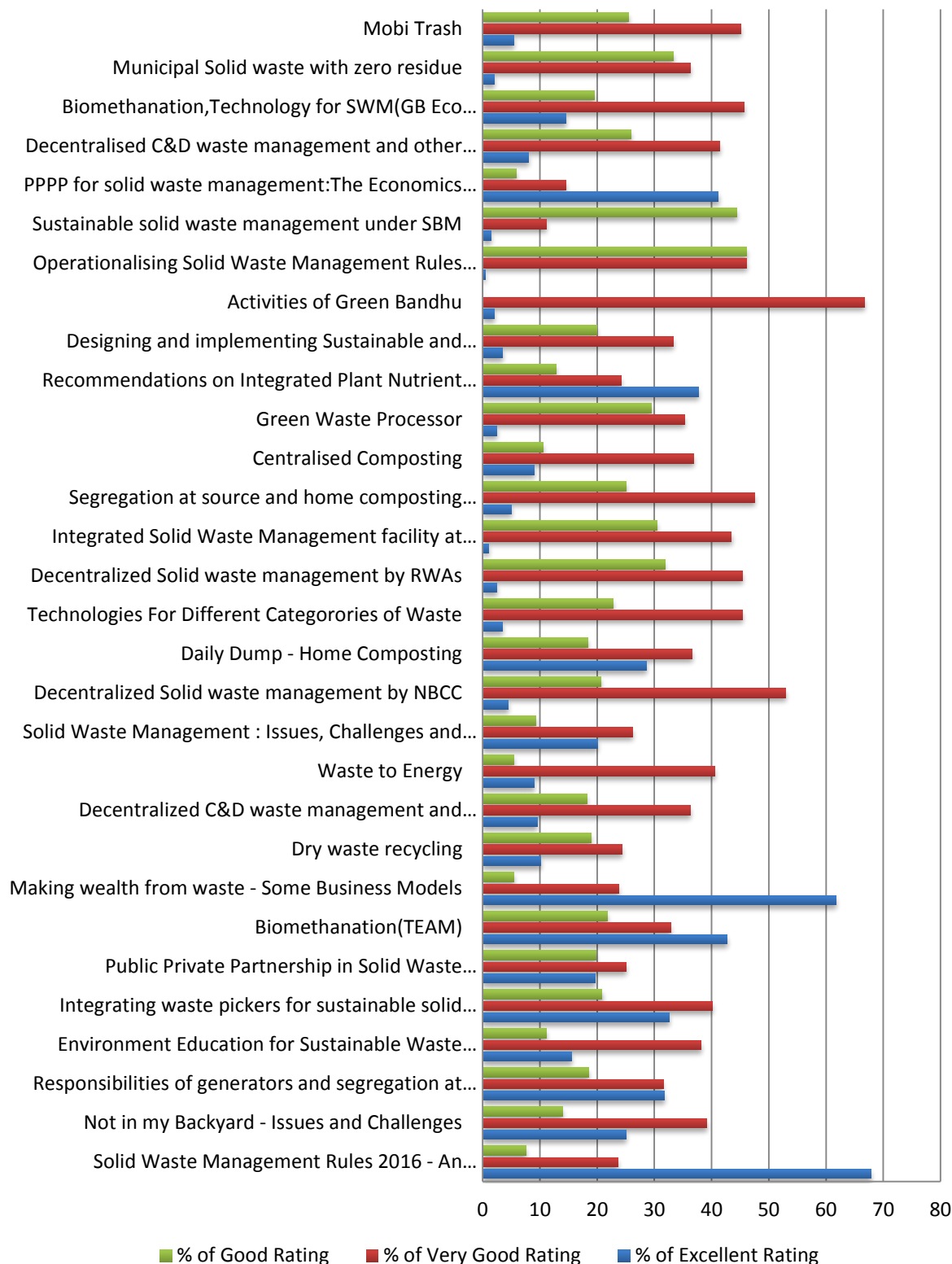


Figure 2 : Profile pattern of ULB Officials

Technical Sessions

The main presentations in each technical session which remained consistent during all twelve workshops included Solid Waste Management - issues, challenges and opportunities, Waste Management rules 2016, Technologies for different categories of waste, Public Private Partnership in SWM, Biomethanation, Construction and Demolition (C&D) waste management and recycling, Decentralized Solid Waste Management by RWAs, Making wealth from waste, Not in my Backyard - issues and challenges and a few more. Other than these, every workshop had a few new presentations and resource persons.

RATING OF LECTURES IN SBM WORKSHOP FROM BATCH 1-12 (MAY - OCT 2016)



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Figure 3: Rating of Lectures in SBM Workshop

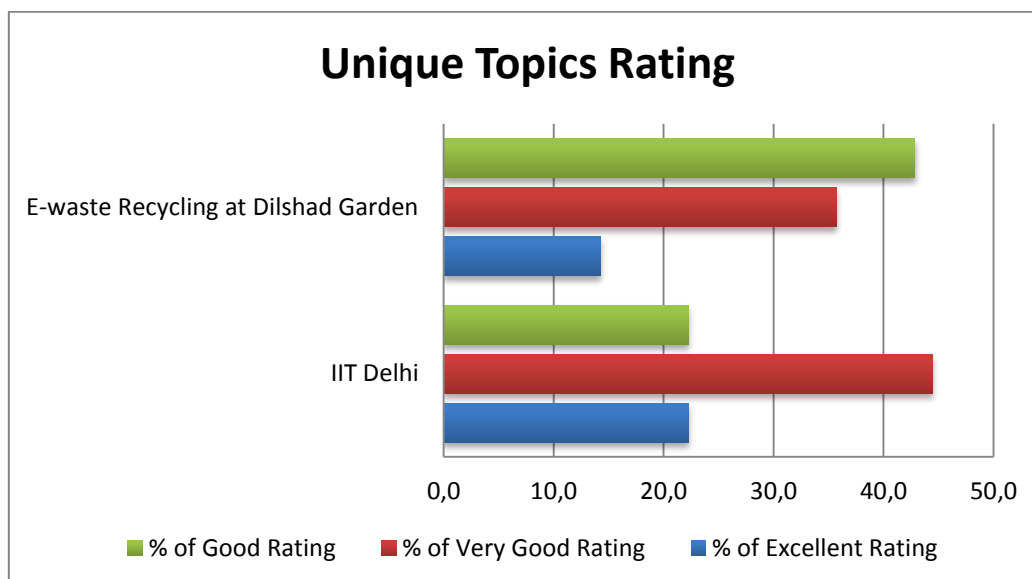


Figure 4 : Ratings given to different technical sessions by participants in the workshops

In the above figures, it is evident that most of the presentations organized for the participants was liked and appreciated by them. These presentations were made to give the participants an idea about the current scenario of solid waste management and the different aspects to the existing problem.

Manual

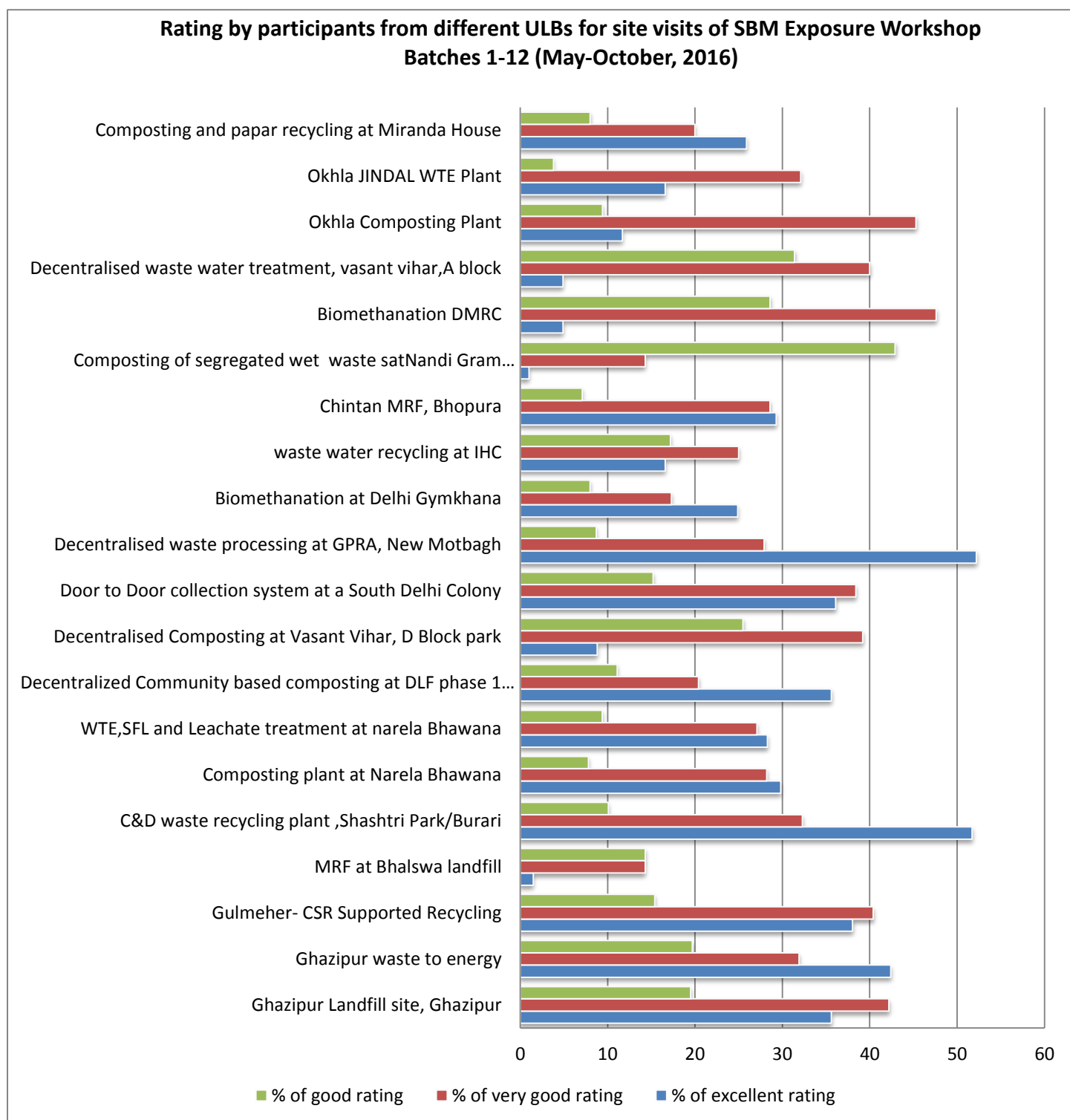
A manual called Swachh Bharat Mission Exposure Site Visit Manual was developed by NIUA for this project which provides the required information on all the plants that the participants were taken to, during the exposure visits. This manual attempted to document the important information and data of each plant and also had an annexure which had quiz questions on each of the plants. The Manual gives the participants an idea about what to ask and focus on during their field visits and encourages them to find answers to the quiz questions by reading the manual and understanding the explanations given by the resource persons during their visit.

Field Visits

Participants were taken to different plants which included Ghazipur landfill site, Ghazipur Waste to Energy (WtE) plant, Gulmeher Recycling Centre, Chintan's Material Recovery Facility (MRF), Construction and Demolition Waste Recycling plant, Paper recycling and Composting at Miranda House, Door to Door waste collection system, decentralized waste processing at DLF Phase IV, Gurugram and GPRA, New Motibagh, Biomethanation plant at Delhi Gymkhana, DMRC, Shastri Park, Okhla Composting Plant and Okhla Timarpur WtE plant. The main reason behind taking the participants to all these places is to make them realize that there are many ways to deal with solid waste issues in any area. It was also to give them a practical view of applying a solution to specific issues concerning solid waste management. We had approached and taken permission from a few alternative sites that

worked as our back up in case any of the above sites were closed for maintenance or for some other reason. We made sure that participants were taken to various field visit sites which showed various centralized and decentralized methods of solid waste management.

Figure 5: Ratings given to various field visit sites by participants



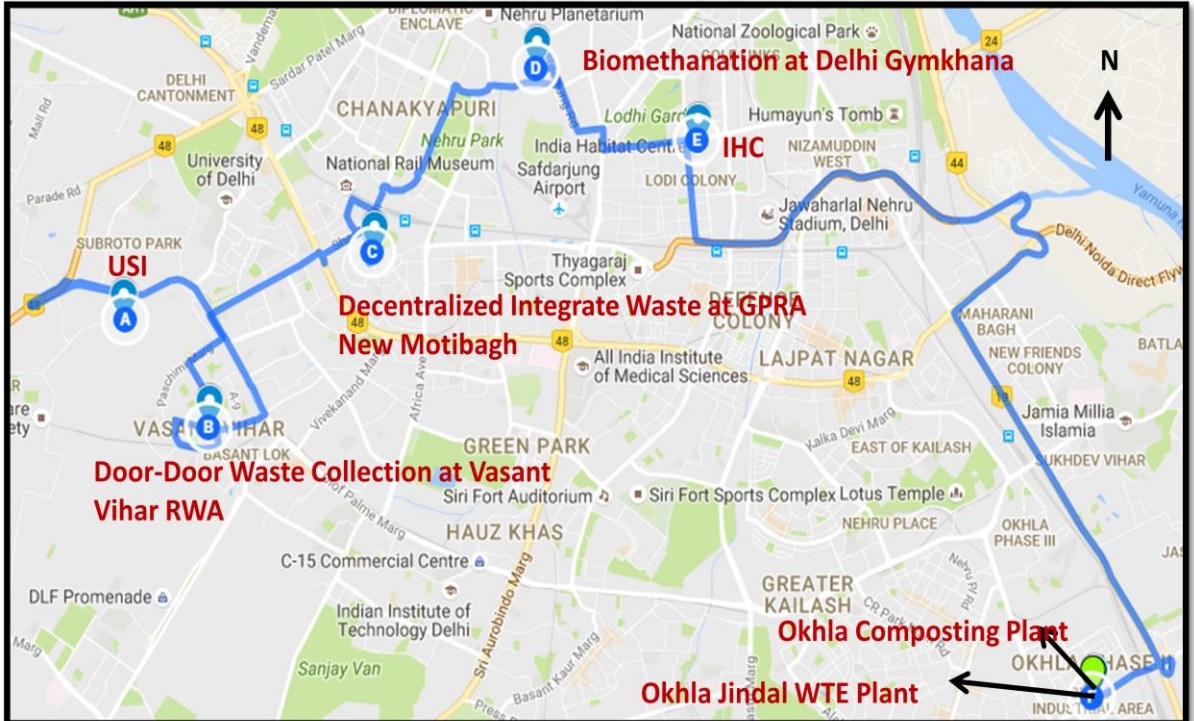
The learnings from above ratings were used for planning subsequent workshops.

Location Maps of site visits

Map 1: Field Visit (Day 2 of Batch 1-5, SBM Exposure Workshop)

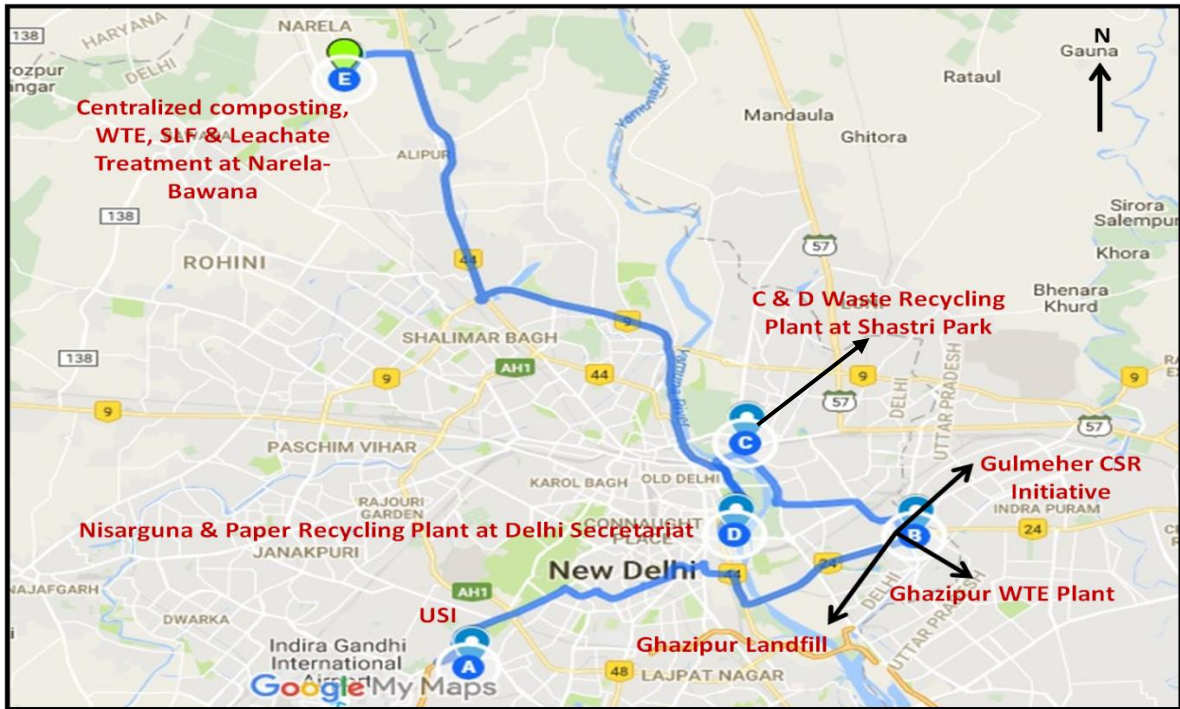


Map 2: Field Visit (Day 3 of Batch 1-5, SBM Exposure Workshop)



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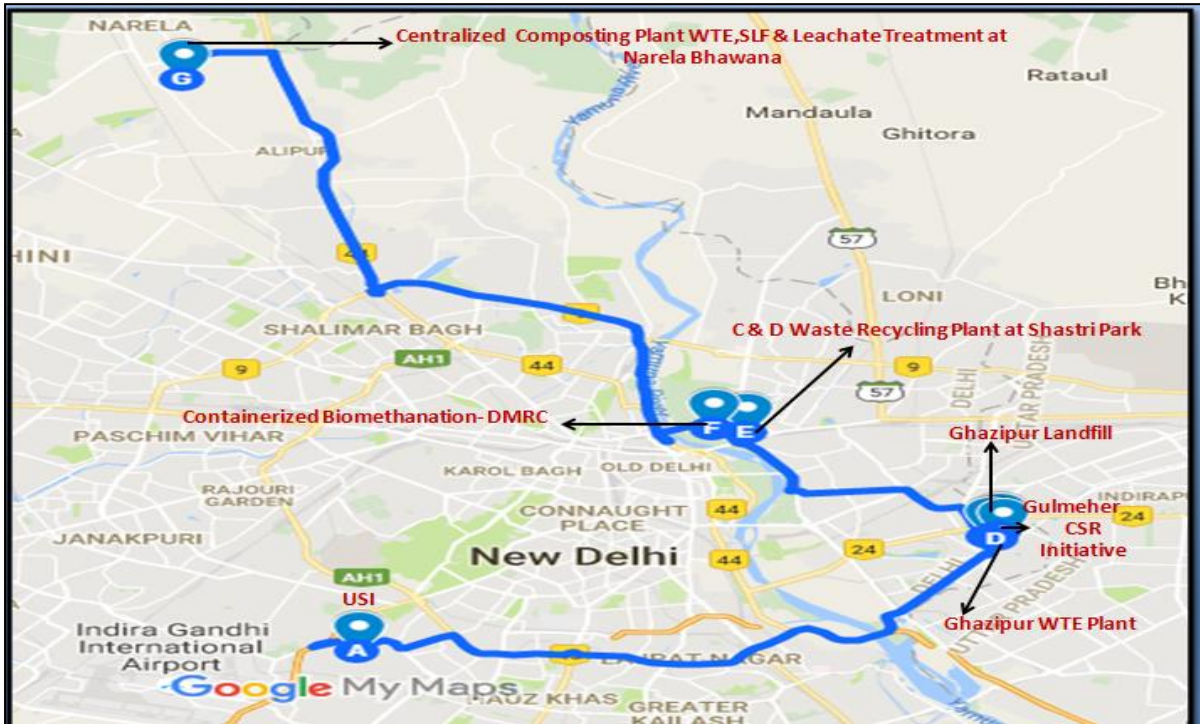
Map 3: Field Visit (Day 2 of Batch 6, SBM Exposure Workshop)



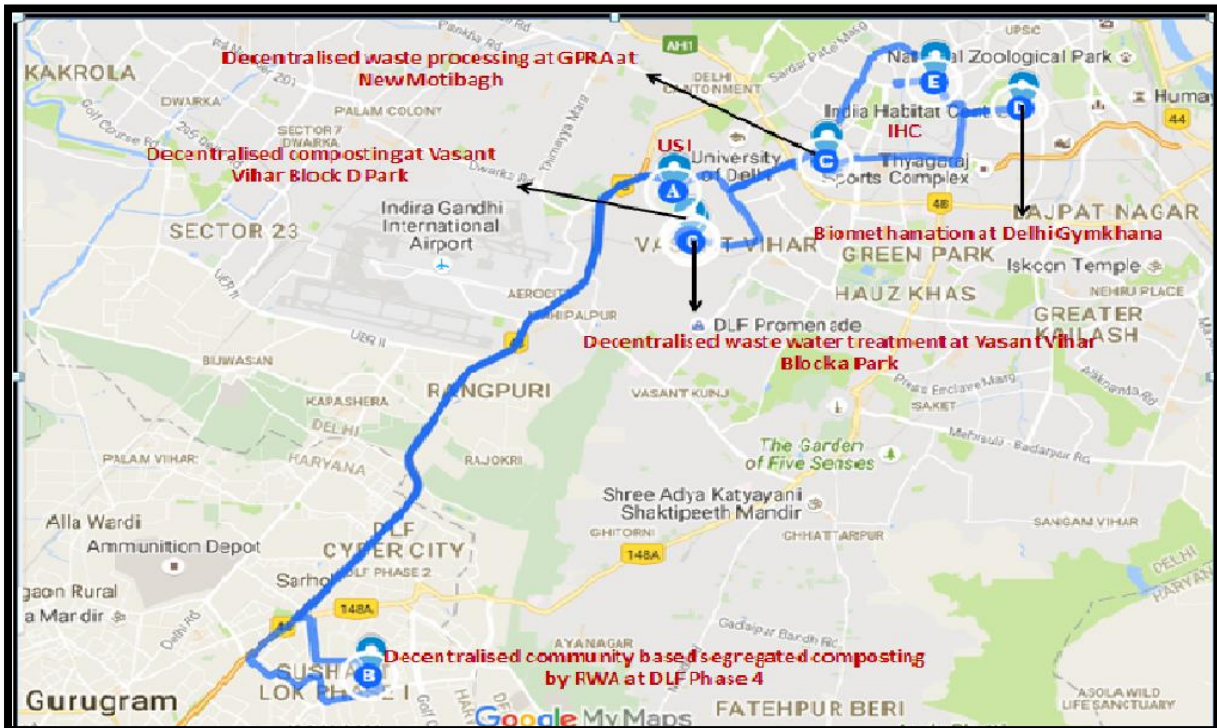
Map 4: Field Visit (Day 3 of Batch 6, SBM Exposure Workshop)



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Map 5: Field Visit (Day 2 of Batch 7-12, SBM Exposure Workshop)



Map 6: Field Visit (Day 3 of Batch 7-12, SBM Exposure Workshop)

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Group Activities

On the last day of the workshop, participants were divided into groups of 4-5 people, who first discussed among themselves and then made a presentation about the challenges and issues that they face in their municipal area with respect to solid waste management. Following this, the second group activity required participants to design plans for their own cities or hypothetical cities of a particular population. This is done to see if they have understood the main concept of this workshop and encourages them to plan to bring about changes in their municipal areas after visiting different plants in Delhi.

Logistics

The accommodation, food, technical sessions, kits and facilitation provided to the participants was liked by most of them. Majority of the participants ranked all the logistics with high ratings.



Figure 6: Rating of the logistics as given by different participants

Green features of the Workshops: Workshop kit (Refer Annexure 8 for detailed description):

The salient feature of the workshops held in this series is that all the events was green events. For instance the participants were provided with file folders, bags, pens, manuals and note books made from recycled material made by NGOs in and around Delhi, Chennai etc. Whether in the field trips or classroom sessions, conservation measures like using reusable water bottles rather than plastic one-time-use bottles, food packed/ served in reusable or safe material rather than unsustainable packaging, using plants in up-cycled woven baskets instead

of cut flowers wrapped in plastics, hand-made paper crafts and gifts as prizes and certificates, along with sustainable accommodation and transportation, left a long term impact on the participants. It was possible to practice what one preaches and the best way to preach is to practice it and show people that conservation was a way of life and not mere examples to cities

Resource Persons:-

Resource persons were varied with as many numbers of academics as experts from corporate organizations and NGOs. Many of the speakers came consistently for all the twelve workshops, while some came for lesser number of workshops. All gave theory as well as practical examples, demonstrations, exhibited videos and answered innumerable questions and discussed viability, sustainability and social relevance.

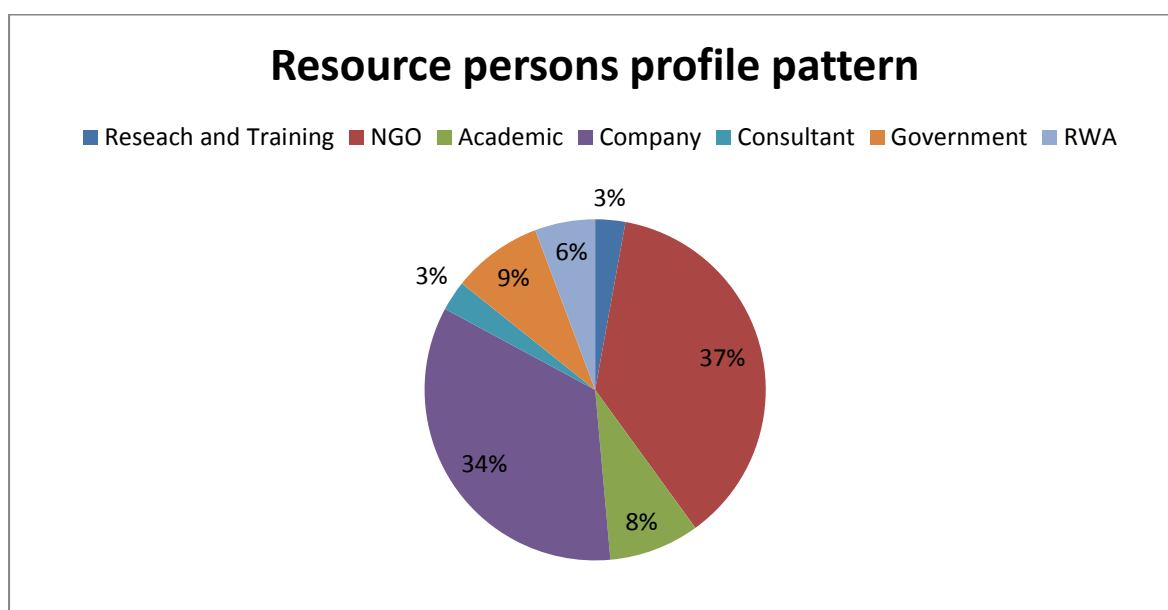


Figure 7: Percentage of Resource persons from different sectors.

Profile of participants and Resource persons (Refer Annexure 4 for detailed description)

Outcomes

- Many of the participants have followed up with the resource persons to whom they were introduced, to get information regarding plant installation and operations in their municipal areas.

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- Interest among different municipal corporations was increasing as a result of which participation in each workshop were increasing.
- The knowledge of participants regarding solid waste management was increasing and this can be made out from the plans they propose during the group activities. The plans proposed were good enough to be made into official proposals to set up such plants in various cities.
- One of the major outcomes of this project was the manual designed by the NIUA which includes information of all the prominent waste management plants/facilities in Delhi/NCR region. The manual was under constant editing and by the end of the project; we had an official documentation of all the plants available for visiting at Delhi with respect to solid waste management for the reference of interested ULBs.

Challenges

- The months of May, June and July were very hot and dry, and August and September were monsoon months. Participants were either reluctant to come to Delhi or found it difficult to attend both days of field trips due to hot and humid condition in May-July. Some participants were not able to come after registering because of water logging, poor sewerage and flood condition in their respective areas. Some states were also on high alert due to floods like Odisha, Bihar, and Assam due to which ULB officials were not allowed to leave headquarters and this led to poor participation.

❖ Recommendations :

Based on analysis of Activity I

The SBM Exposure workshops project successfully completed 12 Batches (May to October 2016), wherein 224 participants not only attended lectures and visited plants to understand technologies but also contributed to Activities 1 and 2. For the ease of the participants, they were placed in 3-6 groups in each workshop totaling to about 44 groups in all 12 batches.

On the last day of the workshop, participants were divided into groups of 4-5 people in each group, who first discussed among themselves and then presented the issues and challenges that they faced in their municipal area with respect to solid waste management.

On analyzing the "issues & challenges" highlighted by the participating ULBs to prioritize the most critical and the least critical ones, they were categorized into their respective inherited types. Ten parent categories were made, each of which was further segmented based on their nature and aspect. The results of the analysis are presented below.

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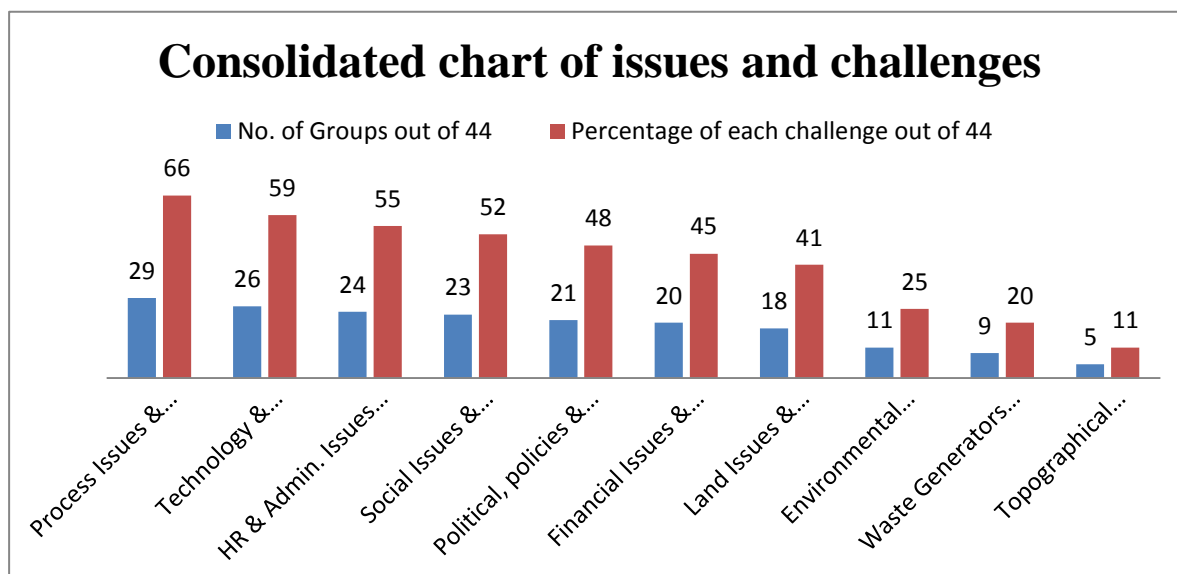


Figure 8: Consolidated chart of Issues & Challenges

I. Process Issues & Challenges :

Our analysis clearly shows that under Issues & Challenges “Process issues & challenges” is flagged very important among various urban local bodies (ULBs). When we further analyzed, the top most priority came out to be “Source segregation” which is indeed the major cause of concern among the ULBs. The second most important issue came out to be “Collection of waste” & thirdly issues related to “Disposal”.

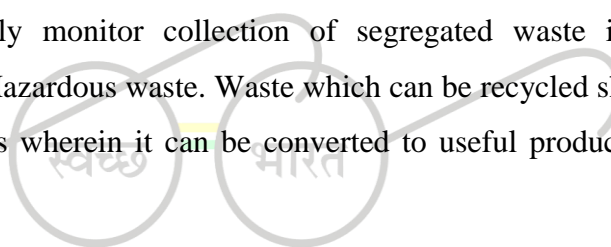
Therefore, few recommendations to help solve these issues & challenges are listed below:

1. Segregation of waste at source has to be made mandatory.

For achieving source segregation of waste at the household/ generator’s level, ULBs should provide incentives such as Bags & Bin (Blue, Green etc.) and also impose penalties in case segregation of waste is not properly done despite notification and warnings.

2. For effective Solid Waste Management, waste has to be collected in different streams.

ULBs have to properly monitor collection of segregated waste into wet, dry, insanitary, E-waste & Hazardous waste. Waste which can be recycled should be given to rag pickers or NGOs wherein it can be converted to useful products and sold to generate livelihood.



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3. After segregating and processing whatever is processable, non-recyclable waste must be disposed in a secured Landfill.

ULBs have to ensure provision of adequate treatment plants and landfill sites. Waste, which are not used for composting, recycling or marketing have to be securely transported to these secured landfill sites.

II. HR. & Administrative Issues & Challenges :

Issues & Challenges related to “HR & Administration” marks the second most important concern among the ULBs. On further analysis, the top most issue comes out to be “Lack of Manpower” which is a major cause of concern among the ULBs. The second most prominent issue under this category is “HR Management” and lastly issue related to “Expertise & skills” of the workers.

Therefore, few recommendations to help solve these issues & challenges are listed below:

1. Manpower has to be increased in Urban Local bodies.

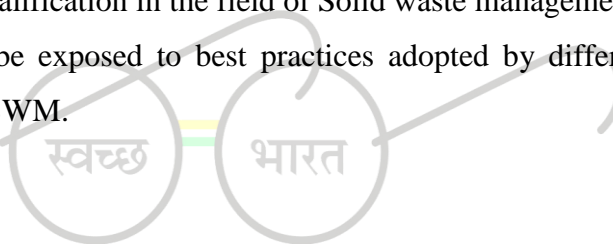
For better management of the solid waste, ULBs should ensure that they have enough skilled labor so that they can be deployed to plants and locations for carrying out various processes related to solid waste treatment.

2. Create Destination organization chart.

ULBs should identify staff members currently working in the municipal corporation, monitor individual tasks, monitor and evaluate them. They must also inculcate among the officers and staff, a sense of pride in their work. To motivate them to do their best to improve the level of service they provide, ULBs must give its staff recognition and prizes.

3. Special training to be conducted for unskilled and skilled employees.

ULBs should ensure that special training is conducted for unskilled staff so that they can obtain necessary qualification in the field of Solid waste management and become skilled. Officers must be exposed to best practices adopted by different cities and learn new advances in SWM.



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III. Technology & Infrastructure Issues & Challenges :

Issues & Challenges related to “Technology & Infrastructure” marks the third most important concern among the ULBs. On further analysis, the top most issue of this comes out to be “Unavailability of Cost effective technology” which is a major cause of concern among the ULBs. The second most prominent issue under this category is “Proper collection & Transportation of waste” and lastly is the issue related to “Lack of adequate Infrastructure” such as treatment plants. Therefore, a few recommendations to help solve these issues and challenges are listed below:

1. Develop technologies for sustainable utilization of solid waste for cleaner, pollution free environment and generation of energy.

ULBs should invest on technologies such as vermicomposting, anaerobic digestion/Biomethanation etc. to generate energy and make this process economic and suitable for integrated SWM.

2. Improve Collection & transportation of waste.

Municipal Officers should ensure that vehicles are selected according to capital costs, its carrying capacity, loading speed, local speed, fuel consumption and maintenance costs. In large cities, containers can be transported by a hydraulic vehicle and in small cities containers can be transported by tractors equipped with a container-lifting device.

3. Increase involvement of Public-Private Partnership.

ULBs should join hands with PPP to setup sustainable infrastructure (solid waste treatment plants) that are economically viable.

IV. Social Issues & Challenges :

Issues & Challenges related to “Social” marks the fourth most important concern among the ULBs. On further analysis, the top most issue comes out to be “Lack of Awareness among the people” which is a major cause of concern among the ULBs. The second most prominent issue under this category is “Lack of public participation” & lastly is the issue related to “Lack of RWA Participation/Competition”.

Therefore, few recommendations to help solve these issues & challenges are listed below:

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1. Building Awareness through Campaigning, Training Workshop and Digital media.

ULBs should ensure that awareness and education campaigns should target elected representatives, schools, non-governmental organizations (NGOs), media, trade associations, families, and the public at large. This can be done via Door –Door awareness programme, Rallies, Street play, Clean up drive etc. Television, radio, and the Internet are very powerful media and can be used to inform citizens of new waste collection arrangements made by the ULB as well as public health benefits emerging from them.

2. Public participation holds the key of success for SWM.

ULBs need to change their mindsets and improve their approach and methods of involving citizens in the day-to-day governance of cities, especially with respect to SWM. They should allow innovation and entrepreneurship from the public, providing space and power within a governance structure where rag pickers, waste workers, slum dwellers, and small and medium entrepreneurs can work alongside health officers, engineers, commissioners, and the rest of the citizenry.

3. RWAs should promote clean drive in their societies.

RWAs (Residential Welfare Association) of a particular area should ensure that each household must segregate their waste into dry, wet, hazardous waste etc. by providing incentives such as bins/bags (blue, green, black etc.) and also disincentives such as fines/warning if they fail to do so. Regular competition among various RWAs in creating zero waste localities would not only lead to a greener society but also help in solving issues of SWM.

V. Political & Policy Framework Issues & challenges :

Issues & Challenges related to “Political & Policy Framework” marks the Fifth most important concern among the ULBs. On further analysis, the top most issue comes out to be “Political Interference” which is a major cause of concern among the ULBs. The second most prominent issue under this category is “PPP, third party, Bilateral Collaboration” and lastly the issue related to “Effective enforcement of policies”.

Therefore, a few recommendations to help solve these issues & challenges are listed below:

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- 1. Avoiding Political Interference:** Once a policy is made by the council and made public, unnecessary political interference in terms of exemptions or incentivization with a political motive should be avoided.
- 2. Setting good examples:** Councillors, Corporators and other political entities should themselves set an example by following the law and rules so that the citizens are motivated to do so instead of seeking exemptions for frivolous reasons.
- 3. Rooting out corruption:** Corruption for award of work to PPP or third party vendors or even NGOs and RWAs can kill any project before it begins. Hence, all such awards and practices should be made transparent, honest and accountable.

VI. Financial Issues & Challenges :

Issues & Challenges related to “Finance” marks the sixth most important concern among the ULBs. On further analysis, the top most issue comes out to be “Lack of Funds” which is a major cause of concern among the ULBs. The second most prominent issue under this category is “User Charges” & lastly issue related to “Spot fine”.

Therefore, few recommendations to help solve these issues & challenges are listed below:

1. Raise Funds for SWM

ULBs can raise funds from treating the waste (Wealth from Waste) through Waste to energy plants, waste recycling and composting which reduces the cost of treating the waste and provides tangible financial benefits from recovered material while conserving energy. ULBs can also come together and develop common facilities on a cost sharing basis and access the capital market to raise fund for such projects through a lead agency that should be established by the state government.

2. User charges to be properly administered.

ULBs need to properly administer user charges as it is an equitable means of funding for SWM and also can provide incentives to reduce waste generation and encourage recycling.

3. Spot fines should be effectively implemented on the people.

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Municipal authorities should charge Spot Fines on people especially bulk generators who litter waste. ULBs should take strict actions by penalizing them with monetary fines and if required by use of legal measures.

VII. Land Issues & Challenges:

Issues and Challenges related to “Land” marks the seventh most important concern among the ULBs. On further analysis, the top most issue comes out to be “Non-availability of land” which is a major cause of concern among the ULBs. The second most prominent issue under this category is “Land topographical Constraints” and lastly is the issue related to “Lack of secure landfill sites”.

Therefore, few recommendations to help solve these issues & challenges are listed below:

1. Availability of suitable, encumbrance free land within the ULBs’ jurisdiction.

ULBs should identify and reserve land for SWM facilities. The requirement of land should be calculated based on a tentative assessment of possible disposal option available to ULBs. Land clearance from concerned authorities should be obtained by the ULBs as early as possible.

2. Suitable solid waste treatment with accordance to the topography.

Cities and towns located on hills must have location-specific methods evolved for final disposal of solid wastes by the municipal authority with the approval of the concerned State Board or the Committee. Because of constraints in finding adequate land in hilly areas, wastes not suitable for road-laying or filling should be disposed in specially designed landfills.

3. Assure secure landfill site on the outskirts of the city.

ULBs should ensure that they have space for dumping non-processable or recyclable waste in a secured landfill. They also need to ensure the landfill site is not close to residential complexes and not too far as it might heat up the transportation cost.

VIII. Environmental Issues & challenges:

Issues & Challenges related to “Environment” marks the eighth most important concern among the ULBs. On further analysis, the top most issue comes out to be “Land Pollution” which is a major cause of concern among the ULBs. The second

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most prominent issue under this category is “Aesthetic (Health)” and lastly is the issue related to “Water pollution”.

Therefore, few recommendations to help solve these issues & challenges are listed below:

1. Land filling Technique

ULBs should ensure that segregation at source is done properly at primary stage and Collection of segregated waste is done in the second stage. Spot fines upon littering of waste, Prohibiting Open dumping, addressing NIMBY, reducing Land filling and composting segregated wet waste closest to the point of generation can help in reducing Land pollution.

2. Making the environment Clean & Non-infectious

ULBs need to ensure that their city is kept clean and healthy. Open dumping, littering, polluting drains with garbage can give rise to many infectious diseases. Health officers must inspect all such locations every month.

3. Keeping water bodies clean

ULBs must take strict action against violators littering drains and canals by imposing spot fines and penalties.

IX. Waste Generators Issue & Challenges:

Issues & Challenges related to “Waste Generators” marks the ninth most important concern among the ULBs. On further analysis, the top most issue comes out to be “Slums” which is a major cause of concern among the ULBs. The second most prominent issue under this category is “Floating population and Migrants (Tourists and Pilgrims)” and lastly the issue related to “Residential”

Therefore, few recommendations to help solve these issues & challenges are listed below:

1. Don't neglect solid waste generation in Slums:

ULBs must not neglect collection of waste from the slum areas. People in slums must be made aware of proper segregation of waste, provided with incentives such as Bags and Bins and regular collection at designated times during the day.

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2. Solid waste management needs to be handled rigorously during festivities:

ULBs need to be more attentive during festivals due to increase in floating population. Therefore it must ensure that enough manpower and treatment facilities are there to efficiently manage solid waste problems. Tourists may also be fined against littering.

3. Incentives to be provided to residents for contributing to solid waste management.

ULBs or presidents of RWAs can provide incentives to residents for carrying out activities such as home or community composting, maintaining a park or community centers for collection and processing of dry waste with help from other residents who are motivated to contribute their time and resources towards solid waste management.

X. Topographical Issues & Challenges

Issues & Challenges related to “Topography” marks the Tenth most important concern among the ULBs. On further analysis, the top most issue comes out to be “Hilly terrain” which is a major cause of concern among the ULBs. The second most prominent issue under this category is “Coastal areas”

Therefore, few recommendations to help solve these issues & challenges are listed below:

1. Management of Solid waste in Hilly Terrain :

ULBs must ensure that since there are constraints in finding adequate land in hilly areas, segregated wastes should be composted, collected and treated closer to point of generation and the rest not suitable for road-laying should be disposed in specially designed landfills, which do not cause landslides or water pollution. ULBs must also ensure that people do not litter waste in the valley since it is very difficult to collect and may end up in water ways and rivers polluting downstream villages, towns and cities.

2. Management of Solid waste in Coastal areas:

ULBs must ensure that since coastal and low lying areas are prone to get polluted easily with direct discharge of industrial waste and sewage. They should instigate strict action against industrial disposal of solid waste into the rivers. Penalty must be levied from violators who litter plastics into the canals, thus blocking its free flow and resulting mosquito and vector menace.

Based on Analysis of Activity II

The second group activity required participants to design plans for their own cities or hypothetical cities of a particular population. This is done to see if they have understood the main concept of this workshop and encourages them to plan to bring about changes in their municipal areas after visiting different plants in Delhi.

On analyzing their proposals individually & giving them scores according to the frequency distribution of each proposal stated by the ULBs, we came to a conclusion that among 10 proposals, which were (Decentralized Composting, Segregation of Dry Waste, Green Bandhu mechanized composting, Biomethanation, Home composting, Plastic Fuel, C&D waste treatment, Hazardous waste treatment, Sewage Treatment plant & Pelletisation); Decentralized composting ranked 1st, Segregation of dry waste ranked 2nd & Green Bandhu Mechanized Composting ranked 3rd.

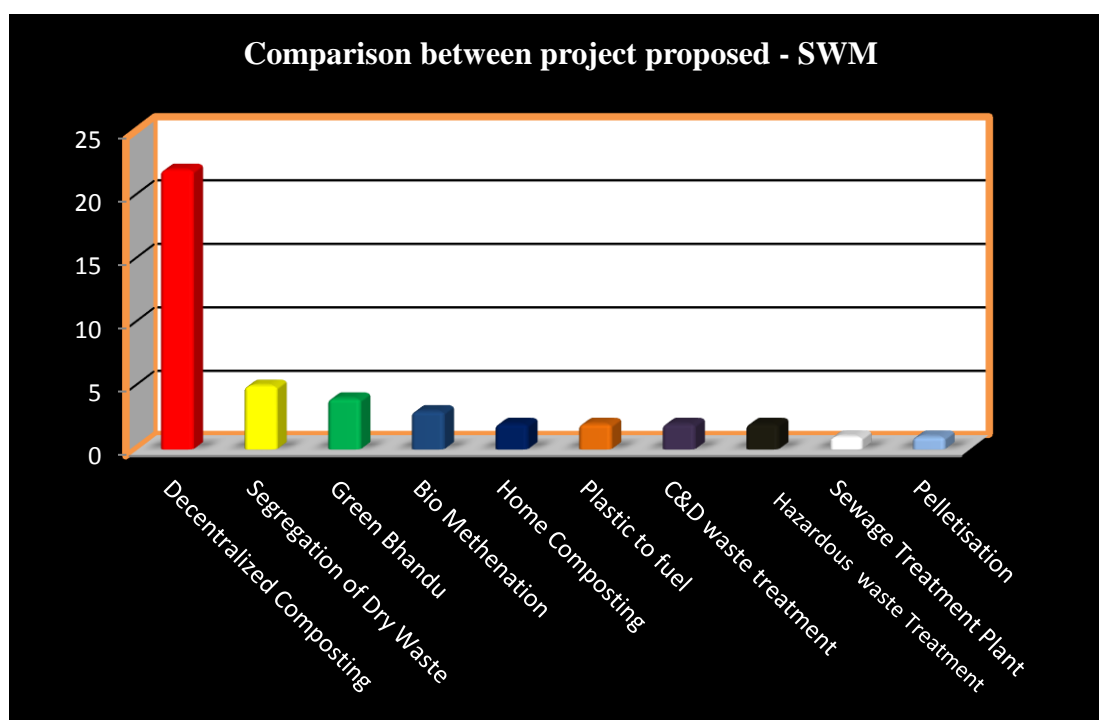


Figure 9 : Comparison between proposed SWM projects

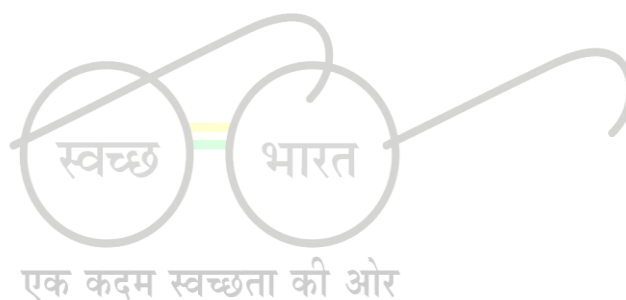
The analysis shows that among different project proposal of cost effective technology stated by 44 groups with regards to SWM, Decentralized Composting is most cost-effective as stated by 22 groups. The second most cost effective proposal is Segregation of Dry Waste as stated by 5 groups. The Third most cost effective proposal is Green Bandhu Mechanized composting as stated by 4 groups. Remaining cost effective proposals are Biomethanation (3), Home composting (2), Plastic to Fuel (2), C & D waste treatment (2), Hazardous waste treatment (2), Sewage Treatment plant (2) and Pelletisation (2).

Recommendations:

- 1) **Decentralized Composting:** This is highly recommended for community, hotel, campuses etc, as it is less dependent on technology and gives fruitful results in the form of rich manure. The overall cost of implementing decentralized composting is pretty less, while its revenue return is profitable. There are several players in the field with simple equipment and techniques helping communities carry out decentralized composting
- 2) **Segregation of Dry waste:** Dry waste such as plastic bottles, wood, cardboard which can be recycled and marketed is highly recommended. It not only helps in recycling of non-biodegradable product but also helps in generating revenue out of it in the form of functional and decorative products. RWAs can collectively also give these dry waste to NGOs wherein they can produce useful items from it. Some examples are Gulmeher-CSR Recycling plant, ACT and Trash to Cash etc.
- 3) **Decentralized mechanized composting like Green Bandhu:** Green Bandhu has been working in the field of solid-waste management for the last five years, specializing in de-centralized solid-waste management. Their expertise is in providing technologies and processes that facilitates in source-segregation which enables conversion of wet waste/organic waste/bio-degradable waste into compost/organic manure in-situ. They implement Low-Tech & Low Cost De-centralized Solid-Waste management.
- 4) **Biomethanation:** There are many firms and technologies such as TEAM (TERI's enhanced acidification and Methenation technology) which can turn organic waste dumps into resource centers and tremendously ease the burden on cities, towns, and even villages. The technology will be of great relevance to municipal corporations as the TEAM process is an effective and ecological way of utilizing waste. Sectors that generate organic waste in large amounts – such as food and fruit processing industries, hotels, community kitchens, and vegetable markets – can make the best use of the technology. Other waste generating activities such as coffee processing, tea processing, and poultry farming will also benefit tremendously. Similarly, BioBox is another technology which provides biomethanation benefits in containerized plants. Similarly, NisargaRuna provides biomethanation technology which is cheaper but requires masonry work.
- 5) **Home Composting:** Technologies like Daily Dump, Compost Tumbler, Sampoon Composter and several others are recommended for every household as it is less dependent on technology. It uses an easy method of composting wet waste, which is used for their own gardening purpose. Example

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- 6) **Plastics to Fuel:** Collecting plastic waste and inputting into Plastics to Fuel Plant results in LPG Gas, Fuel Oil & Activated carbon. In this process only the cost of purchasing the processing plant is high but the pay back return is profitable. This is recommended to those areas where plastic is generated in bulk.
- 7) **C & D waste treatment:** Collecting the waste building material and transporting it to the C&D waste recycling plant is imperative. Upon arrival the mixed C&D waste needs to undergo mechanical segregation to segregate the waste into whole bricks, big concrete pieces and mixed C&D waste. All large sized pieces are resized to 200mm to 400mm by both mechanical and manual means. Further the residue is used for making concrete tiles and sold to various dealers. The cost of C & D plant is expensive but the pay back return is profitable. But it isn't suitable for small towns unless decentralized equipment become available.
- 8) **Hazardous waste treatment:** Hazardous wastes that need treatment or disposal may be freshly generated from an industrial operation. Land disposal and **incineration** are two main dumpsite remediation methods. Some treated hazardous wastes can even be reclaimed or recycled.
- 9) **Sewage Treatment Plant:** Sewage treatment plant is beneficial only near the water bodies away from the residential area. The cost of the decentralized sewage plant & its maintenance is somewhat high but is highly profitable in the long run since recycled water and solids can be used as manure for plants especially for landscaping.
- 10) **Pelletisation:** Pelletisation of municipal solid waste involves the processes of segregating, crushing, mixing high and low heat value organic waste material and solidifying it to produce fuel pellets or briquettes, also referred to as Refuse Derived Fuel (RDF). The process is essentially a method that condenses the waste or changes its physical form and enriches its organic content through removal of inorganic materials and moisture. It is highly recommended for small ULBs. It is cost effective and can be sold to industries and cement plants.



Annexure 1

Details from each Workshop

Inauguration

In **Batch 1**, inauguration was done by Prof. Jagan Shah, Director of (NIUA) and Mr. Saurabh Jain, Deputy Secretary and Joint Mission Director of Swachh Bharat Mission (SBM). The introduction about the workshops was presented by Dr. Shyamala Mani, Professor at NIUA, and the key note address was delivered by Dr. V.K. Vijay, Professor at IIT Delhi.

During **Batch 2**, the introductory speech and welcome address was given by Dr. Shyamala Mani, Professor, NIUA. This was followed by lighting the lamp done by Dr. Mani and Dr. N.B. Mazumdar, Consultant, Solid Waste Management, who also delivered the inaugural cum key note address.

The **Batch 3** workshop started with an introductory speech by Dr. Shyamala Mani, Professor, NIUA after which the lamp was lit by Ms. Sanchita Jindal, Director, MoEFCC and Dr. Shyamala Mani. Ms.Sanchita Jindal delivered the inaugural cum keynote address.

In **Batch 4**, The program started with welcome address to the participants (officials from different ULBs) and an introductory speech by Dr. Shyamala Mani, Professor, NIUA on Swachh Bharat Mission focusing on solid waste management in the city, which was to create awareness and share the idea of recycling of the solid waste. This was followed by Ms. Sanchita Jindal, Director, MoEFCC delivering the key note address and explaining the Solid Waste Management Rules 2016 in detail.

In **Batch 5**, the workshop started with a welcome address and an introductory speech by Dr. Shyamala Mani, Professor N.I.U.A. These were followed by videos on Swachh Bharat Mission focusing on sanitation and solid waste management in the city, to create awareness and to share the idea of recycling of solid waste. Dr.Sanchita Jindal delivered the inaugural cum keynote address explaining the Solid Waste Management Rules 2016 in detail.

In **Batch 6**, The workshop started with Dr.Shyamala Mani welcoming the participants (officials from different ULBs) with an introductory speech focusing on solid waste management in the country with the primary objective of creating awareness and sharing the idea of recycling solid waste. Ms. Sanchita Jindal Director from MoEFCC delivered the inaugural cum keynote address and explained the Solid Waste Management Rules 2016 in detail.

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In **Batch 7**, The workshop started with the welcome address to participants (official from different ULB's) and an introductory speech by Dr. Shyamala Mani, Professor, NIUA on Swachh Bharat Mission focusing on solid waste management in the city, to create awareness and share the idea of recycling of the solid waste. Ms. Sanchita Jindal, Director, MoEFCC delivering the key note address and explaining the Solid Waste Management Rules 2016 in detail

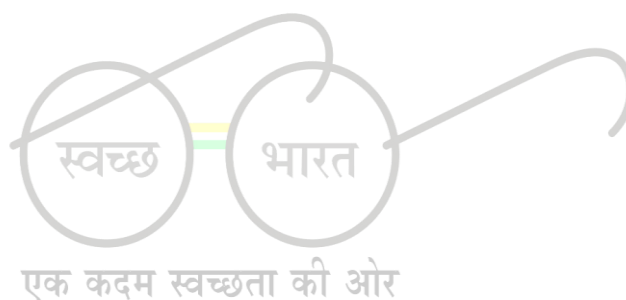
In **Batch 8**, The workshop started welcoming the participants (officials from different ULB's) with an introductory speech by Dr. Shyamala Mani, Professor N.I.U.A. and followed by videos on Swachh Bharat Mission focusing on solid waste management in the city, to create awareness and to share the idea of recycling of the solid waste. Dr. Shyamala Mani then talked about the solid waste management rules 2016 in detail.

In **Batch 9**, The workshop started welcoming the participants (officials from different ULB's) with an introductory speech by Dr. Shyamala Mani, Professor N.I.U.A. Dr.Sanchita Jindal delivered the inaugural cum keynote address explaining the Solid Waste Management Rules 2016 in detail.

In **Batch 10**, The program started with welcome address to the participants (officials from different ULBs) and an introductory speech by Dr. Shyamala Mani, Professor, NIUA on Swachh Bharat Mission focusing on solid waste management in the city, which was to create awareness and share the idea of recycling of the solid waste. Dr. Shyamala Mani Further explain the Solid Waste Management Rules 2016.

In **Batch 11**,The workshop started with an introductory speech by Dr. Shyamala Mani, Professor, NIUA after which the lamp was lit by Dr. Shyamala Mani and Other Participants delivered the inaugural cum keynote address. Dr. Shyamala Mani Further explains the Solid Waste Management Rules 2016.

In **Batch 12**, The 5, the workshop started with a welcome address and an introductory speech by Dr. Shyamala Mani, Professor N.I.U.A. Maj Gen P.K. Sandhu (RETD) (PVSM) talked about the situation of SWM on national level. Dr. Shyamala Mani Further explained about the Solid Waste Management Rules 2016.



Panel Discussion

Batch 1: This session was chaired by Prof. Usha Raghupati of NIUA, a distinguished urban planner, and the following 3 invited resource persons from three different disciplines. Mr. Pradeep Khandelwal, a Chief Engineer of EDMC, Mr. Satish Sinha, who is the Joint Director of Toxics Link, New Delhi and Mr. Suneel Pandey, Director, Green Growth at TERI presented their ideas on the following topics namely Issues, challenges & opportunities in Solid Waste Management, Operationalising Solid Waste Management Rules 2016. and Innovative Technologies for Solid Waste Management respectively.

Batch 2: Panel discussion of Batch 2 was chaired by Dr. N.B.Mazumdar and was followed by three presentations from different resource persons. The session began with the presentation by Ms. Sanchita Jindal. Her presentation included the details regarding Solid Waste Management Rules 2016. She also talked about ULBs' getting power to fine the offender and problems regarding sanitary waste. Her main focus was on Rule 15 which talked about the 37 duties of the ULBs, which she said, must be followed by the ULBs. Following this, Dr. N.B. Mazumdar in his presentation, talked about SWM processing options at different scales. Further he described the Construction and Demolition (C&D) waste Recycling plant at Burari, whose pioneering efforts had made it possible for C&D waste to be separated and recycled instead of being dumped into drains as what happens normally. The last speaker in this session was Mr. Prakash Kumar from Waste Pickers Association, New Delhi. Mr. Prakash Kumar spoke of the importance of integrating waste pickers in the formal Solid Waste Management system, which is supported by the Solid Waste Management Rules 2016. He also talked about the surplus human power that Delhi has in the form of waste pickers, which needs to be utilised and how the economic growth in the Capital.

Batch 3: Panel discussion was chaired by Dr. K. Vijayalakshmi. Dr. Vijaylakshmi talked about construction and demolition waste at a smaller scale. She talked about how Developmental Alternatives had spear headed several programmes for solid waste management including C&D waste management. Following this, Ms. Richa Chaturvedi, talked about decentralized waste management techniques and Chintan's Material Recovery Facility at Bhopura. After this, Mr. Virat explained the functioning of Jindal's Waste to Energy plant situated at Okhla. He explained how the plant works, amount of waste they get every day, machines used and their functioning. Last speaker of this session was Mr. B.C. Sabata who spoke about the significance of Eco-clubs in schools and colleges to sensitize students on environmental issues particularly related to waste management.

Batch 4: Ms. Swati Sambyal from CSE explained about the issues associated with the growing waste generation in the city. Preeti Mahesh from Toxics Link explained

about the importance of segregation of waste at its source by the generators. She focused on economic aspects of the waste management which is done by recycling the maximum amount of waste and reducing the waste from reaching the landfill. She spoke on Issues & Challenges in Dry Waste Recycling for Solid Waste Management. Her talk was focused on the problems that occur due to inadequate dry waste management & strategies to mitigate it.

Batch 5: Ms. Sanchita Jindal from MoEFCC explained about the new legal framework of Solid Waste Management in India i.e. solid waste management rules, 2016 with the applicability and responsibilities of central and state authorities for present and future of Municipal Solid Waste Management (MSWM). After Ms. Jindal, Dr. B.C. Sabata discussed about the significance of Eco-clubs in schools and colleges to sensitize students on environmental issues particularly related to Delhi. He also mentioned that awareness in India, for environment protection, can be increased through Eco Clubs programme and through various other schemes like grants to NGO, publishing suitable advertisement in the national dailies and by organizing various public activities on environmental issues. Following this, Dr. Lakshmi Raghupathy discussed about responsibilities of generators and segregation at source and their experiences. Last speaker of this session was Mr. Rajendra Maggu. He discussed about the initiative that has been taken up by Vasant Vihar RWA, Delhi. They have door to door collection system and then segregation of dry and wet organic waste followed by composting and sustainable utilization of the products obtained from the waste locally processed.

Batch 6: The panel discussion started with Ms. Sanchita Jindal talking about the regulatory instruments for solid waste under EPA and also the situation on the ground level. The presentation also focused on the challenges faced by the ULBs and the different initiatives taken by the central or the state government through different policies and schemes regarding solid waste management.

Batch 7: The panel discussion was chaired by Dr. Shyamala Mani. Ms Sanchita Jindal discussed about the new legal framework of SWM rules 2016 with the applicability and responsibilities of central and state authorities for present and future of Municipal Solid Waste Management (MSWM). After Ms. Jindal Ms. Padma Nandyal: of Sampurn house composter discussed about the composting solution for urban living. She started focusing on today's urban scenario which lack in consistency of waste segregation and dumping of landfill which leads to different type of health hazards. After Ms Nandyal Mr. Suresh discussed about the initiative that is done by Vasant Vihar RWA, Delhi. They have door to door collection system and then segregation is done of dry and wet organic waste so as to decompose and sustainably utilize the products obtained from the waste locally processed. It is widely known for converting wet organic waste into manure by aerobic composting technique. After Mr. Goel Mr Bhushan discussed about the Decentralizes composting

at the neighborhood scale and how integrated waste workers in solid waste management works in this area. He discussed the current waste management situation in urban areas, how waste workers are not well integrated in SWM , how low cost WtE is promoted

Batch 8: The session was chaired by Dr. Shyamala Mani. Ms. Shyamala Mani explained about the new legal framework of Solid Waste Management in India i.e. solid waste management rules, 2016 with the applicability and responsibilities of central and state authorities for present and future of Municipal Solid Waste (MSW). After Ms. Mani Ms Priya Marish discussed about the achievement of 100% source segregation at household level. She discussed about the level of training given to maids and guards to check in at the time of collection of solid waste. She discussed how hard was to convince the household members for segregation but it was only achieved at the ground level work .After Ms. Priya Marish Dr S.S. khanna discussed about the recommendation on integrated plant nutrient management using city compost. After Dr Khanna Mr Bhushan discussed about the Decentralizes composting at the neighborhood scale and how integrated waste workers in solid waste management works in this area. He discussed the current waste management situation in urban areas, how waste workers are not well integrated in SWM , how low cost WtE is promoted

Batch 9: The panel discussion was chaired by Dr. Shyamala Mani. Ms Sanchita Jindal discussed about the new legal frame work of SWM rules 2016 with the applicability and responsibilities of central and state authorities for present and future of Municipal Solid Waste Management (MSWM). After Ms.Jindal The panel discussion was chaired by Dr. Shyamala Mani. Ms Sanchita Jindal discussed about the new legal frame work of SWM rules 2016 with the applicability and responsibilities of central and state authorities for present and future of Municipal Solid Waste Management (MSWM). After Ms.Jindal Dr. L Raghupathy talked about the Responsibility of Generators and Segregation at source- experiences and the NIMBY syndrome. She explained the situation in context of urban localities .After Dr Raghupathy Dr S.S. khanna discussed about the recommendation on integrated plant nutrient management using city compost. Mr Prakash was the last speaker of the panel discussion. He explained on integrated waste pickers for sustainable solid waste management.

Batch 10: The session was chaired by Dr. Shyamala Mani. Ms. Shyamala Mani explained about the new legal framework of Solid Waste Management in India i.e. solid waste management rules, 2016 with the applicability and responsibilities of central and state authorities for present and future of Municipal Solid Waste (MSW). After Ms. Mani ,Ms Niharika discussed about the composting solution for urban living. She started focusing on today's urban scenario which lack in consistency of waste segregation and dumping of landfill which leads to different type of health hazards. She focuses how these can be managed in present day without effecting

environment and human health. After Ms Niharika Ms. Rozita Singh from Daily Dump Franchise talked about her company Daily Dump and the products they make to prepare compost at home without any smell related issues or messy procedures. Dr S.S. Khanna discussed about the Highlights of the recommendations of Inter-Ministerial Task Force on Integrated Plant Nutrient Management using City Compost. After Dr Khanna Mr. Shashi Bhushan discussed about the Decentralizes composting at the neighborhood scale and how integrated waste workers in solid waste management works in this area

Batch 11: The panel discussion was chaired by Dr. Shyamala Mani. Ms Mani discussed about the new legal frame work of SWM rules 2016 with the applicability and responsibilities of central and state authorities for present and future of Municipal Solid Waste Management (MSWM). After Ms Mani Mr. Jubin Jacob Babu discussed about the decentralized waste management in India on larger scale. He proposed an idea of management of waste as close to its source as possible. After the discussion Ms. Monika Sharma talked about her company Daily Dump and the products they make to prepare compost at home without any smell related issues or messy procedures. Dr S.S. Khanna discussed about the Highlights of the recommendations of Inter-Ministerial Task Force on Integrated Plant Nutrient Management using City Compost. After Dr Khanna Mr. Shashi Bhushan discussed about the Decentralizes composting at the neighborhood scale and how integrated waste workers in solid waste management works in this area . After Mr. Bhushan Mr. Devendra singh discussed about the centralized system of municipal solid waste treatment and processing plant. He also discussed about the Centralized MSW Treatment at Ahmadabad Compost Plant of 300 TPD and Centralized MSW Compost Plant at Mauritius of 600 TPD.

Batch 12: The panel discussion was chaired by Dr. Shyamala Mani. Ms Mani discussed about the new legal frame work of SWM rules 2016 with the applicability and responsibilities of central and state authorities for present and future of Municipal Solid Waste Management (MSWM). After Ms Mani Lt Gen Sandhu talked about the SBM mission initiative and the importance of SBM Exposure workshop held by NIUA. He talked about the situation of India in solid waste management. He shared his experiences related to environmental and sustainability. After Lt Gen Sandhu Dr khanna He discussed about the Highlights of the recommendations of Inter-Ministerial Task Force on Integrated Plant Nutrient Management using City Compost. After Mr. Khanna Mr. Jubin Jacob Babu discussed about the decentralized waste management in India on larger scale. He proposed an idea of management of waste as close to its source as possible. After Mr Jacob Ms. Monika Sharma talked about her company Daily Dump and the products they make to prepare compost at home without any smell related issues or messy procedures. After discussion of Ms Monika Mr. Prakash Kumar talked about surplus man power that Delhi has and how the economic growth has been uneven in the Capital. He also mentioned how natural calamities affect poor more. Further he discussed how increase in urban population

increases pressure over Urban Local Bodies as well. After Mr Prakash Mr. Devendra singh discussed about the centralized system of municipal solid waste treatment and processing plant. He also discussed about the Centralized MSW Treatment at Ahmadabad Compost Plant of 300 TPD and Centralized MSW Compost Plant at Mauritius of 600 TPD.

Technical Session 1

Batch 1: This session was mainly based on mitigating strategies to accomplish sustainability in waste management. *Mrs. Shammi Talwar*, a member of *Residents' Welfare Association (RWA)* of A Block in Defence Colony, New Delhi explained that *the model of successful waste management of Defence Colony*, which has been achieved by using simple technique based on 'Composting' was *achievable by not just involving citizens of the society but also integrating garbage collectors in the implementation plans*. *Mr. Imran Khan*, the Head of Programmes – Implementation at *Chintan*, delivered his talk in this session on 'Integrating waste pickers for sustainable solid waste management in Delhi'.

Batch 2: *Mr. Suresh Goel*, President, RWA, Vasant Vihar, discussed and explained to the participants about the waste collection, composting unit and STP plant in Vasant Vihar. He also talked about the rain water harvesting system that they have. Following this, *Mr. Ravi Mishra* briefly explained how they collect and process waste on daily basis at GPRA, New Motibagh, New Delhi. The process of compost making takes 10-15 days in summers and 20-25 days in winters, as told by *Mr. Ravi*. All in all he explained how his plant in Moti Bagh is working and how they produce compost and recycle waste water. Final presentation was done by *Dr. Shyamala Mani* where she talked about challenges and issue related to solid waste management rules.

Batch 3: *Mr. D.C. Pant* was the first speaker of this session and talked about their TEAM (TERI's Enhanced Acidification and Methanation) Technology at various locations in India majorly focusing at their plant at Delhi Gymkhana. After *Mr. Pant*, *Mr. Ravi Mishra* talked about the in-house decentralized sewage treatment plant at New Motibagh. He also explained how the bulk amount of green waste generated there is collected, segregated and then used to make pellets and the kitchen waste composted while the waste plastics are converted to fuel oil at New Motibagh.

Batch 4: *Ms. Richa Chaturvedi* talked about decentralized waste management techniques and *Chintan's* Material Recovery Facility at Bhopura. *Mr. D.C. Pant* talked about their two phase anaerobic digestion technology for organic biodegradable solid waste treatment by TEAM (TERI's Enhanced Acidification and Methanation) Technology.

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Batch 5: Mr. Nagendra Kumar started this session with his explanation about the solid waste management practice which are being used right now and problems associated with existing models. Following this, Mr. Devendra Singh from Excel Industries discussed about the centralized system of municipal solid waste treatment and processing plant. He also discussed about the Centralized MSW Treatment at Ahmedabad Compost Plant of 300 TPD and Centralized MSW Compost Plant at Mauritius of 600 TPD. Last speaker of this session, Ms. Rozita talked about her company Daily Dump and the products they make to prepare compost at home without any smell related issues or messy procedures. The main product described in her presentation was the 3 Tiered Khambha Large Plain with a diameter of 13 inches and height of 38 inches.

Batch 6: Technical session 1 began with Dr. Lakshmi Raghupathy discussing about responsibilities of generators and segregation at source and their experiences. Next was Ms. Geeta Bhargav. Ms. Bhargava discussed about the initiative undertaken by Defence Colony RWA, New Delhi. They have door to door collection system and then segregation is done of dry and wet organic waste so as to decompose it and sustainably utilize the products obtained from the waste locally processed. Next, Ms. Usha Srinivasan talked about the environmental education scenarios in India, focused on the present condition and the practices through students in schools and communities in 11 states and 3 union territories. Last speaker of this session, Mr. Shashi Bhushan Pandit in his discussion talked about the recognition and acknowledgement of rag pickers and waste collectors as an enabled individual in Indian waste management system.

Batch 7: Technical session begins with Mr. Pawan Aggarwal discussing about the PPP in solid waste management. He talked about the De-centralized Biomethanation at Nisargruna & Containerized Plant. He mainly focused on solution for small quantity waste. His discussion was focused on Baroda Nisargruna Biogas Plant and Nisargruna Biogas Plant. Next Dr Lakshmi Raghupati discussed about responsibilities of generators and segregation at source and their experiences. Next, Mr Nagendra from Teri discussed about the solid waste management practice which are being used right now and problems associated with existing models. In his talk his main focus was on the TERI's Enhanced Acidification & Methanation (TEAM) Process. Next, Mr. Abhijit Banerjee and Mr. Vaibhav , explained about the decentralized C&D waste management and recycling. He talked about developmental alternatives for C&D waste management.

Batch 8: The technical session begins with Mr. Devendra singh discussing about the centralized system of municipal solid waste treatment and processing plant. He also discussed about the Centralized MSW Treatment at Ahmadabad Compost Plant of 300 TPD and Centralized MSW Compost Plant at Mauritius of 600 TPD. Next, Dr Lakshmi Raghupati discussed about responsibilities of generators and segregation at

source and their experiences and Not in my back yard-Issues and Challenges. Next, Mr Nagendra from Teri discussed about the solid waste management practice which are being used right now and problems associated with existing models. In his talk his main focus was on the TERI's Enhanced Acidification & Methanation (TEAM) Process. Next Mr Punit Babbar from IL&FS discussed about about the waste to Energy plant. He explains the working mode and how beneficial it is. He also explains how plant is beneficial for clean energy and how waste segregation is done efficiently.

Batch 9: The technical session begins with Dr. K.Vijyalakshmi discussing about construction and demolition waste at a smaller scale. They talked about developmental alternatives for C&D waste management. Next, Mr Nagendra from Teri discussed about the solid waste management practice which are being used right now and problems associated with existing models. In his talk his main focus was on the TERI's Enhanced Acidification & Methanation (TEAM) Process. Next Ms. Rozita talked about her company Daily Dump and the products they make to prepare compost at home without any smell related issues or messy procedures.

Batch 10: The technical session begins with Dr.S.k. Sivakumar discussing about the Solid Waste generation in top five cities in India (Kolkata ,Hyderabad, Chennai, Mumbai, Delhi) and the challenges going to be faced in next decades. He also discussed the existing practices in solid waste disposal process and its problems. Next Mr Nagendra from Teri discussed about the solid waste management practice which are being used right now and problems associated with existing models. In his talk his main focus was on the TERI's Enhanced Acidification & Methanation (TEAM) Process. Next, Mr Pawan Agarwal Mr. Pawan Aggarwal discussing about the PPP in solid waste management. He talked about the De-centralized Biomethanation at Nisargruna & Containerized Plant. He mainly focused on solution for small quantity waste. Next, , Dr Lakshmi Raghupati discussed about responsibilities of generators and segregation at source and their experiences and Not in my back yard-Issues and Challenges.

Batch 11: The technical session begins with Mr Nagendra from Teri discussing about the solid waste management practice which are being used right now and problems associated with existing models. In his talk his main focus was on the TERI's Enhanced Acidification & Methanation (TEAM) Process. Next, Mr Pawan Agarwal discussing about the PPP in solid waste management. He talked about the De-centralized Biomethanation at Nisargruna & Containerized Plant. Next, Dr Lakshmi Raghupati discussed about responsibilities of generators and segregation at source and their experiences and Not in my back yard-Issues and Challenges and E- waste management.

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Batch 12: The technical session begins with Mr. Devendra Singh discussed about the centralized system of municipal solid waste treatment and processing plant. He also discussed about the Centralized MSW Treatment at Ahmadabad Compost Plant of 300 TPD and Centralized MSW Compost Plant at Mauritius of 600 TPD. . Next Mr Nagendra from Teri discussed about the solid waste management practice which are being used right now and problems associated with existing models. In his talk his main focus was on the TERI's Enhanced Acidification & Methanation (TEAM) Process. Next, Mr Pawan Agarwal discussing about the PPP in solid waste management. He talked about the De-centralized Biomethanation at Nisargruna & Containerized Plant. Next, Dr Lakshmi Raghupati discussed about responsibilities of generators and segregation at source and their experiences and Not in my back yard- Issues and Challenges and E- waste management.

Technical Session 2

Batch 1: Mr. Debashish Tripathy, Vice President in Resource Conservation & Strategy at IL&FS Environmental Infrastructure Services Ltd., presented his thoughts on what happens to the Environment due to open dumping and how it can be eradicated. He focused on *management of Construction & Demolition (C&D) waste* at 2 different plants in Delhi, one at Burari and another one at Shastri Park. Further, this session also incorporated a different technology called Bio-box^{XTM} for processing organic waste. *Mr. Sandeep Garg*, Co-Founder and Director of Green Brick Eco Solutions, dialogued regarding the mechanism & economic viability of Bio-box^{XTM}.

Batch 2: Technical session 2 started with the presentation by *Ms. Priyanka Gupta* from *Green Bricks Eco Solutions Pvt. Ltd.* She talked about containerized Biomethanation with case study of Jaipur Railway Station plant. Next presentation was from *Mr. Kousal Yadav, Ramky*. The presentation was on Integrated Solid Waste Management system at Narela Bhawana. After this, *Mr. Arghya Mandal* from *Gulmeher* showed the delegates a video of the work they are doing at Gulmeher. The video talked about total number of employees at Gulmeher, why women like working at this workshop, how it has benefited their lives and their families and what were the obstructions they faced while working at the landfill sites and how the situation has changed as they started working at Gulmeher. The next presentation in this session was given by *Mr. Saurav Bardhan, Green Bandhu*. The presentation was about waste collection and composting of the same. The last presentation of this session was given by *Mr. D.C. Pant, Fellow, TERI*. In his talk, he started by asking the participants that since they have seen the Gymkhana plant as well as other technologies and understood their working; they should be in a position to decide which technology can be applied at their respective corporations.

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Batch 3: Technical session of this batch started with the presentation of Ms. Rozita Singh. She talked about her company Daily Dump and the products they make to prepare compost at home without any smell related issues or messy procedures. Following this, Mr. Abhishek talked about their company Clean India Ventures and the biomass pellets they make. It is a PPP model and is partnered with PUSA. And lastly, Mr. S.R. Dixit talked about how source segregation is extremely important and door to door collection of waste in segregated form is further more important as it would prevent addition of toxics in manure.

Batch 4: Dr. Shyamala Mani explained about the Issues, Challenges and Opportunities in Solid Waste Management. Her talk focused on urban waste management which includes different treatment techniques and processes to produce valuable output from waste. Following this, Mr. Vaibhav Rathi explained about the decentralised Construction and Demolition waste management and recycling. He talked about developmental alternatives for C&D waste management. In the next presentation, Mr. Pawan Aggarwal talked about the De-centralized Biomethanation by Nisargruna technology and Containerized Biomethanation Plant. He mainly focused on solution for medium quantity of wet waste like one to 5 tons per day. Last presentation in this session was by Prof. R.J. Masilamani. He talked about business models and explained to the participants about financial and economic part of any management plan. He talked about how profit has to be sustained and creating wealth from waste is a very attractive proposition.

Batch 5: Mr. Amit Sharma started this session with explanation of the functioning of Jindal's Timarpur, Okhla Waste-To-Energy Plant. This site visit includes, the procedures involved in Integrated Solid Waste Management (ISWM), load factor & quantity of waste processed per day, quantity of power generated, mechanisms for monitoring air pollution and economic feasibility of the plant. He explained how the plant works, amount of waste they get every day, various equipment they use and their functioning. After this, Dr. S.S. Khanna discussed the Highlights of the recommendations of Inter-Ministerial Task Force on Integrated Plant Nutrient Management using City Compost. He also talked about the solid waste management modern techniques and practices which are being practiced or followed in India and the issues and challenges associated with the same. Last speaker of this session was Prof. R.J. Masilamani. He talked about business models and explained to the participants about financial and economic part of any management plan. He talked about how profit has to be sustained and creating wealth from waste is a very attractive proposition.

Batch 6: Technical session 2 started with Mr. Nagendra Kumar discussing about the solid waste management practices which are being used right now and problems associated with existing models. In his talk his main focus was on the TERI's Enhanced Acidification & Methanation (TEAM) Process. Next, Mr. Devendra Singh

discussed about the centralized system of municipal solid waste treatment and processing plant at Ahmedabad and other locations. Last speaker of this session, Mr. Pawan Aggarwal talked about the De-centralized Biomethanation at Nisargruna & Containerized Plant. He mainly focused on solution for medium quantities of waste.

Batch 7: Technical session 2 started with Dr Shyamala Mani discussing about PPPP model in solid waste management and Economics about solid waste management. Next Dr khanna explained about the recommendations of Inter-Ministerial Task Force on Integrated Plant Nutrient Management using City Compost. He also talked about the solid waste management modern techniques and practices which are being practiced or followed in India and the issues and challenges associated with the same. Next, Ms. Rozita talked about her company Daily Dump and the products they make to prepare compost at home without any smell related issues or messy procedures.

Batch 8: Technical session 2 started with assisted Quiz sessions. Next Dr Shyamala Mani discussing about PPPP model in solid waste management and Economics about solid waste management. Next Mr Pawan talked about the De-centralized Biomethanation at Nisargruna & Containerized Plant. He mainly focused on solution for small quantity waste. His discussion was focused on Baroda Nisargruna Biogas Plant and Nisargruna Biogas Plant at Tihar Jail. Next, Ms. Rozita talked about her company Daily Dump and the products they make to prepare compost at home without any smell related issues or messy procedures.

Batch 9: Technical session 2 started with Mr Anurag Prakash and Ms Aparna gupta discussing assisted Quiz sessions and Final Quiz Session. Next Dr Shyamala Mani discussing about PPPP model in solid waste management and Economics about solid waste management.

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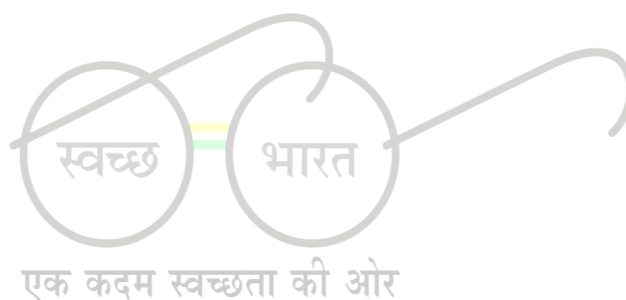
Batch 12: Technical session 2 started with Mr Anurag Prakash and Ms Aparna gupta discussing assisted Quiz sessions and Final Quiz Session. Next Dr Shyamala Mani discussing about PPPP model in solid waste management and Economics about solid waste management.

Technical Session 3

Batch 1: This part of the conference was chaired by Dr. Shyamala Mani, a Professor at NIUA & an expert in SWM field for more than 25 years. Further, this conference was preceded, initially with the discussions and knowledge sharing of Dr. Iqbal Malik, a Founder & Executive Director at Vatavaran NGO. She launched her NGO in 1994, with a team of 10 rag pickers, who were trained for door to door collection of garbage. Ms. Gurpreet Kaur and Mr. Kousal Yadav were also a part of this technical session and talked about ACT and Ramky's Waste Management Facility at Narela Bhawana respectively. Further, this session also involved the views and experiences faced by a famous journalist, Mr. Ranjit Devraj. He specifically talked about the problems being faced by the people of Sukhdev Vihar due to burying of SW at Okhla power plant. Lastly, this technical session was dealt by Mr. D.C. Pant, a fellow at TERI, who deliberated on Biomethanation of Hotel and Canteen Waste.

Batch 3 to 12: Prof. Masilamani talked about business models and explain to the participants about financial and economic part of any management plan. He talked about how profit has to be sustained and creating wealth from waste is a very attractive proposition.

All technical sessions 3 included the group activities that the participants had to participate in and make presentations. All groups comprising 3-6 persons each were first asked to present the challenges they face regarding Municipal Solid Waste Management in their cities and thereafter they had to prepare plans and proposals for a pilot project with all financial details as to how they would solve some of the issues that they cited in their earlier presentation. This was a huge success since most of the participants were enthused by these activities and presented well and won prizes.



Field Visits

Ghazipur Landfill site

The site was shown to the participants by Mr. Bijendra Raghav, Project Manager at the GAIL pilot project at Ghazipur Landfill site and Mr. Lalit. The delegates at this exposure visit were able to comprehend the collection, refining and application of the Landfill Gas (LFG). In addition to this, the plant also demonstrated the need and feasibility of such plants in an urban landscape. The main concerns expressed by the participants during this visit usually are how the waste is being used, cost to set up and maintain the entire project. Participants also inquired about the total area and height of the landfill site, how much waste is treated per day, total waste at the landfill site, how much of the total area has been capped, what is done with the gases produced and how are they stored, is the gas turbine self sustained, total plant cost, process of capping, how much RDF is produced and how does a Biobox function.

Ghazipur Waste to Energy plant

The participants at this visit were mainly interested to know how the collection of waste is done & how Refuse Derived Fuels (RDF) is made. Their questions were mainly related to the capacity of energy generation at the plant and the economic viability of this project. At this site, they were equally curious to know as to what are the mechanisms involved for waste incineration for electricity production from RDF and fundamentals of Leachate Treatment Plant (LTP). This visit therefore, fulfilled the purpose to understand the complete utilization of waste to energy (through RDF production) and waste water treatment systems incorporated at this plant.

Gulmeher Recycling Centre

This site was shown to the first batch participants by Mr. Anurag Kashyap, the CSR Sustainability Incharge of IL&FS, at Gulmeher on May 3rd, which was Gulmeher's foundation day. For batches 2 to 6, the plant was shown to the participants by one of the managers or senior workers present at the plant at that time. The delegates were mainly encouraged to know of the products made by the centre and the positive impact of Gulmeher Livelihood Centre on the local community. This exposure visit thus enabled them to understand the significance of CSR initiatives and draw a framework required to manufacture different products at a local community like this. It also made them aware about the necessity to provide alternative livelihood to waste collectors displaced by projects like Waste to Energy by incineration plants, where recyclables in waste are often burnt and become unavailable to waste collectors for recycling.

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Chintan Material Recovery Facility, Bhopura

At this exposure visit, participants were enthused to see the multifaceted advantages of a Materials Recovery Facility which can supply material to recycling centres as well as define roles and responsibilities of different organizations collaborating for recycling, informal doorstep collection, training and reorganization of the garbage collectors in our society, increase the value of composting and provide a venue for recycling of PET bottles etc. This visit was coordinated by Richa and Vishal (Managers- a voice for Waste Management Program, at Chintan). The major concerns expressed by the participants here were how the compost was being made, what is the duration of the process, how is the segregation being done and what all facilities need to be provided to the waste collectors and segregators. Different products made from waste by the waste segregators were shown to the participants.

C&D Waste Recycling Plant, Shastri Park

This exposure site visit was shown to the participants by *Mr. Sandeep Malhotra, Manager at Shastri Nagar C&D plant*. Here, delegates were eager to know of the various innovations and processes involved for treating inert materials such as construction and demolition waste (C&D waste) generated in the urban landscape. They were enthusiastic to know whether soil and sand, obtained during C&D waste recycling, can be separated or not, if so, then what were the processes involved to accomplish it, as the methods applied to prevent dust and noise pollution. They also enquired about the various other challenges faced by the plant.

C&D Waste Recycling Facility, Burari

Batch 8 and 12 were taken to C&D waste recycling facility at Burari rather than Shastri Park as Shastri Park facility was under maintenance at that time. Here Mr. Anurag Kumar explained the participants about the plant. Here, they wanted to know the various innovations & processes involved for treating inert materials such as C&D waste generated in the urban landscape. They were enthusiastic to know whether soil & sand, obtained during C&D waste recycling, can be separated or not, if so, then what were the ideas & procedures involved to accomplish it, as the methods applied to prevent dust & noise pollution & various other challenges faced by the plant.

Bulk Wet Waste Generator, Miranda House

The plant at Miranda House was shown by *Mr. Saurav Bardhan from GreenBandhu, Dr. Pratibha Jolly, Principal and Bani Roy, Professor, Miranda House*. The plant has been set up in this college to create awareness amongst college students. The plant uses hybrid rapid composting technology in which 200 Kg of waste is processed daily. Dr.(Mrs.) Bani Roy, Professor, Miranda House showed the composting and waste recycling plant to the participants. Participants enquired about the cost of final products, how much water is being used to recycle paper, how many times per day

waste is collected, how much man power is required to run this plant and installation and maintenance costs.

IIT Delhi

Batch 1 was taken to IIT Delhi. This exposure visit brought the practical observations and evidences to the participants, related to Biomethanation for sustainable waste management. This visit was introduced to the accompanied delegate by Mr. Dhruv, Manager at the plant. The purpose of this visit therefore, served in comprehending the overall processes involved and economic necessity for launching or using such models, at a larger and smaller scales.

Nisarguna and paper recycling plant at Delhi Secretariat

Batch 6: It is one of the de-centralized Biomethanation Plant Nisarguna in which the technology was introduced by BARC. Ms. Astha explained about the 1 TPD (Kitchen waste based) Nisarguna biogas plant at Delhi Secretariat which processes waste from the Secretariat kitchen which is canteen food waste and kitchen vegetable waste. The paper recycling plant at Delhi secretariat is one of the best practices recommended to reuse the discarded papers and recycle it.

Composting plant and SLF & Leachate treatment at Narela Bhawana

Batch 6 to 12: Narela bawana plant is a plant of Ramky group with all the treatment facilities of solid waste management and sanitary landfill and also the leachate treatment facility within the same campus for processing.

Participants wanted to know about the quantity of waste processed every day, the output received from different processing units, proportion of the rejects to Landfill site, process adopted for composting and its ability to produce Refuse Derived Fuels (RDF), in order to reduce the rejects.

Door to Door Waste Collection System, Vasant Vihar/Defence Colony

Batch 1, 4 and 6 were taken to Defence Colony. This exposure visit was explained to the participants by *Mrs. Shammi Talwar (member of RWA in Defence Colony) & Mrs. Geeta Bhargava (Secretary of RWA in Defence Colony)*. The participants here were keen to know the time required to process the waste, number of workers employed & responsibility of RWA and citizens in the process, number and dimensions of compost pits and number of households for the processing of wet waste.

Batch 2, 3, 5 and 7 to 12 were taken to Vasant Vihar to show door to door waste collection system. The collection system, composting area as well as their STP plant was shown to the delegates by *Mr. Suresh Goel, RWA President*. Delegates showed keen interest in this system and were curious to know if the segregation begins from

households or *dhalavs*, how much does the manure cost, by what procedure is the manure made, how many waste collectors are involved and from how many households is the waste collected. Quality of manure also became a hot topic of discussion during this visit.

GPRA, New Motibagh

Ravi Mishra, Manager at Green Planet enabled participants at this site to understand the need and significance of decentralized waste management. At this exposure site visit, the delegates were mainly concerned about different kinds and amount of waste they are processing, the mechanism and importance of collection and segregation of waste, the products obtained from organic and green wastes and the procedures they follow to treat plastic wastes. During the visit to STP of this site, participants were interested to know how much water is this plant is treated per day and where is the treated water being used. The major concerns came out to be that how much compost is being produced, how much time does it take for compost to be ready, how much waste is being collected every day, capacity of RDF production unit, production cost and capacity of the plant. Almost all participants were impressed with the plant for converting waste plastics to fuel and felt that it could be used more economically if more waste could be processed at site.

Delhi Gymkhana, TEAM Technology

The participants from batch 2 to 12 were taken to Gymkhana to make them understand TERI's new technology called the "TEAM" technology. The participants showed great interest and asked questions about how the waste is brought to the site, the process of waste feeding into the tanks and also the total cost of the technology. Questions like capacity of the plant, processing time, why floating dome type biogas holder has been installed, production cost of the plant and total cost and area needed to set up such plants. Participants saw a compact model for efficient waste management which uses traditional knowledge in a modernized way.

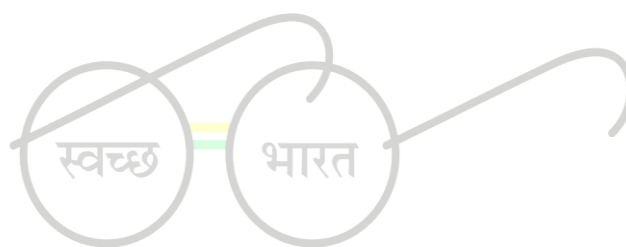
IL&FS Compost Plant, Okhla

This particular exposure location was comprehensively put together to participants by Mr. Anil Gupta, Manager at Okhla compost plant. He gave insights of the Public Private Partnership (PPP) model, which works in association with MCD & IL&FS. The participants asked various questions related to the preparation of the compost and its quality. The participants learnt and understood each and every step of compost production. Participants also inquired about how much is being received per day, what is the capacity of the plant, capacity of vehicles, do they use different cars for different kind of waste, how much RDF is collected and how is it dealt with. Participants learned the full functioning and production of compost from raw waste and how to manage such a large scale plant.

Jindal Waste to Energy Plant, Okhla

The functioning of this site visit was elaborated and introduced to the participants by Mr. Virat Chaudhary, Assistant Manager of the plant. At this plant, the participants' main apprehension was: the procedures involved in Integrated Solid Waste Management (ISWM), load factor and quantity of waste processed per day, quantity of power generated, mechanisms for monitoring air pollution and economic feasibility of the plant.

At the Okhla Waste to Energy plant the participants saw how mixed waste can be used to generate energy. The Jindal plant is able to generate about 2000 Tons of waste daily. The participants showed keen interest and were willing to open up such a waste management facility at their respective corporations.

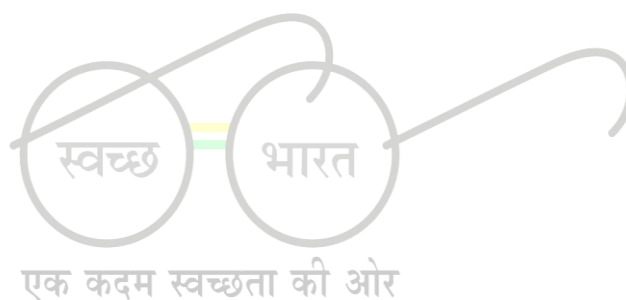


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Group Activities

Group Activity 1: Under this activity batches 1 to 12, participants were divided into multiple groups, each group consisting of 3-6 members and were asked to mention the challenges and issues that are faced by their cities related to solid waste management and then propose probable solutions. Problems like land unavailability, lack of processing and segregation, no waste composting plants, open drainage, lack of public participation, lack of funding, willingness is less and objection is more, no source segregation is there.

Group Activity 2: Batches 1-12 were divided into multiple groups for this activity as well. Under this activity, participants came up with hypothetical models for solid waste management in their cities/localities/areas etc. They were judged on the basis of the presentation they gave, financial accuracy and how viable the project seemed.



Annexure 2

Photos of Workshops (Batch 1 to Batch 12)

Inauguration



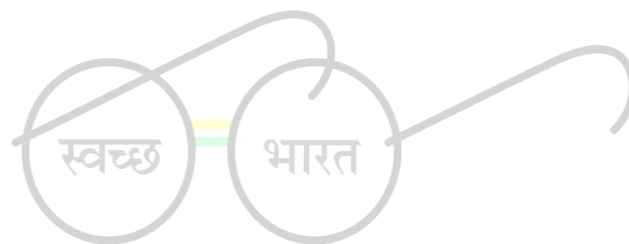
Photo 1: Workshop Inauguration

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Key Note Address



Photo 2: Key note speakers



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Panel Discussion

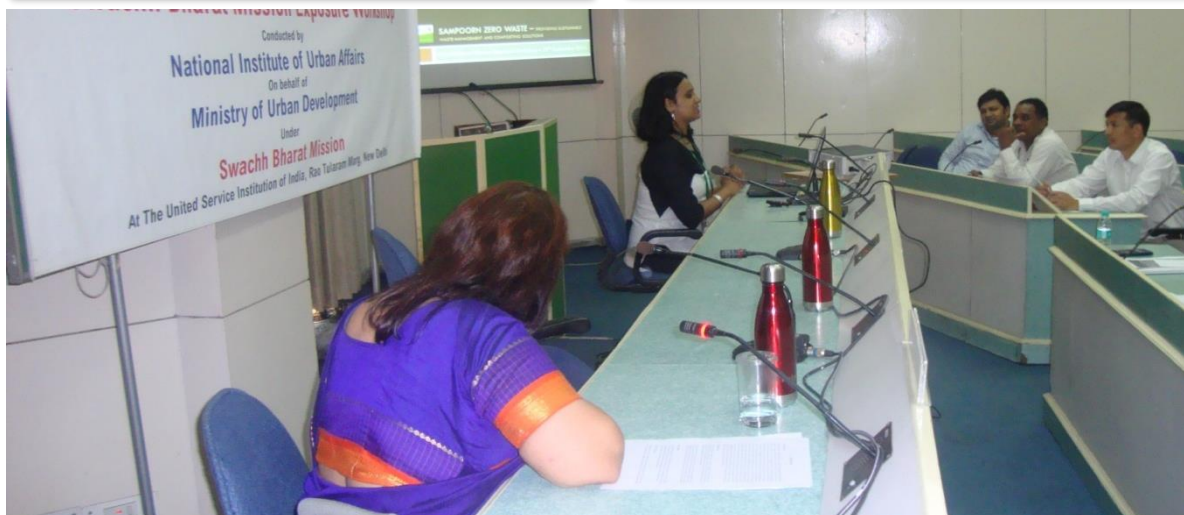
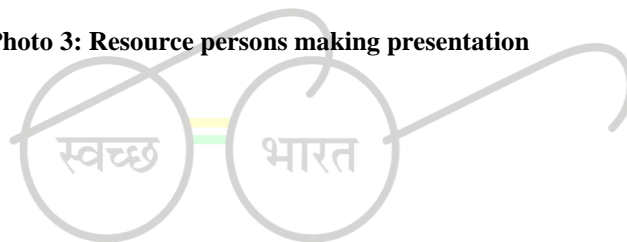


Photo 3: Resource persons making presentation

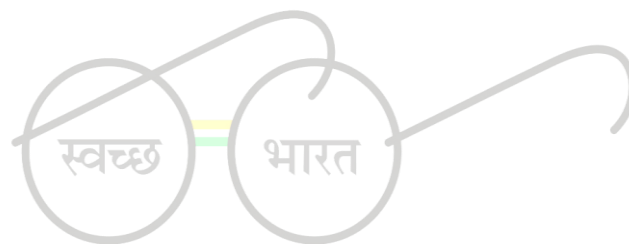


एक कदम स्वच्छता की ओर

Technical Session 1



Photo 4: Presentations for participants for different batches

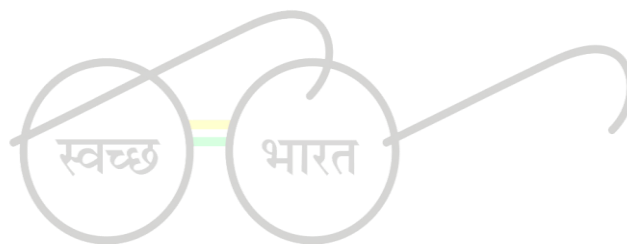


एक कदम स्वच्छता की ओर

Technical Session 2



Photo 5: Presentations in technical session 2 for different batches

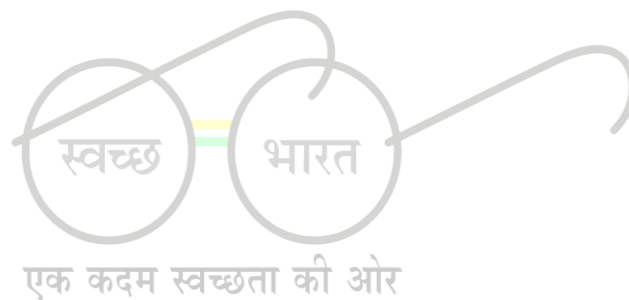


एक कदम स्वच्छता की ओर

Technical Session 3



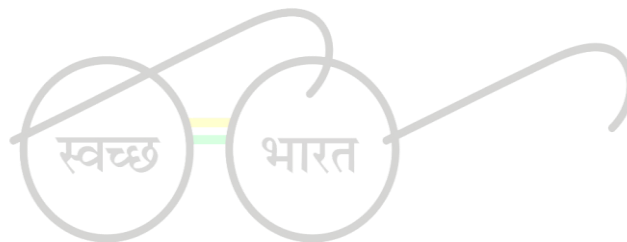
Photo 6: Presentations for participants of different batches and participants doing group activities



Ghazipur Landfill site (Site visit)



Photo 7: Participants at Ghazipur landfill site



एक कदम स्वच्छता की ओर

Ghaziipur Waste to Energy plant (Site Visit)

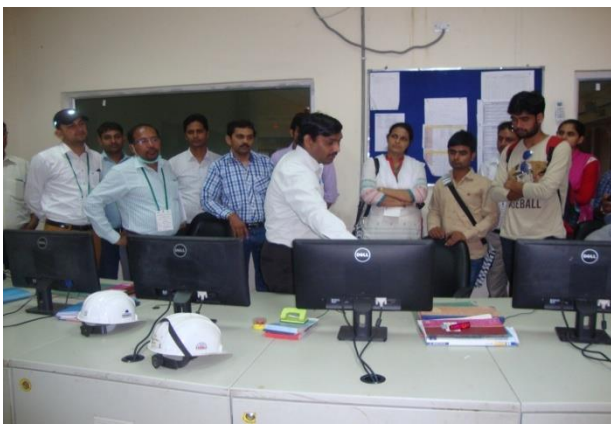
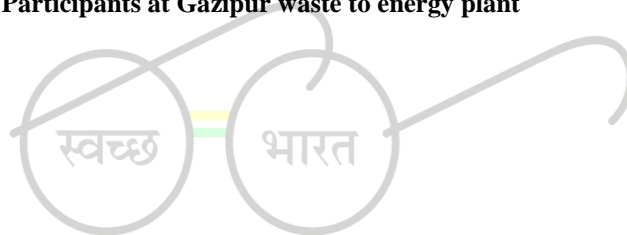


Photo 8: Participants at Gazipur waste to energy plant



एक कदम स्वच्छता की ओर

Gulmeher (Site Visit)



Photo 9: Participants at Gulmeher-CSR Livelihood Centre.



एक कदम स्वच्छता की ओर

Material Recovery Facility, Bhopura



Photo 10: Participants at Chintan Material Recovery Facility



एक कदम स्वच्छता की ओर

Construction and Demolition Waste Recycling Plant, Shastri Park



Photo 11: Participants at C&D Waste Recycling Plant



एक कदम स्वच्छता की ओर

Bulk Wet Waste Generator, Delhi University

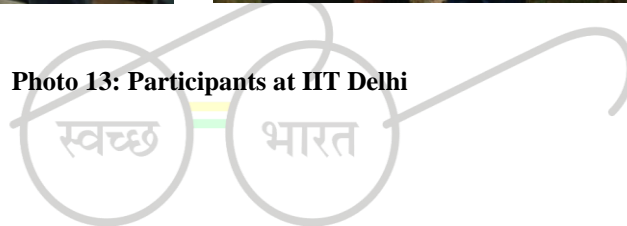


Photo 12: Participants at Miranda house

IIT Delhi



Photo 13: Participants at IIT Delhi



एक कदम स्वच्छता की ओर

Nisarga Runa and Paper Recycling, Delhi Secretariat



Photo 14: Participants at Nisarga Runa and Paper Recycling Plant

Integrated Waste Treatment Plant at Narela Bhawana



Photo 15: Participants at Ramky's integrated waste treatment plant



एक कदम स्वच्छता की ओर

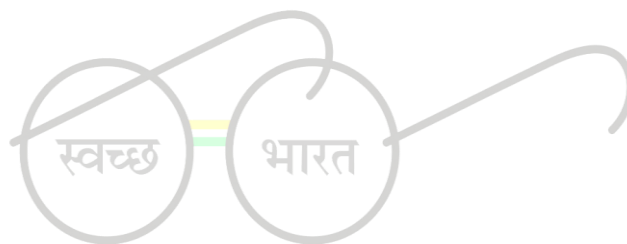
Door to Door Waste Collection System, Defence Colony/ Vasant Vihar



Vasant Vihar

Defence Colony

Photo 16: Participants at Vasant Vihar and at Defence colony, Door to Door waste collection system

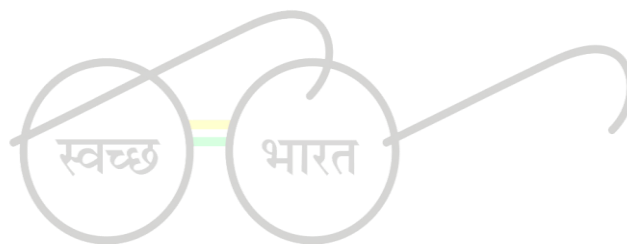


एक कदम स्वच्छता की ओर

GPRA, New Motibagh



Photo 17: Participants at GPRA, New Motibagh

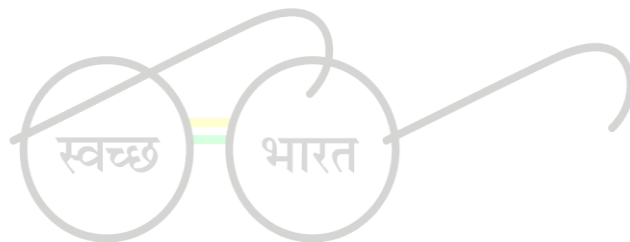


एक कदम स्वच्छता की ओर

TEAM Technology, Gymkhana club



Photo 18: Participants at Gymkhana TEAM technology plant



एक कदम स्वच्छता की ओर

Jindal Waste to Energy plant, Okhla



Photo 19: Participants at Okhla WTE plant

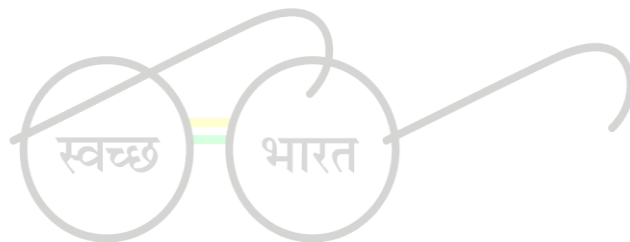


एक कदम स्वच्छता की ओर

Okhla Compost Plant



Photo 20: Participants at Okhla Compost plant



एक कदम स्वच्छता की ओर

C&D Waste Recycling, Burari

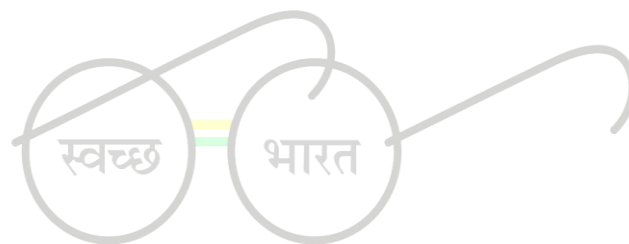


Photo 21: Participants at C&D recycling facility, Burari

Containerized Biomethnation, DMRC



Photo 22: Participants at containerized biomethanation plant at DMRC

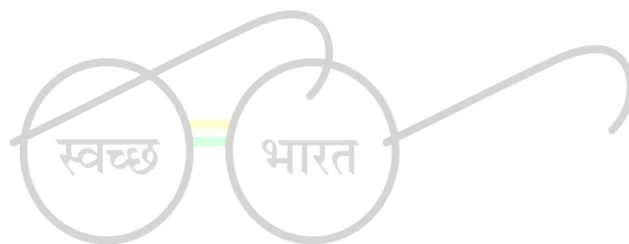


एक कदम स्वच्छता की ओर

Decentralized community based composting and Door to Door waste collection system, Gurgaon DLF
phase 1 and 4



Photo 23: Participants at decentralized community based composting unit at Gurgaon



एक कदम स्वच्छता की ओर

National Institute of Urban Affairs

Annexure 3

Table 3: List of Participants
Swachh Bharat Mission Exposure Workshop Participant List (Batch I-XII)

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89	Vandana Nitin		Damoh Municipality	Madhya Pradesh	Damoh	9303183600	
90	Usha Vivek		Damoh Municipality	Madhya Pradesh	Damoh	9300927936	
91	Naveeta Amit		Damoh Municipality	Madhya Pradesh	Damoh	9893222809	
92	Kirshna Raj		Damoh Municipality	Madhya Pradesh	Damoh	9826620330	

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95	Mr Harendra Singh Thakur	Health Officer	Municipal Corporation Dewas	Madhya Pradesh	Dewas	7024154028/ 9479401851	NA
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122	Shankar Krishna Mudhe	Assistant Engineer	Municipal Corporation Of Greater Mumbai	Maharashtra	Mumbai	9167871696	shankar_mudhe@rediffmail.com
123	Parshuram N Kurhade	Assistant Engineer	Municipal Corporation Of Greater Mumbai	Maharashtra	Mumbai		
124	Mr. Sunil M Vhatkar	Assistant Engineer	Municipal Corporation Of Greater Mumbai {S-ward}	Maharashtra	Mumbai	9004445240	aeswm.rs@mcgm.gov.in
125	Mr.Subhash Machre	Regional Officer	Pimpri Municipal Corporation {A-Zone}	Maharashtra	Pimpri	9922501911	s.machare@pcmindia.gov.in
126	Mr. B.B Kamble saha	Health Officer	Pimpri Municipal	Maharashtra	Pimpri	9922501869	bb.kamble@pcmindia.gov.in

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S.N o.	Name	Designation	Corporation	State	City	Mob. No.	Email ID
			Corporation {B-Zone}				
127	Mr.Khose Chandrakant Shivaji	Asst. Commissioner	Pimpri Chinchwad Municipal Corporation	Maharashtra	Pimpri	7722074333	c.khose@pcmcindia.gov.in
128	Mr. Shirke Dhakoji Jagannath	Assistant Health Officer	Pimpri Chinchwad Municipal Corporation	Maharashtra	Pimpri	9922501876	dj.shirke@gmail.com
129	Rameshwar Balkrishna Mohadikar	Deputy Engineer	Pimpri Chinchwad Municipal Corporation	Maharashtra	Pimpri Chinchwad	9922501697	r.mohadikar@pcmcindia.gov.in
130	Manoj Lonkar	Assistant Commissioner	Pimpri Chinchwad Municipal Corporation	Maharashtra	Pimpri Chinchwad	9922501288	m.lonkar@pcmcindia.gov.in
131	T. H Date	Assistant Health Officer	Pimpri Chinchwad Municipal Corporation	Maharashtra	Pimpri Chinchwad	9922501439	tomaridate@gmail.com
132	Mr. Sukdeo Chatrulal Darveshi	Asst. Municipal Commissioner	Vasai Virar City Municipal Corporation	Maharashtra	Vasai	9823433381	vasaiviracorporation@yahoo.com
133	Mr. Lightfullson Snaitang	Assistant Engineer	Urban Affairs, Baghmara, Meghalaya	Meghalaya	Baghmara	8014450541	lightfulsnaitang@gmail.com
134	Rynsan Pde	Sanitary Inspector	Jowai Municipal Board	Meghalaya	Jowai	9612395177	amselandu@gmail.com
135	Mr. B. M. Rani	Assistant Engineer	Shillong Municipal Board, Meghalaya	Meghalaya	Shillong	9863062837	budondrorani@gmail.com
136	Mr. Andrew Umdor	SI	Shillong Municipal Board, Meghalaya	Meghalaya	Shillong	9863061285	lamumdor@gmail.com
137	Mr. Denice K. Sangma	Assistant Engineer	Tura Municipal Board	Meghalaya	Tura	9615925646, 9774625504	denicekoc@gmail.com
138	Mr. Elangmiki Shullai	Assistant Urban planner	Directorate of Urban Affairs, Meghalaya	Meghalaya	Shillong	8575786161	duashillong@yahoo.com
139	Ethel Rothangpuii	Secretary	Aizawl Municipal Corporation	Mizoram	Aizawl	9436142676	ethelrtp@gmail.com
140	R Lalnuntluanga	Sanitation expert	Directorate of Urban Development & Poverty Alleviation	Mizoram	Aizawl	8729919069	tratte108@gmail.com
141	Er. Badal Ch. Bhadra	Executive Engineer	Dimapur Municipal Council, Nagaland	Nagaland	Di,apure	9436431320, 8131958607	dmceedimapur@gmail.com , t_fithu@yahoo.com
142	Mr. Vizoshito Savi	Sanitary Incharge	Kohima Municipal Council, Nagaland	Nagaland	Kohima	9089871162	vizosavi@gmail.com
143	Mr. Kilepchiba Jamir	Sanitary Incharge	Mokokchung Municipal Council, Nagaland	Nagaland	Mokokchung	9436605453	t_fithu@yahoo.com

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S.N o.	Name	Designation	Corporation	State	City	Mob. No.	Email ID
144	Parbir Kumar Khilar	Addt.EO	Puri Municipality	Odisha	Puri	9437314721	parbirkumarkhilar@yahoo.in
145	Sanjay kumar ishra	EO	Puri Municipality	Odisha	Puri	9437028122	skm1068@gmail.com
146	Dr. Basanta Kumar Mishra	Health Officer	Rourkela Municipal Corporation, Odisha	Odisha	Rourkela	9439999167	healthofficerrkl@gmail.com, rourkelamunicipality@gmail.com
147	Mr. Sahil Malhotra	Chief Sanitary Inspector	Municipal Corporation Amritsar, Punjab	Punjab	Amritsar	9988855419	csisahil01@gmail.com
148	Mr. Sarabjit Singh	Chief Sanitary Inspector	Municipal Corporation Amritsar, Punjab	Punjab	Amritsar	8568969212	sarabjit2380@gmail.com
149	Jagdeep Singh	Chief Sanitary Inspector	Amritsar Municipal Corporation	Punjab	Amritsar	8054001688	Jagdip.CSI@gmail.com
150	Mr. Davinder Singh	Sanitary inspector	Municipal Council, Baghapurana, Moga, Punjab	Punjab	Baghapurana	8283041200	eomcbpa@gmail.com
151	Mr. Sandeep Kataria	Chief Sanitary Inspector	Municipal Corporation Bathinda	Punjab	Bathinda	9876010022	sandeepkatariacsi@gmail.com
152	Mr. Gulshan Kumar	Executive Engineer, Public Health Division No.4	Chandigarh Municipal Corporation	Punjab	Chandigarh	9872511358	comm-mcc-chd@nic.in
153	Mr. Vijay Premi	S.D.E., Public Health Division No. 7	Chandigarh Municipal Corporation	Punjab	Chandigarh	9872511245	comm-mcc-chd@nic.in
154	Dr. P.S. Bhatti	Medical Officer of Health-cum-Nodal Officer, SBM(U)	Chandigarh Municipal Corporation	Punjab	Chandigarh	9915738068	dr2410psbhatti@gmail.com
155	Ashwani Kumar Soni	Assistant Professor	Punjab Agricultural University	Punjab	Jalandar	9417789138	ashwanisoni@pau.edu
156	Mr. Harpal Aujla	Sr Assistant Manager	Municipal Corporation Ludhiana	Punjab	Ludhiana	9876668200	pmidcludhiana@gmail.com
157	Dr. Charanjit Uppal	Medical Officer of Health	Municipal Corporation Ludhiana, Punjab	Punjab	Ludhiana	9780039480	mohmcl@gmail.com
158	Mr. Pankaj Upadhaya	Sr Assistant Manager	Municipal Corporation Moga	Punjab	Moga	9592663939	pankaj_delhi24@yahoo.co.in
159	Mr. Deepak Kumar	Chief Sanitary Inspector	Municipal Corporation Pathankot, Punjab	Punjab	Pathankot	9041337777	deepakcy@yahoo.com
160	Mr. Janu Chalotra	Chief Sanitary Inspector	Municipal Corporation Pathankot, Punjab	Punjab	Pathankot	9646794696	januchalotra2@gmail.com

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S.N o.	Name	Designation	Corporation	State	City	Mob. No.	Email ID
161	Rishabh Gupta	Sanitary Inspector	Municipal Corporation Patiala	Punjab	Patiala	09316055511/ 08146055511	rishabgupta555@gmail.com
162	Mr. Vikas Chaudhary	Sanitary Inspector	Municipal Council Rajpura, Punjab	Punjab	Rajpura	9872735869	vikaschaudhary3388@gmail.com
163	Mr. S.K Verma	Superintendent Engineer	Nagar Nigam Ajmer	Rajasthan	Ajmer	9414355173	
164	Ms. Dipika Gajraj	Revenue Officer (Second)	Municipal Corporation of Bikaner	Rajasthan	Bikaner	7611055728	deepika.gajraj2210@gmail.com
165	Mrs. Alka Burdak	Executive Officer	Municipal Corporation of Bikaner	Rajasthan	Bikaner	7611055726	alkaburdak@gmail.com
166	Ms. Suman Saharan	Junior Engineer	Municipal Corporation of Bikaner	Rajasthan	Bikaner	9214096555	sumansaharan1936@gmail.com
167	Ms. Geeta Yadav	Junior Engineer	Municipal Corporation of Bikaner	Rajasthan	Bikaner	9414264728	geetayadav0606@gmail.com
168	Vishu Lama	Municipal Executive Officer	Mangan Nagar panchayat	Sikkim	Mangan Nagar	9832054622	vlama@yahoo.com
169	V. Sivarama Krishnan	Sanitary Inspector	Jayankondam Municipality	Tamil Nadu	Jayankondam	9092205783	sirak113srk@gmail.com
170	C.N. Raghu Prasad	Zonal Commissioner, East Zone	Greater Hyderabad Municipal Corporation	Telangana	Hyderabad	9849905901	cnraghu.prasad@gmail.com
171	P. Saroja	Deputy Commissioner	Greater Hyderabad Municipal Corporation	Telangana	Hyderabad	9618888110	dc1.ghmc@gmail.com
172	Yashashri Kommareddy	Environmental Engineer	Greater Hyderabad Municipal Corporation	Telangana	Hyderabad	967633318	yashashri18@gmail.com
173	Mr. Srinivas Reddy	Dy.Executive Engineer	Greater Hyderabad Municipal Corporation	Telangana	Hyderabad	7032911018	luckycnu2@gmail.com
174	Mr. Aftab Hanifee	Assistant Engineer	Greater Hyderabad Municipal Corporation	Telangana	Hyderabad	7337364215	aftabhanifee@gmail.com
175	Ms. G.Nikhila	Assistant Engineer	Greater Hyderabad Municipal Corporation	Telangana	Hyderabad	7337364218	nikhila.g222@gmail.com
176	Mr. C.R. Babu	E.O.	Ramagundam Municipal Corporation	Telangana	Ramagundam		
177	Mr. S. Jagannathan Rao	Executive Engineer	Ramagundam Municipal Corporation	Telangana	Ramagundam	9491054913	

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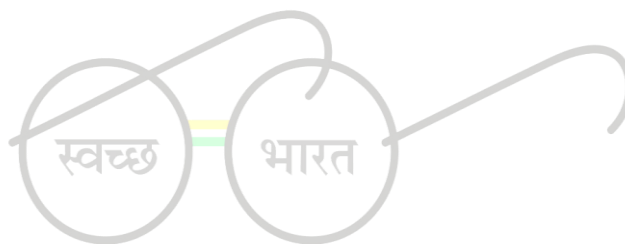
S.N o.	Name	Designation	Corporation	State	City	Mob. No.	Email ID
178	Mr. Rakesh Jagdish Rathore	Draughtsman Gr.I	Daman Municipal Council	Union Territory of Daman & Diu	Daman	9904879000	rakeshrathod.dmc@gmail.com
179	Mr. Krishan Kumar	Chief Officer	Daman Municipal Council	Union Territory of Daman & Diu	Daman	8285216185	codmc-daman-dd@nic.in
180	Mr. Chandragiri Isvar	Councillor	Daman Municipal Council	Union Territory of Daman & Diu	Daman	9898262383	
181	Mr. Suresh M. Patel	Sr. Supervisor	Daman Municipal Council	Union Territory of Daman & Diu	Daman	9879171512	
182	Mr. Tandel Anilkumar Devjibhai	President	Daman Municipal Council	Union Territory of Daman & Diu	Daman	9898666444	damantalkies_daman@yahoo.com
183	Mr. R. K. Singh	Executive Engineer	Agra Municipal Corporation	Uttar Pradesh	Agra	7300740617	ravindra.singh0211@gmail.com
184	Dr. Kuldeep	NSA	Aligarh Municipal Corporation	Uttar Pradesh	Aligarh	9411489644	kundeppkumar1962@gmail.com
185	Mr. Jitendra Kumar Gandhi	Chief Sanitary & Food Inspector	Allahabad Municipal Corporation	Uttar Pradesh	Allahabad	7408412957	jitendra.gandhi074@gmail.com
186	Mr. Rajiv Kumar Rathi	Environment Engineer	Allahabad Municipal Corporation	Uttar Pradesh	Allahabad	7408422389	rathi_rjv@yahoo.co.in
187	Mr. Uttam Kumar Verma	Environmental Engineer	Nagar Nigam Bareilly, UP	Uttar Pradesh	Bareilly	7055519614	uttamkverma1965@gmail.com
188	Mr. Ajay Ram	Assistant Engineer	Firozabad Municipal Corporation	Uttar Pradesh	Firozabad	7088118010	ajaytec78@gmail.com
189	Dr. Rakesh Babu	MOH	Jhansi Municipal Corporation	Uttar Pradesh	Jhansi	8808053864	dr.r.b.gautam@gmail.com
190	Mr. Ashok Kumar Bhati	Municipal Commissioner	Municipal Corporation of Kanpur	Uttar Pradesh	Kanpur	8601800833	bhati.moni@gmail.com
191	Mr. Pankaj bhushan	Environment Engineer	Lucknow Municipal Corporation	Uttar Pradesh	Lucknow	9415188957, 9839007409	pbgarg@yahoo.co.in
192	Mr. Ashish Pandey	Sanitary & Food Inspector	Lucknow Municipal Corporation	Uttar Pradesh	Lucknow	8004921871	lnn8004921871@gmail.com
193	Mr. Munish Kumar	Sanitary & Food Inspector	Meerut Municipal Corporation	Uttar Pradesh	Meerut	7599271299	k10872munish@gmail.com
194	Ms. Mansa Negi	Sanitary Inspector	Municipal Corporation of Roorkee	Uttarakhand	Roorkee	7088663344	mansasanu11@gmail.com
195	Mr. Mridul Kumar	Sanitary Inspector	Municipal Corporation of Roorkee	Uttarakhand	Roorkee	7300619470	kumarmridul66@gmail.com
196	Mr. Amit Kumar	Sanitary Inspector	Municipal Corporation of Roorkee	Uttarakhand	Roorkee	8650227711	amitkumarchoudhary88@gmail.com
197	Mr. Neeraj Joshi	Deputy Municipal Commission	Haldwani Municipal Corporation	Uttarakhand	Haldwani	9756206154	neeruj65@gmail.com

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S.N o.	Name	Designation	Corporation	State	City	Mob. No.	Email ID
198	Mr. Rajiv Kumar	Sanitary Inspector	Nagar Palika Manglor, Haridwar	Uttarakhand	Haridwar	8533028028, 9811258993	nppmanglor@gmail.com
199	Mr. Vikas Chhachhar	Sanitary Inspector	Municipal Corporation Kashipur	Uttarakhand	Kashipur	9837678444	vikashchhachhar@gmail.com
200	Mr. D. S. Rana	Executive Officer	Nagar palika Parishad, Mussoorie	Uttarakhand	Mussoorie	9927413788	nppmussoorie@gmail.com
201	Dr. R. K. Singh	Sr. Municipal Health Officer	Nagar palika Parishad, Mussoorie	Uttarakhand	Mussoorie	9411722009, 7536804949	rajpurusingh@gmail.com
202	Mr. Virender Singh Bist	Sanitary Inspector	Nagar palika Parishad, Mussoorie	Uttarakhand	Mussoorie	9412142646	nppmussoorie@gmail.com
203	Ms. Neetu Bohra	Member of nainital nagar palika parishad	Nainital Nagar Palika	Uttarakhand	Nainital	9720455203	neetubohra34@gmail.com
204	Mr.Rohitash Sharma	Executive Officer	Nainital Nagar Palika	Uttarakhand	Nainital	9412050815	rohitasheo@gmail.com
205	Mr. Rajesh Sah	Secretary	Nainital Hotels and Restaurants Association	Uttarakhand	Nainital		himalayanwanderer@gmail.com
206	Mr.Mahaprasad Sengupta	Chairman	Bankura Municipality	West Bengal	Bankura	9434315052	bankuramunicipality@rediffmail.com
207	Mr.Dilip Agarwalla	Vice-Chairman	Bankura Municipality	West Bengal	Bankura	9474388388	bankuramunicipality@rediffmail.com
208	Mr.Tapan Kumar Pal	Executive Officer	Bankura Municipality	West Bengal	Bankura	9475270651	bankuramunicipality@rediffmail.com
209	Mr. Subir Banerjee	Sanitary Inspector	Bankura Municipality	West Bengal	Bankura	8900335920	bankuramunicipality@rediffmail.com
210	Mrinal Kanti sarkar	Sub-Assistant Engineer	Bhatpara Municipality	West bengal	Bhatpara	8697704426	mirnalsarkar68@gmail.com
211	Suman Mistry	Sanitary Assistant	Bhatpara Municipality	West bengal	Bhatpara	7059443540	
212	Dr. Ishani Dasgupta	Medical Officer	Durgapur Municipal Corporation	West Bengal	Durgapur	9475173363	durgapurmunicipalcorporation@gmail.com
213	Mr. Sujay Kumar Banerjee	Sub Assistant Engineer	Durgapur Municipal Corporation	West Bengal	Durgapur	9434514042	durgapurmunicipalcorporation@gmail.com
214	Mr. Mrityunjoy Mahato	Sanitary Inspector	Durgapur Municipal Corporation	West Bengal	Durgapur	9732053150	durgapurmunicipalcorporation@gmail.com
215	Mr. Atanu Rudra	H.A.	Durgapur Municipal Corporation	West Bengal	Durgapur	9832250309	rudra.atanu81@gmail.com
216	Mr. Dulal Sarkar	Vice-Chairman	English Bazar Municipality	West Bengal	English Bazar	9434065422	englishbazarmunicipality@gmail.com

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S.No.	Name	Designation	Corporation	State	City	Mob. No.	Email ID
217	Mr. Sachin Saliur Zaman	Urban Planner & Nodal Officer SBM	English Bazar Municipality	West Bengal	English Bazar	9434872975, 8906166256	englishbazarmunicipality@gmail.com
218	Mr. Moley Roy	Sanitary Inspector	Kalyani Municipality	West Bengal	Kalyani	9433679009	moley@rediffmail.com
219	Mr. Sudama Ray	Chairman	Kanchrapara Municipality	West Bengal	Kanchrapara	9748882263	
220	Mr. Asoke Mandal	Member C.I.C (Sanitation)	Kanchrapara Municipality	West Bengal	Kanchrapara	8902011277	
221	Mr. Prakash Singh	Sanitary Inspector	Kanchrapara Municipality	West Bengal	Kanchrapara	9477046160	
222	Dipyendu Acharya	Sanitary Inspector	Nabadwip Municipality	West bengal	Nabadwip	8482073123	
223	Krishnandu Pal	Sanitary assistant	Nabadwip Municipality	West bengal	Nabadwip	8482073123	pkrishnendu@gmail.com
224	Mr. Ganesh Bhattacharya	S.I./F.S.O.	Siliguri Municipal Corporation	West Bengal	Siliguri	9434047757	smcwb@hotmail.com



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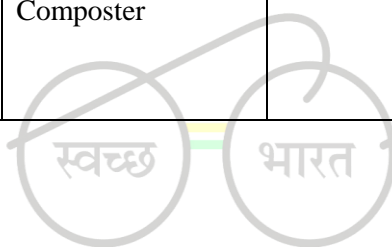
Annexure 4

Table 4: Profile of Resource Persons

S.No	Name	Designation	Organization	Type of Organization	Qualification	Specialization	Experience
1	Mr. Agarwal Pawan	Managing Director	Green Bricks Eco Solutions	Company		Solid Waste Management, Biogas	
2	Mr. Babbar Punit	Deputy Manager	IL&FS Environmental Infrastructure & Services Limited	Company	M.Tech	Environmental Engineering	10yrs
3	Mr. Bardhan Saurav	Co-Founder	Green Bandhu	Company	M.S	Electrical Engineer &MSW	10 yrs
4	Mr. Banerjee Abhijit		GIZ	Company	Ph.D	Environmental Policy	4yrs
5	Mr. Bhushan Shashi	President	AIKMM	NGO	Graduate	–	12yrs
6	Ms. Chaturvedi Richa	Manager	Chintan	NGO	LLB & SWM	Law Researcher &SWM expert	7yrs
7	Mr. Dixit S.R.	President	Jan Sewa Ashram	NGO		Waste Management	25yrs
8	Mr. Garg Sandeep	Specialist auditor	Green Bricks Eco Solutions	Company	B.Tech	Waste Water and Solid Waste Management	3yrs
9	Mr. Goel Suresh		RWA, Vasant Kunch	RWA			
10	Ms. Gupta Priyanka	Research Associate	Green Bricks Eco Solutions	Company	M.Sc	Environmental Science	4yrs
11	Mr. Jacob Jubin		Development Aternative	NGO	M..Sc	Architecture	
12	Ms. Jindal Sanchita	Director	MoEFCC	Government	Ph.D	Environmental Engineering	29yrs
13	Ms. Kaur Gurpreet	Founder Secretary	ACT	NGO	MSc/B.ed	SWM and Social Welfare Development	25yrs

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S.No	Name	Designation	Organization	Type of Organization	Qualification	Specialization	Experience
14	Dr. Khanna S.S.	Consultant	GoI	Independent Consultant	Ph.D	Soil Sciences & Solid Waste Management	50yrs
15	Mr. Khandelwal Pradeep	Chief Engineer	EDMC	Government	M.Tech	Environmental Engineering	32 Yrs
16	Mr. Kumar Nagendra	Associate Fellow	TERI	NGO		designing and development of anaerobic bio-digestors for solid waste management	
17	Dr. Malik Iqbal	Founder, president	Vatavaran	NGO	Ph.D	S.W.M., animal welfare	22yrs
18	Dr. Mani Shyamala	Professor	NIUA	Research and Training	Ph.D	Waste Management	32 Yrs
19	Prof. Masilamani R.J.	Professor	BIMTECH	Academic	MBA	Management	30yrs
20	Ms. Mehrish Priya	Secretary	Governing Body, Regency Park 2	RWA	B.Sc	Sales, Marketing,	15yrs
21	Mr. Mishra Ravi	Engineer	Green Planet Waste management	Company	M.Tech	Environmental Engineering	3yrs
22	Ms. Nandyal Niharika	Co-founder	Sampoorn Home Composter	Company	MBA	Market research, market understanding, project conceptualization and analytical skills	
23	Ms. Nandyal Padma	Co-founder and Director	Sampoorn Home Composter	Company	M.Sc	Ecology and Environment, Public Administration	25yrs



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S.No	Name	Designation	Organization	Type of Organization	Qualification	Specialization	Experience
24	Mr. Pandey Suneel	Director, Green Growth and Resource Efficiency Division	The Energy and Resources Institute (TERI)	NGO	Ph D	municipal, industrial and hospital waste management, waste-to-energy issues, impact assessment, air, water and soil quality monitoring, site assessments, performance evaluation of ETP and institutional strengthening and capacity building	25yrs
25	Mr. Pant D.C.	Fellow	TERI	NGO	(PhD)	Bio mass to Energy	20yrs
26	Mr. Prakash	President	Sajag Society	NGO			
27	Dr. Raghupathy Lakshmi	Visiting Professor	TERI University	Academic	Ph.D	Environmental studies	30yrs
28	Dr. Sabata B.C.	Senior Scientific Officer	DoE at Govt. of NCT	Government	Ph.D	Environmental Studies	26yrs
29	Ms. Sharma Monica		Daily Dump	NGO	Graduate	Business management	10yrs
30	Mr. Singh Devendra	Manager	Excel Industries	Company	Bachelors	Management Studies	5yrs
31	Ms. Singh Rozita	Research Associate	Daily Dump	NGO	M.Sc	Sustainable development	4yrs
32	Mr. Tripathy Debashish	Engineer	IL&FS	Company	M.Tech	Environmental Engineering	32yrs
33	Prof. Vijay V.K.	Professor	IIT Delhi	Academic	Ph D	Renewable Energy	27 Yrs
34	Dr. Vijaylakshmi K.	Vice President	Development Aternative	NGO	Ph.D	Environmental Engineering	25yrs
35	Mr. Yadav Kousal	Engineer	Ramky Enviro	Company	M.Tech	-	

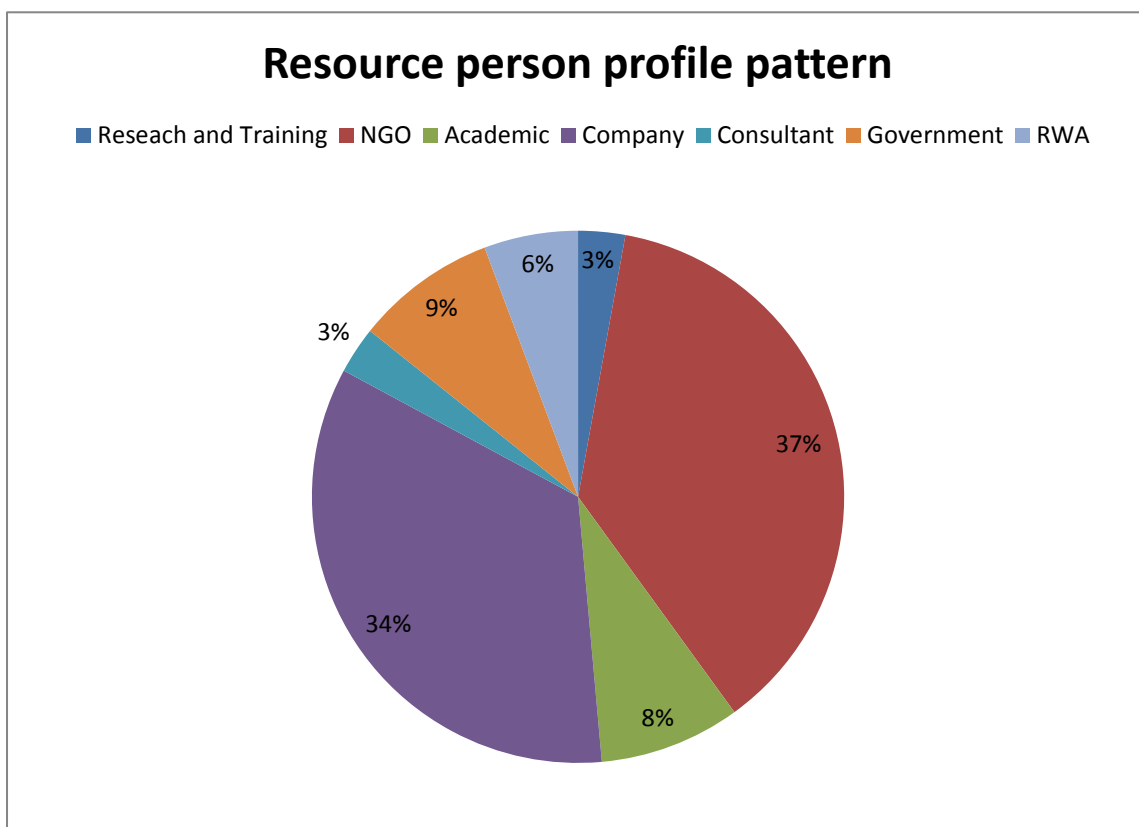
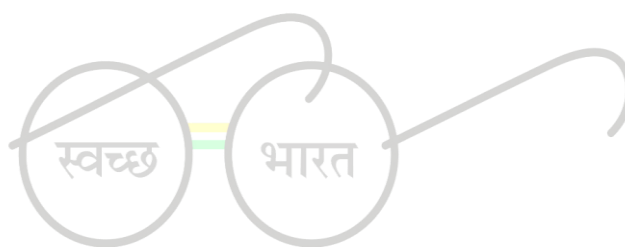


Figure 10: Profile pattern of Resource Persons by percentage



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Table 5: Professional synopsis of resource persons

Sr. No.	Name of resource person	Professional synopsis
1.	Mr. Agarwal Pawan	He is the Managing Director of GBES and Digital Utilities (DU) group of companies. He was awarded the National award for outstanding Research and Development, for the year 2002 by FICCI & DSIR. In 2009, he collaborated with M/s BiogasClean Aps Denmark for manufacturing and selling the equipment for biological scrubbing of H ₂ S from biogas for power generation, an emerging renewable energy sector. In 2014 took controlling stake in Green Bricks Eco Solutions Pvt Ltd, an IIT Delhi start up, a company into design manufacturing and supply of Bio CNG plants and decentralized waste management systems. He has collaboration with BARC for Nisargruna- a waste processing technology.
2.	Mr. Babbar Punit	He is a post-graduate (M.Tech) in Environmental Engineering, with over Eight years of experience in Government as well as Private sectors, especially in Solid Waste Management. For last 5 years, he has actively engaged in to the Waste to Energy Sector and involved in the implementation of Ghazipur Waste to Energy Project at IL&FS Environmental Infrastructure & Services Limited, Delhi. As a Deputy Manager, he is heading the Environment Department and looking in to the overall project management from the stage of conceiving till its successful commissioning at Ghazipur WTE plant. He has also Carried out specialized trainings on “Biomethanation, Upscaling, Challenges and Opportunities” at Biogas Development and training Centre (BDTC), IIT, Delhi & “Structuring and Implementation of Waste-to-Energy Projects in Municipal Solid Waste Management” at Administrative Staff College of India, Hyderabad.
3.	Mr. Bardhan Saurav	He is the founder of Green Bandhu and Co-founder/Technical Head of Earthima Technologies. A post-graduate in Electrical Engineering from University of Wisconsin-Madison, USA, Saurav, always had the passion and desire to work in the field of social work. During his decade long stay in the US, he worked with multiple organizations such as Hewlett-Packard, Wachovia Corporation and Bank of America, where he was introduced to the various aspects of corporate social responsibility of which

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Sr. No.	Name of resource person	Professional synopsis
		environment and waste management were an integral part.
4.	Mr. Banerjee Abhijit	<p>Since 2013, Abhijit has been working with GIZ-India to implement projects related to resource efficiency and pollution prevention as part of Indo-German bilateral development cooperation. In the current Resource Efficiency project, he is managing the component on construction and demolition (C&D) waste reuse. He has coordinated a nationwide baseline assessment of current practices and challenges in the C&D waste sector, and is engaged with collaboration with a range of the stakeholders in the public and private sectors to promote C&D waste utilization.</p> <p>Dr. Banerjee obtained his master's and PhD degrees in Environmental Policy from the USA, and has more than a decade of research experience in the environmental policy field.</p>
5.	Mr. Bhushan Shashi	<p>Shashi Bhushan has been involved in aspects of socio-political processes since he was 12 years old. From Bhojpur in Bihar, Shashi was associated with All India Students Association (AISA) and Indian People's Front (IPF), Bihar, in his teenage days. He led a student movement on the issue of fee hike in Bihar schools in 1991.</p> <p>He moved to Delhi in 1994 and was associated with Sajha Manch and Chintan before starting out independently on his work of mobilizing ragpickers, in 2003, to form a union for their social security and rights. The politics and economics of garbage disposal in urban India and the socio-economic condition of the millions of poor people involved in this daily process is the main arena of Shashi Bhushan's work in AIKMM.</p> <p>All India Kabadi Mazdoor Mahasangh, spearheaded by Shashi, has almost 16,000 members in Delhi and NCR (Sonapat, Faridabad, Ghaziabad, Noida, Gurgaon). He endeavours to have ragpickers and waste-collectors acknowledged and recognized as</p>

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Sr. No.	Name of resource person	Professional synopsis
		<p>enabled individuals in the Indian waste management system as opposed to them being seen as outcasts of society, at the mercy of contractors and middlemen. His long term vision is to bring dignity and protection to the ragpicker's and waste-collector's profession. Shashi is currently leading a struggle against a waste-to-energy incinerator that is being set up at the Ghazipur landfill.</p> <p>AIKMM is also a part of Alliance for Indian Waste Pickers (AIW), a network of organisations working for the informal waste sector in Delhi.</p>
6.	Ms. Chaturvedi Richa	<p>Currently Richa is the Manager at Chintan (an NGO related to Environment Research and Action Group). Her expertise lies in Advocacy and outreach Programme, the field of waste management.</p> <p>In past she was the Law Researcher to the chairperson at N.G.T (2014), and a Head-note editor in INDLAW communications Private Limited in 2009.</p> <p>Her major areas of interest lie in:-</p> <ul style="list-style-type: none"> • Waste management • Environmental Law • Human Rights etc. <p>She has done L.L.M, New Delhi in the field of Environment Law, Human Rights and criminal law.</p>
7.	Mr. Dixit S.R.	<p>He is presently, the President of Jan Sewa Ashram, Fatehpur (U.P.). He has 25 years of experience as a Rural development professional and Science Communicator, having expertise in Waste Management, Waste Paper Recycling and Low Cost Farming. He has been awarded, first Prize for Rural Development Programme, by the Departments of Youth Welfare and Social Work (Government of Uttar Pradesh). He has also written a Handbook on Vermi-composting.</p> <p>Mr. Dixit, has established 8 Waste Paper recycling units 4 solid</p>

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Sr. No.	Name of resource person	Professional synopsis
		<p>waste management plant in deferent parts of the country. He has also launched 100 vermi-culture units in Jhajjar, Haryana for different organizations, such as Indian Oil Corporation, etc. and has organized several national and international seminars and workshops with the support of Department of Science & technology communication and awareness and micro-enterprises. In addition to the above, Mr. Dixit has been the part of several projects like,</p> <ol style="list-style-type: none"> 1. Training on waste paper recycling at Andaman & Nicobar Island (2003-2004) 2. Solid waste management project at Salogara, Solan-H.P. (2003-2004) 3. Vermi-culture Training for SHG's at Jhajjar (2006-2007) 4. Development of NPK rich manure (2011-2012) 5. Communication of Eco-Wash Technology in Schools, Villages & Municipalities (2014-2015) & many more.
8.	Mr. Garg Sandeep	<p>Akzo Nobel (2 years), IITB Startup (1 year) – Sandeep had been actively involved in forming and executing the Environment, Health and Safety policies of Akzo Nobel at a facility level. He is a specialist auditor and has had active project management roles in the past. Sandeep also worked on the development and commercialization of an IIT Bombay patented waste water treatment technology. He has a Bachelor's Degree from IIT Delhi.</p>
9.	Mr. Goel Suresh	
10.	Ms. Gupta Priyanka	<p>Priyanka Gupta: Masters in Environmental Science & Resource Management from TERI (The Energy & Resources Institute) 2015 batch. Into the field of waste management from last one n half year.</p>

स्वच्छ भारत
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Sr. No.	Name of resource person	Professional synopsis
11.	Mr. Jacob Jubin	He is an Architect, graduated from School of planning and architecture, New Delhi. Having practiced Architecture for 2 years, he is currently working at Development Alternatives, and managing programs towards urban resilience and implementation of environmental friendly practices, such as waste management and sustainable housing.
12.	Ms. Jindal Sanchita	Ms Sanchita Jindal is presently Director in the Ministry of Environment, Forest and Climate Change. Educational qualification wise, she is M.Sc. (Chemistry), has done M. Tech. in Analytical Chemistry from IIT Delhi and submitted her Ph.D. in Environmental Engineering from IIT Delhi. She joined the Ministry in 1989, however before that she worked in IIT Delhi for 2 and a half years on Indoor Air Pollution. She has an work experience of 29 yrs out of which 15 yrs in the field of Management of Hazardous Chemicals & Waste and Disaster Management, about 3 yrs in Control of Air Pollution sector and then about 8 yrs in Environment Clearance to Thermal Power Plants, Industries Sector and River Valley and Hydro Power Projects. She was involved in formulation of various Environmental Rules like Manufacture, Storage and Import of Hazardous Chemicals Rules, Hazardous Waste Rules, Chemical Disaster Management rules, Hazardous Analysis, Battery Management rules, Public Liability Insurance Act and Rules, Environment Impact Assessment Notification, 2006 etc. and their implementation. Recently, she was actively involved in revising rules on Municipal Solid Waste Management, Plastic Waste, Construction and Demolition Waste, Bio-Medical Waste, Fly Ash Utilization. She has been abroad 15 times and last year she participated in ISWA- 2015 at Belgium and presented Country Paper at Round Table of Environment Decision Makers.
13.	Ms. Kaur Gurpreet	She is a social development professional with a post graduate

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Sr. No.	Name of resource person	Professional synopsis
		qualification and 25 years of experience in social development sector. She has also worked on various projects of UNICEF, World bank.
14.	Dr. Khanna S.S.	He is Ph.D from University of Illinois, U.S.A in Soil Science and Agronomy. He has served as a Professor, Assistant Professor, Associate Professor and Senior Professor at various universities. He has been Advisor Planning Commission G.O.I for 5 years. He has received several awards including Life Time Award from Society of Soil Sciences. Chairman of the Task Force on Solid Urban Wastes - Biodegradable Segment for Keeping City Clean and Field Green. He has developed technologies for rapid composting of biodegradable material of rural urban waste in collaboration with the scientists of Indian Institute of Soil Science, Bhopal-ICAR. Currently he is the Vic President of DAV organization and main selection panel of ICAR, G.O.I.
15.	Mr. Khandelwal Pradeep	Pradeep Khandelwal, having 32 years of professional experience, is presently working as Chief Engineer in East Delhi Municipal Corporation (erstwhile Municipal Corporation of Delhi). He has been associated with the organization for more than 30 years. He did his B.Tech in Civil Engg. from REC Kurukshetra in 1983 and post graduation in the field of Environmental Engg. & Science from IIT Delhi in the year 2003. He has worked in various fields like planning, monitoring, execution and management of various projects in different sectors. He has attended many technical seminars on transport sector earth quake, ready mix concrete, drainage, software technology, land filling. He has presented four papers one in Institution of India on TRAFFIC MANAGEMENT MEASURE AS A TOOL FOR ENERGY SAVINGS , two Indian Building Congress on Green Building and Tall structures one on GIS. He has been proactively involved in projects associated with

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Sr. No.	Name of resource person	Professional synopsis
		<p>development and management of urban facilities, so including solid waste management, at various capacities. Municipal Corporation of Delhi has nominated him for technical visits to Japan, Denmark, Malaysia, Singapore, Thailand, Brazil and Colombia for development of urban facilities, building Complex, Climate Change and Solid Waste Management He has also given presentations on Drainage, Solid Waste Management and C & D waste management in various seminar/workshops.</p> <p>He is also a life member of various institutions like IRC, IBC, Earthquake society of India, and Association of Structural Engineers etc.</p>
16.	Mr. Kumar Nagendra	<p>He is currently an associate fellow in Energy Environment Technology division at TERI University. His key skills lie in designing and development of anaerobic bio-digestors for solid waste management. Development of protocol and pilot plant on waste management, conducting training programmes related to solid waste management, assessment of biomass and preparation of feasibility and detailed project report for WTE project, IE assessment of WTE projects etc.</p> <p>Mr. Kumar has been closely working with state nodal agencies of Ministry of New and Renewable Energy (MNRE) from various years. He has also managed various projects on solid waste management like, setting up of 4 MW different feed stocks (cow dung and agricultural residue) based biogas power plant at Binjon, Punjab, prepared CEO Endorsement Document for UNIDO on “Organic Waste Streams for industrial renewable energy applications in India”, Installation of TEAM process plant at Navi Mumbai Municipal Corporation (NMMC), Mumbai with the capacity of 250 kg/day) etc. He is also the member of biogas Forum-India (BIGFIN).</p>
17.	Dr. Malik Iqbal	<p>She founded Vatavaran in 1994. He is a primatologist and has been working in the field of S.W.M., animal welfare and many more issues since a very long time.</p>
18.	Dr. Mani Shyamala	<p>She is a Professor, National Institute of Urban Affairs (NIUA) has an MSc. in Microbiology from Madurai Kamaraj University, M.Phil and Ph.D degrees in Environmental Science from JNU, India and an MPH from School of Public Health, University of</p>

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Sr. No.	Name of resource person	Professional synopsis
		California, Berkeley, USA. A national science talent scholar, a recipient of ICAR Fellowship in Agri. Microbiology and Fogarty Int. fellowship in Environmental Health, she has presented papers in several conferences and seminars in India and abroad. Her projects have received international recognition including the UNCHS Global 100 award for Community based waste management and Low cost sanitation in slums in Bangalore, the Platicon India award for innovative Plastics Reuse and Recycling, recognition by International Model Forest Network Canada and Regional Centres of Expertise of the UNU-IAS Japan for setting up the Regional Centre of Expertise at Kodagu (Coorg) for management of pilgrimage places.
19.	Prof. Masilamani R.J.	At present, he is the professor at Birla Institute of Management Technology (BIMTECH), Noida and CEO with over 30 year of experience in fertilizer, automobile, food and consumer electronics industry. In past he has worked in different industries mainly, the TATA group of companies, J.V's including the PepsiCo J.V. and the Timex J.V. He was the Managing Director of Timer Watches Ltd. (1991-2002). Mr. Masilamani has been a consultant to several companies in the Automobile and power sector and recently he has also joined the retail sector. He was a rank holder in IIMA and was selected for the Tata Administrative Service. Further he was also evaluated and rewarded several times, as one of the outstanding performers in Tata Engineering and Locomotive Co. Ltd (now Tata Motors). He was also the Chairperson of Precision Industry Confederation in 1998-2000 and is presently working on the project "Resolving the Oil Pricing Conundrum – balanced stakeholder perspective".
20.	Ms. Mehrish Priya	She has done her Bachelor's Degree from Welcomgroup Graduate School of Hotel Administration, Manipal. She has experience in Sales and Marketing in Hotel Industry and Advertising Agencies. Last working position in 2002 as Country Manager for Indus

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Sr. No.	Name of resource person	Professional synopsis
		Cruising & Shipping Pvt. Ltd. with whom she was responsible for setting up a catering institute to train cooks/chefs for the Cruise line Industry, as well as, for the recruitment of staff for Cruise line Companies in USA and Europe. Currently, she is serving in the position of Secretary of the Governing Body, Regency Park 2, Gurgaon, on a volunteer basis, since 2014. She has also launched the Solid Waste Segregation Programme in Regency Park 2 on February 1, 2016, which is running successfully.
21.	Mr. Mishra Ravi	He is M.tech in environmental engineering .currently working as project manager at green planet waste management Pvt. Ltd. Attended the course of design , construction and maintenance of rural roads by Rural Engineering Department UP Govt. in 2013.
22.	Ms. Nandyal Niharika	An MBA graduate; Neeharika brings in extensive experience in market research, market understanding, project conceptualization, and analytical skills. Working for about a decade in the corporate world, Neeharika decided to join her brother and mother when they proposed the idea of starting something in the area of waste management. With waste management always been a passion - practicing it at home and propagating it outside – starting something in it became an easy call! Neeharika is currently the co-founder of the waste management organization – Sampoom Zero Waste. She particularly takes care of the company’s marketing activities and conducts workshops at different societies, schools and office complexes
23.	Ms. Nandyal Padma	She has worked as a teacher for 25 years, at all levels – primary, middle and higher secondary in Delhi, Bangalore Dubai, Hyderabad. Environment was one of the subjects she taught after acquiring two masters’ degrees- one in ecology and environment and the other in public administration. She also has a post-graduate diploma in higher education. Also, she started ‘Nature Clubs’ while serving as a teacher in schools she worked in India and Dubai. Padma has propagated the cause in many ways – by building awareness, educating, writing modules at schools and college level; by working with RWAs, NGOs, residents and corporate to create a system of segregation, collection and

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Sr. No.	Name of resource person	Professional synopsis
		composting at societies. Since then she has written two books, delivered lectures in schools and colleges, conducted talk shows, written several articles and modules, and created activity groups within communities and continues to sensitize and enthuse people about environmental concerns and measures. She is currently the Co- founder and Director of Sampoom Zero Waste (a startup in the area of waste management), Gurgaon.
24.	Mr. Pandey Suneel	He is presently Director, Green Growth and Resource Efficiency Division. In addition, he is also working as Adjunct Faculty and Head for Centre for Regulatory & Policy Research of TERI University. He has more than 25 years of consultancy/ research experience in the areas of municipal, industrial and hospital waste management, waste-to-energy issues, impact assessment, air, water and soil quality monitoring, site assessments, performance evaluation of ETP and institutional strengthening and capacity building.
25.	Mr. Pant D.C.	Expertise in Wet biomass to energy conversion, resource mapping, development and Management of Technical and consultancy projects. He is a Fellow and area convenor in the Biomass Energy Technology Application (BETA) group of TERI, New Delhi, India. He has received his M.Sc. degree in Environmental Science and is on the verge of completion of his Ph.D. in the subject of biomass to energy. Mr. Pant has more than 20 years of experience in the field of research and development, policy formulation through project implementation, design and development of waste to energy (WTE) technologies, manufacturing and dissemination of anaerobic digestion technologies.
26.	Mr. Prakash	
27.	Dr. Raghupathy	She is currently a visiting professor at TERI University and an

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Sr. No.	Name of resource person	Professional synopsis
	Lakshmi	<p>Adviser to Environment and Waste Management. She was the Director, Additional Director Joint Director and Deputy Director at Ministry of Environment, Forests & Climate Change (MoEF&CC) from the period of 1987 to 2007. She has done her PhD in Environmental Sciences from BITS Pilani in 1983.</p> <p>Mrs. Raghupati is one of the key members in formulating E-waste policies and has been an advisor for its management for past 2 years and a consultant for management of municipal solid waste for 6 years. She has received award for outstanding contribution in the area of E- waste management in India at International Electronics Conference & Expo (IERC), San Francisco, USA in May 2010. She was an advisor at Manufacturers Association for Information Technology (MAIT) in 2008. She is also presently, the founder and Independent consultant at sustainable development solutions since 2007.</p>
28.	Dr. Sabata B.C.	<p>He is currently, Senior Scientific Officer, Department of Environment at Government of NCT of Delhi. Previously, he was a lecturer of Botany in Arunachal University. He was also the In-charge of Eco-club in Delhi which was started in 1998.</p>
29.	Ms. Sharma Monica	<p>She is post graduate in Business management and did her fashion designing and worked in MNC for 8 years as a senior merchandiser and was passionate for cleanliness. She has been an associated with Daily dump from past three years and works on spreading awareness related to waste segregation, composting and how to convert wealth out of waste. She has also formed an NGO "Human Kind Foundation" in 2015 June which works as a platform to make society aware of waste management, sanitation and hygiene. Other than this, she is working with few schools ,Rotary club, MCF, National institute of financial management, RWAS etc to guide them how to convert waste into wealth. She is one of the Amassador of Faridabad under Swachh Faridabad mission affiliated by Municipal Corporation of Faridabad.</p>
30.	Mr. Singh Devendra	<p>He is currently, the manager at Excel Industries and has experience in waste management since last five years. He has done his bachelor's in management studies.</p>

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Sr. No.	Name of resource person	Professional synopsis
31.	Ms. Singh Rozita	<p>Currently, she is a Research Associate at Centre for Research on Sustainable Urban Development & Transport Systems, in The Energy and Resources Institute (TERI), New Delhi. In past, she is a Journalism graduate with a Masters in Sustainable Development Practice. Her experience ranges from field exposure, youth networking and action to project management and community action. She was selected as an International Climate Champion (ICC) by British Council and TERI in 2009. Under the ICC programme she has been involved with several awareness and local action programmes targeted at sensitizing individuals on the importance of effective waste management. She is also engaged in spearheading a composting initiative in New Delhi in partnership with Daily Dump since 2013. Daily Dump was recently awarded the first prize in the category of solid waste management at the 2nd Smart Cities India Expo. The enterprise was also the winner of India Social Entrepreneur of the Year, 2015.</p> <p>Ms. Rozita, is also known for her involvement in conducting risk and vulnerability assessments and preparing city resilience strategies. Currently her team is also working with the Government of Goa and Uttarakhand to conduct policy research in order to identify entry points for an urban climate resilience policy at the State level.</p>
32.	Mr. Tripathy Debashish	<p>He is an engineer with over 32 years of experience. For the last 10 years with IL&FS Environment, currently Vice president Strategy with wide ranging experience in waste management.</p>
33.	Prof. Vijay V.K.	<p>Virendra Kumar Vijay is working as a Professor at IIT Delhi. He obtained his Bachelor of Engineering (Agriculture) and Master of Engineering in Renewable Energy Sources degree from College of Technology and Agricultural Engineering, Udaipur and Ph.D. from IIT Delhi in 1998.</p> <p>Prof. Vijay started his career as an Assistant Professor in</p>

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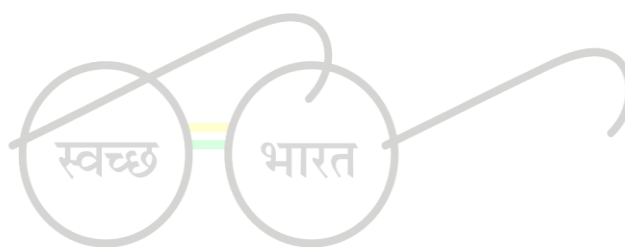
Sr. No.	Name of resource person	Professional synopsis
		<p>Renewable Energy Centre at the College of Technology and Agricultural Engineering Udaipur in 1989 and shifted to IIT Delhi in 2002. He is actively engaged in research and worked for more than 25 sponsored research and consultancy projects from India and abroad. He has about 125 publications in journals and conferences, 7 books and one lab manual to his credit. Prof. Vijay has successfully developed technology on Biogas Enrichment and bottling for Vehicular Application and transferred it to the industries and field. He also received a patent for it. He is fellow of Institution of Engineers and Life Member of NASI, ISAE, ISTE, SESI and other scientific and professional societies/ bodies. He has attended more than 100 National/International Conferences/Seminars/Workshops. He is also member of many national/International level expert committees. He is the Indian coordinator of Sustainable Energy and Environment Forum (SEE Forum) working in Asia with head quarter in Japan, General Secretary of Biogas Forum (India). He has travelled widely in India and abroad. He has visited USA, UK, Japan, Switzerland, Finland, Sweden, Denmark, Germany, Thailand, Singapore, Italy, Vietnam, Belgium and other countries in past. He was visiting Professor at Nagoya University, Japan. Prof. Vijay has received a number of awards for his outstanding contribution in research, teaching and extension. He is recipient of Gold Medal Award for M.E. Examination, National level first prize in 1992 for original book writing in Hindi in the scheme of Prakrit Urja Puruskar Yojana by the Ministry of Non Conventional Energy Sources, Govt. of India on the book titled “Biogas Vigyan AvamUpyog”, Second National Prize 1993 for original book writing in hindi on subjects related to environment titled “Paryavaran Siksha” by the Ministry of Environment and Forest, Govt. of India, Hari Ohm Ahsaram Prerit Young Scientist</p>

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Sr. No.	Name of resource person	Professional synopsis
		<p>Award 1998 for outstanding research work during 1994-97 in the area of renewable energy conferred by Sardar Patel Renewable Energy Research Institute, Vallabh Vidyanager, SGSITS-ISTE Young Engineering Teacher National Award 1999, ISAE Book Award 1998, ISAE Team Research Award 1999, Young Scientist Award 2000 by National Academy of Agricultural Sciences, India in Agricultural Engineering, Prakriti Bharati – National Award 2005 for S&T Application for developing biogas enrichment and bottling technology for rural sector. IIT Delhi Alumni Association Award in Open House on Biogas Enrichment Technology for Vehicular Use in 2009.</p>
34.	Dr. Vijayalakshmi K.	<p>She is currently the Vice President of Development Alternatives. Her main focus and achievements are in the area of:</p> <ol style="list-style-type: none"> a. Water Quality testing b. Development and Application of innovative technologies that address the problems of Women. <p>At Development Alternatives, Dr. Vijaya Lakshmi is responsible for strengthening the organization's capabilities in designing solutions for the brown issues of the Environment such as, air, water & land. Under her leadership, the industry and urban environment groups have pioneered addressing the Environmental and Social Issues of Small and Medium Enterprises (SMEs) and large Corporates.</p> <p>She has expertise in:</p> <ol style="list-style-type: none"> a. Environment Management Systems (EMS) planning, design and facilitation of implementation; b. EIA and EMP studies; c. Corporate Responsibility – policies and procedures; d. Corporate Sustainability – measurement and verification, and many more

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Sr. No.	Name of resource person	Professional synopsis
		She is also responsible for promoting the NGO – Business and other Stakeholder Partnership models especially for handling the Environment Issues of Small and Medium Enterprises.
35.	Mr. Yadav Kousal	He is a mechanical engineer graduated from Nagpur University. Joined Ramky Enviro engineer Ltd in 2012.looking after the operation and maintenance of MSW processing and disposal unit at Narela bhawana which is an integrated MSW treatment facility.



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Annexure 5

Winners of Quiz (Batch 1 to Batch 12)

<p>BATCH 1</p> <p>1ST - Mr. Ajay Ram, Firozabad Municipal Corporation, Uttar Pradesh.</p> <p>2ND - Mr. Radhey Sham, Municipal Corporation of Faridabad, Haryana.</p>	<p>BATCH 2</p> <p>1ST - Mr. Pankaj Bhushan, Lucknow Municipal Corporation, Uttar Pradesh.</p> <p>2ND - Ms. Teresa Sharma, Agrim Welfare foundation.</p>	<p>BATCH 3</p> <p>1ST-Mr. Vikas Chhachhar, Municipal Corporation Kashipur</p> <p>2ND - Mr. Harish Kumar, Municipal Corporation Rohtak, Haryana</p>	<p>BATCH 4</p> <p>1ST- Mr. Sachin Saliur Zaman, English Bazar Municipality, West Bengal.</p> <p>2ND - Mr. Sujay Kumar Banerjee, Durgapur Municipal Corporation, West Bengal.</p>
<p>BATCH 5</p> <p>1ST - Dr. Basanta Kumar Mishra, Rourkela Municipal Corporation, Odisha</p> <p>2ND - Mr. Kilepchiba Jamir, Mokokchung Municipal Council, Nagaland.</p>	<p>BATCH 6</p> <p>1ST - Mr.Rishabh Gupta, Municipal Corporation Patiala, Punjab.</p> <p>2ND - Mr.Samved Sharma, SUDA, Chattisgarh.</p>	<p>BATCH 7</p> <p>1st- Ashwani Kumar Soni, Punjab Agricultural University, Ludhiana</p> <p>2nd – Ved Nandyal, Sampoorana Home Composters, Gurgaon</p>	<p>BATCH 8</p> <p>1st - P. Saroja, Greater Hyderabad Municipal Corporation, Telangana</p> <p>2nd – Vivek Agarwal, Municipal Corporation Damoh, Madhya Pradesh</p>
<p>BATCH 9</p> <p>1st- Devang M. Shah, Surendranagar Municipal Corporation, Gujarat</p> <p>2nd – Gohil Jignesh, Vadodara Municipal Corporation, Gujarat</p>	<p>BATCH 10</p> <p>1st- Saikesh Paruchuri, Tenali Municipality, Andhra Pradesh</p> <p>2nd – Vibha Singh, MIECOFT, Delhi</p>	<p>BATCH 11</p> <p>1st - Aftab Hanif, Greater Hyderabad Municipal Corporation, Telangana</p> <p>2nd – Krishan Kumar, Daman Municipal Council, Daman</p>	<p>BATCH 12</p> <p>1st - Tapas Chatterjee, ACT, Delhi NCR</p> <p>2nd – Shankar K. Mudhe, Municipal Corporation of Greater Mumbai, Maharashtra</p>

Annexure 6

Winners of Group Activity (Batch 1 to Batch 12)

Prizes were given to groups who came first & second in group activity

Batch1	Batch 2	Batch 3
1ST - Mr.Ajay Ram, Firozabad Municipal Corporation. Mr. Ashok Kumar Bhati, Municipal Corporation Kanpur. Dr. Kuldeep, Aligadh Municipal Corporation.	1ST - Dr.P.S.Bhatti, Chandigarh Municipal Corporation. Mr.Gulshan Kumar, Chandigarh Municipal Corporation. Mr.Shyam Sunder, Municipal Corporation of Gurgaon. Mr.Munish Kumar, Meerut Municipal Corporation.	1ST - Ms. Dipika Gajraj, Municipal Corporation of Bikaner, Rajasthan. Mrs. Alka Burdak, Municipal Corporation of Bikaner, Rajasthan. Ms. Suman Saharan, Municipal Corporation of Bikaner, Rajasthan. Ms. Geeta Yadav, Municipal Corporation of Bikaner, Rajasthan. 2ND- Mr. D. S. Rana, Nagar Palika Parishad, Mussoorie Dr. R. K. Singh, Nagar Palika Parishad, Mussoorie Mr. Virender Singh Bist, Nagar Palika Parishad, Mussoorie



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Batch 4

1ST-

Mr. Dulal Sarkar, English Bazar Municipality, West Bengal.

Mr. Rajeev Kumar, Nagar Palika Manglor, Haridwar, Uttarakhand.

Mr. Pankaj, Dhanbad Municipal Corporation, Jharkhand.

Ms. Subhanjali Saxena, Urban development & Housing Department, Government of Bihar, Patna.

2ND-

Dr. Ishani Dasgupta, Durgapur Municipal Corporation.

Mr. Sujay Kumar Banerjee, Durgapur Municipal Corporation.

Mr. Mrityunjoy Mahato, Durgapur Municipal Corporation.

Mr. Atanu Rudra, Durgapur Municipal Corporation

Batch 5

1ST-

Mr. Elangmiki Shullai, Directorate of Urban Affairs, Meghalaya.

Mr. Lightfullson Snaitang, Urban Affairs, Baghmara, Meghalaya.

Mr. B. M. Rani, Shillong Municipal Board, Meghalaya.

Mr. Andrew Umdor, Shillong Municipal Board, Meghalaya.

2ND-

Mr. Davinder Singh, Municipal Council, Baghapurana, Moga, Punjab.

Mr. Deepak Kumar, Municipal Corporation Pathankot, Punjab.

Mr. Janu Chalotra, Municipal Corporation Pathankot, Punjab.

Mr. Vikas Chaudhary, Municipal Council Rajpura, Punjab.

Batch 6

1ST-

Shri Nitish Aman Sahu, Municipal Council Bilaspur, Chattisgarh.

Shri Amit Sarkar, Municipal Council Raipur, Chattisgarh.

Shri Harishankar Verma, Municipal Council Rajnandgaon, Chattisgarh.

Shri Ashwini Kumar Das, Municipal Council Korba, Chattisgarh.

Shri M. Shreekanth Nair, Municipal Council, Bilaspur, Chattisgarh.

2ND-

Mr. Jagdish Pal, Indore Municipal Corporation, Madhya Pradesh.

Shri Anchal Diwan, Municipal Council Birgaon, Chattisgarh.

Bhushan Pawan, Municipal Corporation Dewas, Madhya Pradesh.

Vishwas Chand Shrama, Neemuch Municipality, Madhya Pradesh.

Batch 7	Batch 8	Batch 9
<p>1ST- Mr. C.M. Mishra, Municipal Council of Hoshangabad</p> <p>Mr. Sanjay Kumar, Puri Municipality, Odisa</p> <p>Mr. Kunal Raj, Motihari Municipal Council, Bihar</p> <p>2ND- Mr. Ved Nandyal, Sampoon Home Composter, Gurgaon</p> <p>Mr. Ashwani Soni, PAU, Ludhiana</p> <p>Mr. Parbir Khilar, Puri Municipality, Odisa</p> <p>Mr. Nasir Khan, Municipal Council Pithampur, Madhya Pradesh</p>	<p>1ST- Ms. P. Saroja, Greater Hyderabad Municipal Corporation, Telangana</p> <p>Arafaat Khan, Damoh Municipality, Madhya Pradesh</p> <p>Mr. Usha Vivek, Damoh Municipality, Madhya Pradesh</p> <p>2ND- Ms. Yashashri Kommareddy, Greater Hyderabad Municipal Corporation, Telangana</p> <p>Mr. Vandana Nitin, Damoh Municipality, Madhya Pradesh</p> <p>Mr. Krishna Raj, Damoh Municipality, Madhya Pradesh</p>	<p>1ST- Mr. Devang Shah, Surendranagar Dudhrej Nagar Palika, Gujarat</p> <p>Mr. Ganpat Bhai, Surendranagar Dudhrej Nagar Palika, Gujarat</p> <p>Mr. Jignesh Kumar, Vododara Municipal Corporation, Gujarat</p> <p>Mr. Jagdeep Singh, Amritsar Municipal Corporation, Punjab</p> <p>2ND- Mr. Bachubhai, Surendranagar Dudhrej Nagar Palika, Gujarat</p> <p>Mr. Piyush Patel, Surendranagar Dudhrej Nagar Palika, Gujarat</p> <p>Mr. Sachin Patil, Chandrapur Municipal Corporation, Maharashtra</p> <p>Mr. Jitender Sinh, Surendranagar Dudhrej Nagar Palika, Gujarat</p>

Batch 10	Batch 11	Batch 12
<p>1ST- Krishnandu Pal, Nabadwip Municipality West Bengal</p> <p>Shivarama Krishnan, Jayankondam Municipality, Tamil Nadu</p> <p>Manoj Lonkar, Pimpri Chinchwad Municipal Corporation, Maharashtra</p> <p>Saikesh Paruchuri, Tenali Municipality, A.P</p> <p>Vishu Lama, Mangan Navagadh Nagar Panchayat, Sikkim.</p> <p>2ND- Harshad C Tatamiya, Jetpur Navagadh Nagar Palika, Gujarat</p> <p>Malini Rajendran, Micoft, New Delhi.</p> <p>A.K. Aggrawal, NDMC, New Delhi.</p> <p>Chandan Sharma, Kurud Municipality Corporation, Chattisgarh</p> <p>Sarla C, Chitradurga City Municipal Corporation, Karnataka</p>	<p>1ST- Mr. Tandel Anilkumar, Daman Municipal Council, Daman</p> <p>Mr. Srinivas Reddy, Greater Hyderabad Municipal Corporation, Telangana</p> <p>Mr. Satyawan Bawalekar, Greater Mumbai Municipal Corporation, Maharashtra</p> <p>Mr. B.B. Kamble, Pimpri Municipal Corporation, Maharashtra</p> <p>2ND- Mr. Aftab Hanifee, Greater Hyderabad Municipal Corporation, Telangana</p> <p>Mr. Raghav Shunglu, ScrapApp, Delhi</p> <p>Mr. Chandragiri Isvar, Daman Municipal Council, Daman</p> <p>Mr. Sudhir Vishnu Parkale, Greater Mumbai Municipal Corporation, Maharashtra</p>	<p>1ST- Mr. S. Jaganmohan, Ramagundam Municipal Corporation, Telangana</p> <p>Mr. P.N. Kurhade, Municipal Corporation of Greater Mumbai, Maharashtra</p> <p>Mr. Tapan Kumar, Bankura Municipality, West Bengal</p> <p>Mr. S. Sivrama Krishna, Tadipatri Municipal Corporation, Andhra Pradesh</p> <p>Mr. P. Abdul Khadar, Kozikhode Municipal Corporation, Kerela</p> <p>2ND- Mr. Naresh Kumar, Nagar Palika Parishad Mau, Uttar Pradesh</p> <p>Mr. Tapas Chatterjee, ACT, Delhi</p> <p>Mr. P.C.K. Rajan, Kozikhode Municipal Corporation, Kerela</p> <p>Mr. Shaji Clement, State Sanitation Mission, Kerela</p> <p>Mr. Sudama Ray, Kanchrapara Municipality, West Bengal</p> <p>Mr. Subir Banerjee</p>

Annexure 7

Swachh Bharat Mission Exposure Workshops - A Green Event

The idea of a "Green Workshop" came up when we started planning this series of 12 workshops and wanted to inculcate a culture of conservation and maximize the use of sustainable, re-useable and recyclable materials in conducting and managing the "SBM Exposure Workshop". This was to encourage the participants to 'learn by experience' the philosophy of conservation through the green workshop.

There are two aspects to this Green workshop:

1. Use of Reusable & Recyclable materials:

With an aim of Clean India Mission, to work in harmony with nature, few NGOs and organizations were motivated to get involved indirectly as promoter of Green Materials.

On the first day of workshop, it is ensured by NIUA team that each of the participant is provided with reusable stainless steel water thermos bottles, so as to reduce the accumulation of used plastic water bottles, each of which is of 0.5 ltr capacity and the price is about Rs.400/-. The stainless steel water thermos bottles which are given to participants of the workshop are filled up, as and when required by the workshop organisers namely NIUA staff at USI, which has supplied clean drinking water in water dispensers. These reusable bottles also maintain the temperature of water, as needed during field visits to various location within Delhi-NCR.

During each workshop, the NIUA team provides all the participants with a 'SBM Workshop training kit' which comprises of a **File folder, a Note book, a Manual and a pen**. Each of these items of the training kit is made from recycled paper. It is an appreciable effort of an NGO named "**Action in Community and Training-ACT**", based in **Faridabad, which recycles tetrapaks to manufacture hand-made paper**. Moreover, the plants which are given to Resource Persons in a basket to felicitate them are made from metalised plastic wrappers, which are often discarded as 'non-recyclable' and are often found littered on roadsides and dhalaos (derived from food packaging plastic waste material). This is again recycled by the NGO, **Action in Community and Training-ACT, which teaches women in sub-urban areas to weave them into baskets using straw from fruit packaging**. The plants used to felicitate resource persons are **specifically medicinal plants** in order to contribute **towards Environmental Sustainability**.

Recycled pens utilized in the workshop are made by an **NGO called "Trash to Cash"** which trains disabled people to manufacture them from waste or 'Trash' as they call it, for a Green cause, which also fetches 'Cash'.

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The bags which are given to the participants is processed from '**Discarded polybag waste**'; made by an NGO called **Sam Foundation, Chennai or Green Exnora, Pammal, Chennai**. The Certificates given to the participants and winners are made from recycled hand-made paper made by "**Action in Community and Training-ACT**" and the gifts/ prizes given to the winners of individual and group activities are made of hand-made handicraft products from recycled paper and waste flowers by **Gulmeher, a CSR supported facility of IL&FS**.

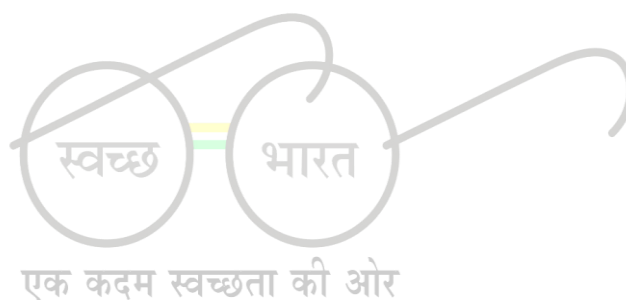
We also ensure that the refreshment provided during the field trips are also in recyclable packaging.

The entire planning and execution is done in such a way that the waste generation is minimized and encourages the use of recyclable materials and reusable items instead of throw-away ones.

The participants are gently reminded from time to time to become green participants by minimizing wastage while adopting conservation practices in the spirit of the Green Workshop.

2. Mission & Vision behind conducting Green workshop at USI (United Service Institution of India):

- a) USI meets energy conservation measures by using LED lights.
- b) Automatic dimming lights are installed at the reception, hallway of the residency resort and many other places.
- c) Power connection of the accommodation rooms can only be switched by the room keys, which ensures that no lights/ appliances stay turned on un-necessarily in an empty room.
- d) The entire open area is well equipped with plants, creepers and patch gardens.



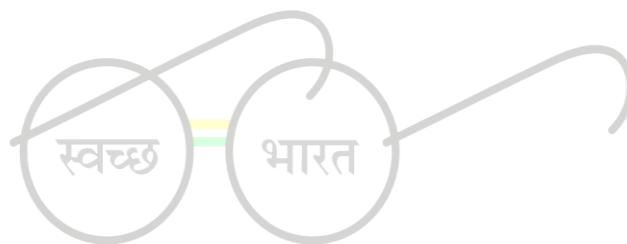
Photos of Reusable and Recycled materials used during SBM Exposure workshop



Reusable Stainless steel water bottles



Bag from recycled plastic



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Basket from non-recyclable plastic



Gift from waste paper & flowers



Manual cover from recycled paper



Gift wrappers from recycled paper

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Annexure 8

Schedule of SBM Exposure Workshop (Batch 1 to Batch 12)

Batch 1

SWACHH BHARAT MISSION EXPOSURE WORKSHOPS May 2nd-5th, 2016

AGENDA

Day I

2ND MAY, 2016

Inauguration

Timings	Topic	Speaker
10.30 a.m.	Introduction	Dr. Shyamala Mani, NIUA
10.35 a.m.	Welcome	Prof. Jagan Shah, Director NIUA
10.40 a.m.	Lighting the lamp	
10.45 a.m.	Key note address	Prof. V.K. Vijay, IIT Delhi
11:10 a.m.	Inaugural address	Shri. Saurabh Jain, Dty Secretary, SBM
11.25 a.m.	Vote of thanks	

Panel Discussion: Chairperson – Prof. Usha Raghupathi

Timings	Topic	Speaker
11:30 a.m.	Solid Waste Management: issues, challenges and opportunities	Mr. Pradeep Khandelwal, Chief Engineer EDMC
12:00 noon	Operationalising Solid Waste Management Rules 2016	Mr.Satish Sinha, Toxics Link, New Delhi
12.30 p.m.	Innovative Technologies for Solid Waste Management	Dr. Suneel Pandey, Director, Green Growth, TERI
01.00 p.m.	LUNCH	
	<u>Technical session 1</u>	
02:00 p.m.	Decentralized Solid Waste Management by RWA	Ms. Shammi Talwar, RWA member
02:30 p.m.	Integrating waste pickers of sustainable solid waste management in Delhi	Mr. Irfan Khan Chintan
03.00 p.m.	TEA	
03:30 pm	Designing and Implementing Sustainable and Environmental	Mr.Debashish Tripathy, Vice-President, IL&FS Environmental

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	Initiatives	Infrastructure and Services Ltd.
04.15 p.m.	Future of Biomethanation for SWM	Mr. Sandeep Garg, Biobox/Green Bricks
04.45 p.m.	Decentralized Waste Management by NBCC	Mr. Ravi Mishra, Green Planet

Day II - 3RD MAY 2016

Timings	Location
09.00 a.m.	Ghazipur landfill site, Ghazipur
10.00 a.m.	Ghazipur Waste to Energy Plant of IL&FS
11.00 a.m.	Gulmeher
12.00 noon	Chintan Material Recovery Facility, Bhopura
12.45 p.m.	Lunch at NIUA
2.30 p.m.	GPRA, New Motibagh
4:30 p.m.	IIT Delhi

Day III - 4TH MAY 2016

Timings	Location
08.30 a.m.	Door to Door waste collection system at Defence Colony
09.30 a.m.	C&D Waste Recycling Plant at Shastri Park
12.30 p.m.	Early lunch at NIUA
02.00 p.m.	Okhla Composting Plant
3:30 p.m.	Okhla Jindal WTE plant

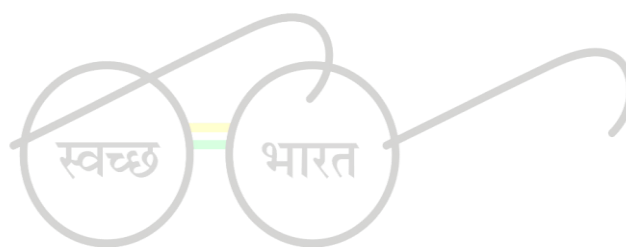
Day IV

5TH MAY, 2016

Timings	Topic	Speaker
09.00 a.m.	Recap (Assisted Discussion)	
10.00 a.m.	Sustainable Solid Waste Management under SBM	Dr.Iqbal Malik, Vatavaran
10.30 a.m.	Emerging Technologies in SWM	Mrs.Almitra Patel
10.45 a.m.	Issues and Challenges in Dry Waste Recycling for Solid Waste Management	Ms. Gurpreet Kaur, ACT
11.00 a.m.	Integrated Solid Waste Management facility at Narela Bhawana	Mr. Kousal Yadav
11.15 a.m.	Biomethanation of Hotel and Canteen waste	Mr. D.C.Pant, Fellow, TERI

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11.30 a.m.	Tea	
12.00 a.m.	First group activity	
12.15 p.m.	Second group activity	
01.00 p.m.	Lunch	
02.00 p.m.	Consolidation	
02.30 p.m.	First set of presentations	
3.30 p.m.	Tea	
04.00 p.m.	Second set of presentations	
5.00 p.m.	Valedictory and Certificate Distribution	CPHEEO Representative



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Batch 2

SWACHH BHARAT MISSION EXPOSURE WORKSHOPS May 16th – 19th, 2016

AGENDA

Day I

16th MAY, 2016

Inauguration

Timings	Topics	Speakers
12.30 p.m.	Introduction&Welcome	Dr. Shyamala Mani, NIUA
12.35 p.m.	Lighting the lamp	
12.40 p.m.	Inaugural address	Mr.Saurabh Jain, Addl. Mission Director, Swachh Bharat Mission, MoUD
12.50p.m.	Designing and Implementing Sustainable and Environmental Initiatives	Dr.N.B.Mazumdar, Consultant, SWM
1.10p.m.	Vote of thanks	NIUA
1:15 p.m.	Lunch	

Panel Discussion

Chair person:Dr.N.B.Mazumdar

Timings	Topics	Speakers
2:15p.m.	Solid Waste Management Rules 2016	Ms. Sanchita Jindal, Director, MoEFCC
2:45 p.m.	Technologies for different categories of waste	Dr.N.B.Mazumdar, Consultant, SWM, IL&FS Environmental Infrastructure Services Ltd
3:10 p.m.	Integrating waste pickers of sustainable solid waste management	Mr.Prakash, Waste Pickers Association, Delhi
3.30 p.m.	Tea	

Technical session 1

Timings	Topics	Speakers
3:45 p.m.	Solid Waste Management: issues, challenges and opportunities	Dr. Shyamala Mani, NIUA
4:10 p.m.	Decentralized Solid Waste Management by RWA	Mr.Suresh Goel, President, RWA, Vasant Vihar, New Delhi

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4:30 p.m.	Biomethanation	Mr. D.C.Pant, Fellow, TERI
5:00 p.m.	Decentralized Solid Waste Management by NBCC	Mr. Ravi Mishra, Green Planet

Field Trips

Day II –17th MAY 2016

Timings	Locations
09.00 a.m.	Ghazipur landfill site, Ghazipur
10.00 a.m.	Ghazipur Waste to Energy
11.00 a.m.	Gulmeher – CSR supported Recycling
12.00 noon	Chintan Material Recovery Facility, Bhopura
01.30 p.m.	Lunch at Haldirams, Dilshad Garden
03.00 p.m.	E-waste Recycling at Shastri Park
4:00 p.m.	C&D Waste Recycling Plant at Shastri Park

Day III - 18TH MAY 2016

Timings	Locations
08.30 a.m.	Door to Door waste collection system at Vasant Vihar RWA
10.30 a.m.	GPRA, New Motibagh
12.30 p.m.	TEAM Technology at Delhi Gymkhana
1:30 p.m.	Lunch at NIUA
03.00 p.m.	Okhla Jindal WTE plant
04:00 p.m.	Okhla Composting Plant

Day IV - 19TH MAY, 2016

Technical session 2

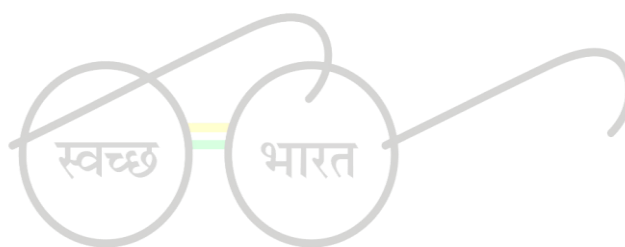
Timings	Topics	Speakers
09.00 a.m.	Recap (Assisted Discussion)	
10.00 a.m.	Activities of Green Bandhu	Mr.Saurav Bardhan
10.15 a.m.	Issues and Challenges in Dry Waste Recycling for Solid Waste Management	Mr.Anurag Kashyap, Gulmeher Recycling
10.30 a.m.	Integrated Solid Waste Management facility at NarelaBhawana	Mr.AbhayRanjan, Ramky
10.45 a.m.	ContainerisedBiomethanationPlant	Ms.Priyanka Gupta, Green Bricks Eco Solutions Pvt. Ltd.
11.00 a.m.	TEA BREAK	

Technical session 3

Timings	Topics	Co-ordinator
11.30 a.m.	Group activity I	Dr. Shyamala Mani, NIUA
12.15 p.m.	Presentation of group activity	
01.00 p.m.	LUNCH	

Technical session 4

Timings	Topics	Coordinator
02.00 p.m.	Group Activity II	Dr. Shyamala Mani, NIUA
03.00 p.m.	Presentation of group activity	
03.30 p.m.	TEA BREAK	
04.00 p.m.	Filling Feedback form by participants	NIUA team
04:30 p.m.	Valedictory and Certificate Distribution	Shri. Praveen Prakash, J.S. and Mission Director, SBM



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Batch 3

SWACHH BHARAT MISSION EXPOSURE WORKSHOPS June 6th to 9th, 2016

AGENDA

Day I

June 6th, 2016

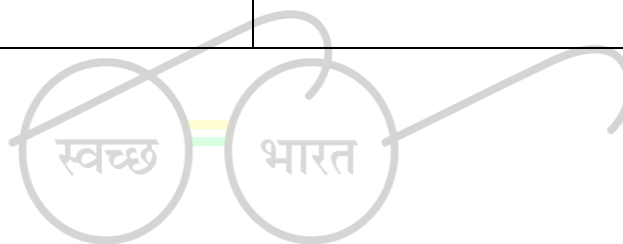
Inauguration

Timings	Topics	Speakers
12.00p.m.	Introduction & Welcome	Dr. Shyamala Mani, NIUA
12.05 p.m.	Lighting the lamp	
12.10 p.m.	Inaugural address	Mr. Saurabh Jain, Addl. Mission Director, Swachh Bharat Mission, MoUD*
12.25p.m.	Solid Waste Management Rules 2016 – An inclusive approach to Waste Management	Ms. Sanchita Jindal, Director, MoEFCC*
12.55p.m.	Vote of thanks	NIUA
1:00 p.m.	Lunch	

Panel Discussion

Chair person: Dr. K. Vijayalakshmi

Timings	Topics	Speakers
2:00 p.m.	Responsibilities of generators and segregation at source - experiences	Dr. K. Vijayalakshmi, V.P., Development Alternatives
2:20 p.m.	Integrating waste pickers of sustainable solid waste management in Delhi	Ms. Bharti Chaturvedi, Director, Chintan*
2:40 p.m.	Waste to Energy - Learnings	Mr. Sandip Dutt, Jindal Ecopolis*
3:00 p.m.	Environmental Education for sustainable waste management	Dr. B. C. Sabata, Sr. Scientific Officer, Department of Environment, Govt. of NCT of Delhi
3:20 p.m.	Q&A	
3.30 p.m.	Tea	



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Technical session 1

Timings	Topics	Speakers
3:45 p.m.	Solid Waste Management: issues, challenges and opportunities	Dr. Shyamala Mani, NIUA
4:15 p.m.	Biomethanation	Mr. D.C.Pant, Fellow, TERI
4:45 p.m.	Decentralized Solid Waste Management by NBCC	Mr. Ravi Mishra, Green Planet

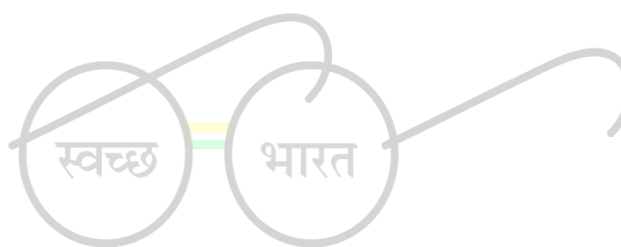
Field Trips

Day II –June 7th 2016

Timings	Locations
09.00 a.m.	Ghazipur landfill site, Ghazipur
10.00 a.m.	Ghazipur Waste to Energy
11.00 a.m.	Gulmeher – CSR supported Recycling
12.00 noon	Chintan Material Recovery Facility, Bhopura
01.00 p.m.	Lunch at Haldirams, Dilshad Garden
02.00 p.m.	C&D Waste Recycling Plant at Shastri Park
03:30 p.m.	Composting – Bulk Wet waste generator

Day III – June 8th 2016

Timings	Locations
08.30 a.m.	Door to Door waste collection system at a South Delhi location
10.30 a.m.	Decentralised waste processing at GPRA, New Motibagh
12.30 p.m.	Biomethanation at Delhi Gymkhana
1:30 p.m.	Lunch at NIUA
03.00 p.m.	Okhla Timarpur WTE plant by Jindal
04:00 p.m.	Okhla Composting Plant by IL&FS



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Day IV – June 9th, 2016

Technical session 2

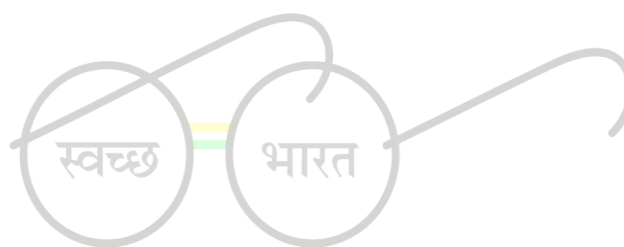
Timings	Topics	Speakers
09.00 a.m.	Recap (Assisted Discussion)	
10:00 a.m.	Green Waste Processor	Mr.Alok Gupta, Clean India Ventures
10:15 a.m.	Dry Waste Collection and Recycling	Mr.S.R.Dixit, Jan Sewa Ashram and Earth India
10:30 a.m.	Daily Dump	Ms.Rozita Singh
10:45 a.m.	Q&A	
11:00 a.m.	TEA BREAK	

Technical session 3

Timings	Topics	Co-ordinator
11:15 a.m.	How to make wealth from waste?- Making Business Models	Prof.R.J.Masilamani *
11.45 a.m.	Group activity I	Dr. Shyamala Mani, NIUA
12.15 p.m.	Presentation of group activity	
01.00 p.m.	LUNCH	

Technical session 4

Timings	Topics	Coordinator
02.00 p.m.	Group Activity II	Dr.Shyamala Mani, NIUA
03.00 p.m.	Presentation of group activity	
03.30 p.m.	TEA BREAK	
04.00 p.m.	Filling Feedback form by participants	NIUA team
04:30 p.m.	Valedictory and Certificate Distribution	Shri. Praveen Prakash, J.S. and Mission Director, SBM*



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Batch 4

SWACHH BHARAT MISSION EXPOSURE WORKSHOPS June 20th to 23rd, 2016

AGENDA

Day I

June 20th, 2016

Inauguration

Timings	Topics	Speakers
12.00p.m.	Introduction&Welcome	Dr. Shyamala Mani, NIUA
12.05 p.m.	Lighting the lamp	
12.10 p.m.	Inaugural address	Mr.Saurabh Jain, Addl. Mission Director, Swachh Bharat Mission, MoUD*
12.25p.m.	Solid Waste Management Rules 2016 – An inclusive approach to Waste Management	Ms. Sanchita Jindal, Director, MoEFCC
12.55p.m.	Vote of thanks	NIUA
1:00 p.m.	Lunch	

Panel Discussion

Chair person:Dr. Shyamala Mani, NIUA

Timings	Topics	Speakers
2:00p.m.	Responsibilities of generators and segregation at source - experiences	Ms. PritiMahesh, Chief Programme Coordinator, Toxics Link
2:20 p.m.	Not in my Backyard – Issues and Challenges	Ms.SwatiSambyal, CSE
2:40 p.m.	Environmental Education for sustainable waste management	Dr.B.C.Sabata, Sr.Scientific Officer, Department of Environment, Govt. of NCT of Delhi
3:10 p.m.	Q&A	
3.30 p.m.	Tea	

Technical session 1

Timings	Topics	Speakers
3:45 p.m.	Integrating waste pickers for sustainable solid waste management	Ms.RichaChaturvedi, Manager, A voice for waste programme, Chintan
4:15 p.m.	Public Private Partnership in Solid Waste Management	Mr. Giresh Mohan, Regional Manager ITC
4:45 p.m.	Biomethanation	Mr. D.C.Pant, Fellow, TERI

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Field Trips

Day II –June 21st2016

Timings	Locations
09.00 a.m.	Ghazipur landfill site, Ghazipur
10.00 a.m.	Ghazipur Waste to Energy
11.00 a.m.	Gulmeher – CSR supported Recycling
12.00 noon	Chintan Material Recovery Facility, Bhopura
01.00 p.m.	Lunch at Haldirams, Dilshad Garden
02.00 p.m.	C&D Waste Recycling Plant at Shastri Park
03:30 p.m.	Composting and Paper Recycling at Miranda House

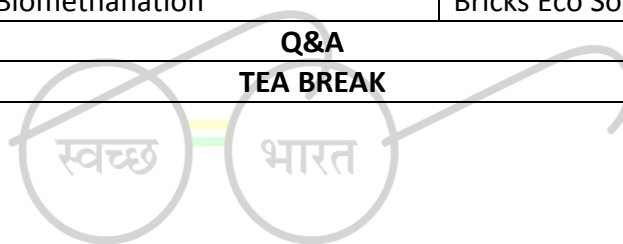
Day III –June 22nd2016

Timings	Locations
08.30 a.m.	Door to Door waste collection system at a South Delhi Colony
10.30 a.m.	Decentralised waste processing at GPRA, New Motibagh
11.30 p.m.	Biomethanation at Delhi Gymkhana
12:30 p.m.	Waste water recycling at IHC
1:30 p.m.	Lunch at NIUA
03.00 p.m.	Okhla Timarpur WTE plant by Jindal
04:00 p.m.	Okhla Composting Plant by IL&FS

Day IV –June 23rd, 2016

Technical session 2

Timings	Topics	Speakers
09.00 a.m.	Recap (Assisted Discussion) & Quiz	Dr. Shyamala Mani, NIUA
10:00 a.m.	Decentralised C&D waste management and recycling	Dr. K. Vijayalakshmi, V.P., Development Alternatives
10:15 a.m.	Waste to Energy - Learnings	Mr. Sandip Dutt, Jindal Ecopolis
10:30 a.m.	Nisarga Runa and Containerised Biomethanation	Mr. Sandeep Garg, Green Bricks Eco Solutions
10:45 a.m.	Q&A	
11:00 a.m.	TEA BREAK	



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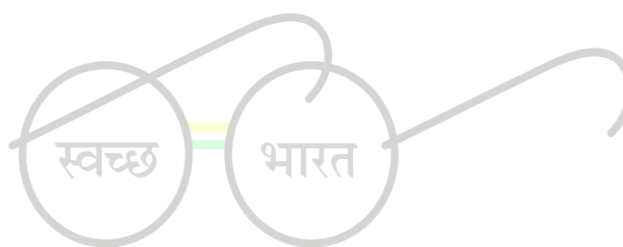
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Technical session 3

Timings	Topics	Co-ordinator
11:15 a.m.	Making wealth from waste- Some Business Models	Prof.R.J.Masilamani, BIMTECH, Greater NOIDA
11.45 a.m.	Group activity I	Dr. Shyamala Mani, NIUA&Prof.R.J.Masilamani, BIMTECH
12.15 p.m.	Presentation of group activity	
01.00 p.m.	LUNCH	

Technical session 4

Timings	Topics	Coordinator
02.00 p.m.	Group Activity II	Dr.Shyamala Mani, NIUA&Prof.R.J.Masilamani, BIMTECH
03.00 p.m.	Presentation of group activity	
04.00 p.m.	Filling Feedback form by participants	NIUA team
04:30 p.m.	Swachh Bharat Mission	Shri.Saurabh Jain, Additional Mission Director
	Role of Swachh Bharat Mission Exposure Workshop for capacity building of ULBs	Shri. Praveen Prakash, J.S. and Mission Director, SBM
	Certificate Distribution &Valedictory Address	Shri. Mahesh Giri, Hon.MP, East Delhi
	Vote of Thanks	Dr.Shyamala Mani, NIUA
5:00 p.m.	High Tea	



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Batch 5

SWACHH BHARAT MISSION EXPOSURE WORKSHOPS July 4th to 7th, 2016

AGENDA

Day I

July 4th, 2016

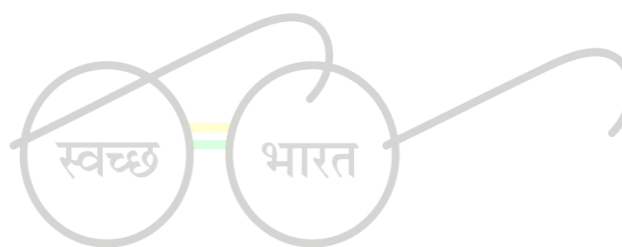
Inauguration

Timings	Topics	Speakers
12.00p.m.	Introduction&Welcome	Dr. Shyamala Mani, NIUA
12.05 p.m.	Lighting the lamp	
12.10 p.m.	Inaugural address	Mr.Saurabh Jain, Addl. Mission Director, Swachh Bharat Mission, MoUD*
12.25p.m.	Solid Waste Management Rules 2016 – An inclusive approach to Waste Management	Ms. Sanchita Jindal, Director, MoEFCC
12.55p.m.	Vote of thanks	NIUA
1:00 p.m.	Lunch	

Panel Discussion

Chair person:Dr. Shyamala Mani, NIUA

Timings	Topics	Speakers
2:00p.m.	Responsibilities of generators and segregation at source - experiences	Dr.Lakshmi Raghupathy, Former Director, MoEFCC
2:20 p.m.	Not in my Backyard – Issues and Challenges	Mr.Rajinder Maggu, RWA, Vasant Vihar
2:40 p.m.	Environmental Education for sustainable waste management	Dr.B.C.Sabata, Sr.Scientific Officer, Department of Environment, Govt. of NCT of Delhi
3:10 p.m.	Q&A	
3.30 p.m.	Tea	



एक कदम स्वच्छता की ओर

National Institute of Urban Affairs

Technical session 1

Timings	Topics	Speakers
3:45 p.m.	Integrating waste pickers for sustainable solid waste management	Ms. Rozita Singh, Daily Dump
4:15 p.m.	Public Private Partnership in Wet Waste Management	Mr. Devendra Singh Soun, Senior Executive, Excel Industries
4:45 p.m.	TEAM Biomethanation	Mr. Nagendra, Fellow, TERI

Field Trips

Day II –July 5th2016

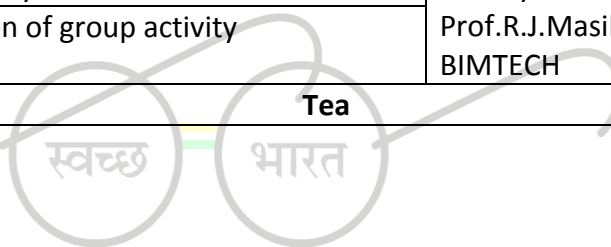
Timings	Locations
09.00 a.m.	Door to Door waste collection system at a South Delhi Colony
10.00 a.m.	Decentralised waste processing at GPRA, New Motibagh
11.00 a.m.	Biomethanation at Delhi Gymkhana
12.00 noon	IHC waste water management
12.30 p.m.	Lunch at NIUA
02.00 p.m.	C&D Waste Recycling Plant at Shastri Park
03:30 p.m.	Composting and Paper Recycling at Miranda House

Day III –July 6th2016

Timings	Locations
10.30 a.m.	Okhla Composting Plant by IL&FS
11.30 a.m.	Okhla Timarpur WTE plant by Jindal
1:00 p.m.	Lunch at USI

Technical session 2

Timings	Topics	Co-ordinator
2:15 p.m.	Making wealth from waste- Some Business Models	Prof.R.J.Masilamani, BIMTECH, Greater NOIDA
2:45p.m.	Group activity I	Dr. Shyamala Mani, NIUA& Prof.R.J.Masilamani, BIMTECH
3.15 p.m.	Presentation of group activity	
4.00 p.m.	Tea	



एक कदम स्वच्छता की ओर

National Institute of Urban Affairs

Technical session 3

Timings	Topics	Coordinator
04.15 p.m.	Group Activity II	Dr.Shyamala Mani, NIUA&Prof.R.J.Masilamani, BIMTECH
05.00 p.m.	Presentation of group activity	

Day IV–July 7th, 2016

Technical session 4

Timings	Topics
09.00 a.m.	Ghazipur landfill site, Ghazipur
10:00 a.m.	Ghazipur Waste to Energy
11:15 a.m.	Gulmeher – CSR supported Recycling
12:00 p.m.	Chintan Material Recovery Facility, Bhopura
1:30p.m.	Lunch at Dilshad Gardens
2:30 p.m.	Assisted Discussion, Quiz and Filling Feedback forms

Valedictory Function

Venue: Ghazipur WTE Plant Conference Hall

Date: July 7th, 2016 Time: 3:30 p.m. – 4:30 p.m.

3:30 p.m.	<p>Welcome</p> <p>Swachh Bharat Mission</p> <p>Role of Swachh Bharat Mission Exposure Workshop for capacity building of ULBs</p> <p>Certificate Distribution &Valedictory Address</p> <p>Vote of Thanks</p>	<p>Shri.Debashish Tripathy, IL&FS, Gurgaon</p> <p>Shri.Saurabh Jain, Additional Mission Director</p> <p>Shri. Praveen Prakash, J.S. and Mission Director, SBM</p> <p>Shri. Maheish Girri, Hon.MP, East Delhi</p> <p>Dr.Shyamala Mani, NIUA</p>
4:30 p.m.	High Tea	

स्वच्छ भारत

एक कदम स्वच्छता की ओर

Batch 6

SWACHH BHARAT MISSION EXPOSURE WORKSHOP July 18 to 21st, 2016

AGENDA

Day I

July 18th, 2016

Inauguration

Timings	Topics	Speakers
12.00p.m.	Introduction&Welcome	Dr. Shyamala Mani, NIUA
12.05 p.m.	Lighting the lamp	
12.10 p.m.	Inaugural address	Mr.Saurabh Jain, Addl. Mission Director, Swachh Bharat Mission, MoUD*
12.25p.m.	Solid Waste Management Rules 2016 – An inclusive approach to Waste Management	Ms. Sanchita Jindal, Director, MoEFCC
12.55p.m.	Vote of thanks	NIUA
1:00 p.m.	Lunch	

Panel Discussion

Chair person:Dr. Shyamala Mani, NIUA

Timings	Topics	Speakers
2:00p.m.	Responsibilities of generators and segregation at source - experiences	Dr.Lakshmi Raghupathi, Consultant
2:20 p.m.	Not in my Backyard – Issues and Challenges	Ms.Geeta Bhargava, Secretary, Defence Colony RWA
2:40 p.m.	Environmental Education for sustainable waste management	Mrs. Srinivasan, Development Alternatives, New Delhi
3:10 p.m.	Q&A	
3.30 p.m.	Tea	

Technical session 1

Timings	Topics	Speakers
3:45 p.m.	Integrating waste pickers for sustainable solid waste management	Mr.Shashi Bhushan Pandit, Secretary, All India Kabadi Mazdoor Mahasangh
4:15 p.m.	Public Private Partnership in Solid Waste Management	Mr. Pawan Aggarwal, CEO, Green Bricks Eco-solutions, Delhi
4:45 p.m.	Biomethanation	Mr. Nagendra, Assistant Fellow, TERI
5:15 p.m.	Centralised Composting & Mobicash	Mr.Devendra Singh Soun, Excel Industries

National Institute of Urban Affairs

Field Trips

Day II –July 19th2016

Timings	Locations
09.00 a.m.	Ghazipur landfill site, Ghazipur
10.00 a.m.	Ghazipur Waste to Energy
11.00 a.m.	Gulmeher – CSR supported Recycling
12.00 noon	C&D Waste Recycling Plant at Shastri Park
1:00 p.m.	Nisarguna and paper recycling plant at Delhi Secretariat
01.30 p.m.	Lunch at Delhi Secretariat
03.30 p.m.	Composting plant at Narela Bhawana
04:00 p.m.	SLF and Leachate treatment at Narela Bhawana

Day III –July 20th2016

Timings	Locations
08.30 a.m.	Door to Door waste collection system at a Vasant Vihar
10.00 a.m.	Decentralised waste processing at GPRA, New Motibagh
11.00 a.m.	Biomethanation at Delhi Gymkhana
12:00 noon	Waste water treatment at IHC
12:30 p.m.	Lunch at NIUA
02:00 p.m.	Chintan Material Recovery Facility, Bhopura
3:30 p.m.	Miranda House composting and paper recycling plant

Day IV–July 21st, 2016

Technical session 2

Timings	Topics	Speakers
09.00 a.m.	Recap (Assisted Discussion)& Quiz	Dr.Shyamala Mani, NIUA
10:00 a.m.	Making wealth from waste- Some Business Models	Prof.R.J.Masilamani, BIMTECH, Greater NOIDA
10:45 a.m.	TEA BREAK	

Technical session 3

Timings	Topics	Co-ordinator
11.00 a.m.	Group activity I	Dr. Shyamala Mani, NIUA& Prof.R.J.Masilamani, BIMTECH
11.30a.m.	Presentation of group activity	

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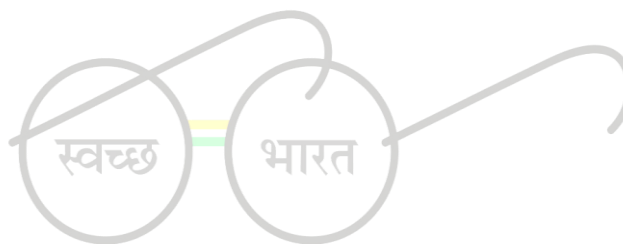
12.00 p.m.	Group Activity II	Dr.Shyamala Mani, NIUA & Prof.R.J.Masilamani, BIMTECH
12:30 p.m.	Presentation of group activity	
01:00 p.m.	Filling Feedback forms	
01.15 p.m.	LUNCH	
02.00 p.m.	Departure to WTE Ghazipur for Valedictory	

Valedictory Function

Venue: Ghazipur WTE Plant Conference Hall

Date: July 21st, 2016 Time: 3:30 p.m. – 4:30 p.m.

3:30 p.m.	Welcome	Shri.Debashish Tripathy, IL&FS, Gurgaon
	Swachh Bharat Mission	Shri.Saurabh Jain, Additional Mission Director
	Role of Swachh Bharat Mission Exposure Workshop for capacity building of ULBs	Shri. Praveen Prakash, J.S. and Mission Director, SBM
	Certificate Distribution &Valedictory Address	Shri. Maheish Girriji, Honorable MP, East Delhi
	Vote of Thanks	Dr.Shyamala Mani, NIUA
4:30 p.m.	High Tea	



एक कदम स्वच्छता की ओर

Batch 7

SWACHH BHARAT MISSION EXPOSURE WORKSHOP August 8 to 11, 2016

AGENDA

Day I

August 8th, 2016

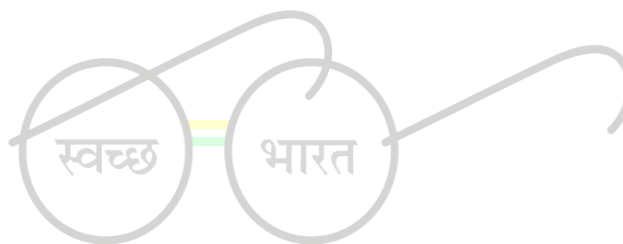
Inauguration

Timings	Topics	Speakers
12.00p.m.	Introduction & Welcome	Dr. Shyamala Mani, NIUA
12.05 p.m.	Lighting the lamp	
12.10 p.m.	Inaugural address	Mr.Saurabh Jain, Addl. Mission Director, Swachh Bharat Mission, MoUD*
12.25p.m.	Solid Waste Management Rules 2016 – An inclusive approach to Waste Management	Ms. Sanchita Jindal, Director, MoEFCC
12.55p.m.	Vote of thanks	NIUA
1:00 p.m.	Lunch	

Panel Discussion

Chair person:Dr. Shyamala Mani, NIUA

Timings	Topics	Speakers
2:00p.m.	Sampoorn House Composter	Ms. Padma Nandyal
2:20 p.m.	Not in my Backyard – Issues and Challenges	Mr.Suresh Goel, President RWA, Vasant Vihar
2:40 p.m.	Integrating waste pickers for sustainable solid waste management	Mr.Shashi Bhushan Pandit, Secretary, All India Kabadi Mazdoor Mahasangh
3:10 p.m.	Q&A	
3.30 p.m.	Tea	



एक कदम स्वच्छता की ओर

Technical session 1

Timings	Topics	Speakers
3:45 p.m.	Public Private Partnership in Solid Waste Management	Mr. Pawan Aggarwal, CEO, Green Bricks Eco-solutions, Delhi
4.05 p.m.	Responsibilities of generators and segregation at source - experiences	Dr.Lakshmi Raghupathi, Consultant
4:25 p.m.	Biomethanation	Mr. Nagendra, Assistant Fellow, TERI
4:45 p.m.	Construction and Demolition Waste Recycling	Mr.Abhijit Banerjee and Mr.Vaibhav, GIZ and Development Alternatives

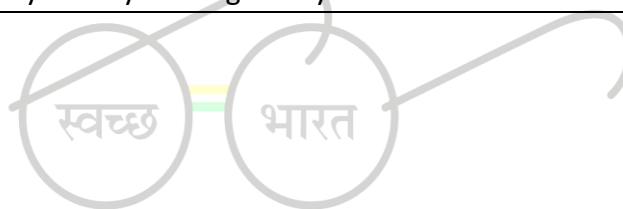
Field Trips

Day II – August 9th 2016

Timings	Locations
09.00 a.m.	Ghazipur landfill site, Ghazipur
09:45 a.m.	Ghazipur Waste to Energy
10:45 a.m.	Gulmeher – CSR supported Recycling
11.45 am	C&D Waste Recycling Plant at Shastri Park
1:45 p.m.	Lunch at Gujrawala Town, GT Karnal Road
03:30 p.m.	Composting plant at Narela Bhawana
04:15 p.m.	WTE, SLF and Leachate treatment at Narela Bhawana

Day III – August 10th 2016

Timings	Locations
08.30 a.m.	Door to Door waste collection system at Vasant Vihar
10.00 a.m.	Decentralised waste processing at GPRA, New Motibagh
11.00 a.m.	Biomethanation at Delhi Gymkhana
12:00 noon	Waste water treatment at IHC
12:30 p.m.	Lunch at NIUA
02:30 p.m.	Decentralised community based composting at DLF phase I & IV, Gurgaon by Green Bandhu
3:30 p.m.	Material Recovery Facility at Gurgaon by All India Kabadi Mazdoor Sangh



एक कदम स्वच्छता की ओर

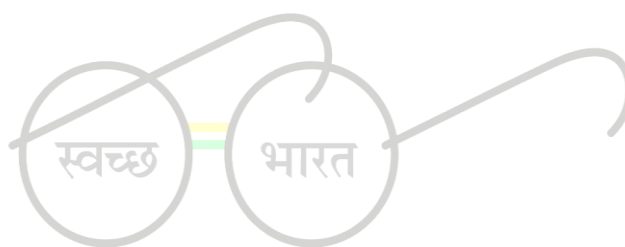
Day IV – August 11th 2016

Technical session 2

Timings	Topics	Speakers
09.00 a.m.	Recap (Assisted Discussion)& Quiz	Dr.Shyamala Mani, NIUA
10:00 a.m.	Recommendations on Integrated Plant Nutrient Management Using City Compost	Dr.S.S.Khanna, Expert
10:45 a.m.	TEA BREAK	

Technical session 3

Timings	Topics	Co-ordinator
11:00 a.m.	Making wealth from waste- Some Business Models	Prof.R.J.Masilamani, BIMTECH, Greater NOIDA
11.30 a.m.	Group activity I	Dr. Shyamala Mani, NIUA & Prof.R.J.Masilamani, BIMTECH
12.15 p.m.	Presentation of group activity	
01.15 p.m.	LUNCH	
02.00 p.m.	Group Activity II	Dr.Shyamala Mani, NIUA & Prof.R.J.Masilamani, BIMTECH
03:00 p.m.	Presentation of group activity	
04:00 p.m.	Filling Feedback forms	
04:30 p.m.	Distribution of certificates and Valedictory	



एक कदम स्वच्छता की ओर

Batch 8

SWACHH BHARAT MISSION EXPOSURE WORKSHOP August 22 to 25, 2016

AGENDA

Day I

August 22nd, 2016

Inauguration

Timings	Topics	Speakers
12.00p.m.	Introduction & Welcome	Dr. Shyamala Mani, NIUA
12.05 p.m.	Lighting the lamp	
12.10 p.m.	Inaugural address	Mr.Saurabh Jain, Addl. Mission Director, Swachh Bharat Mission, MoUD*
12.25p.m.	Solid Waste Management Rules 2016 – An inclusive approach to Waste Management	Ms. Sanchita Jindal, Director, MoEFCC
12.55p.m.	Vote of thanks	NIUA
1:00 p.m.	Lunch	

Panel Discussion

Chair person:Dr. Shyamala Mani, NIUA

Timings	Topics	Speakers
2:00p.m.	Responsibilities of Generators and segregation at source- experiences	Ms. Priya Marish, RWA Regency Park II, Gurgaon
2:20 p.m.	Recommendations on Integrated Plant Nutrient Management Using City Compost	Dr.S.S.Khanna, Expert
2:40 p.m.	Integrating waste pickers for sustainable solid waste management	Mr.Shashi Bhushan Pandit, Secretary, All India Kadi Mazdoor Mahasangh
3:10 p.m.	Q&A	
3.30 p.m.	Tea	

Technical session 1

Timings	Topics	Speakers
3:45 p.m.	Centralised Composting	Mr. Devendra Singh Soun, Excel Industries
4:05 p.m.	Not in my Backyard – Issues and Challenges	Dr.Lakshmi Raghupathi, Consultant
4:25 p.m.	Biomethanation	Mr. Nagendra, Assistant Fellow, TERI

National Institute of Urban Affairs

4:45 p.m.	Waste to Energy- viability and sustainability	Mr. Punit Babbar, WTE, IL&FS
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Field Trips

Day II – August 23rd 2016

Timings	Locations
08:00 a.m.	Departure from USI
09:00 a.m.	Ghazipur landfill site, Ghazipur
09:45 a.m.	Ghazipur Waste to Energy
10:45 a.m.	Gulmeher – CSR supported Recycling
11:45 a.m.	C&D Waste Recycling Plant at Shastri Park
01:45 p.m.	Lunch at Gujrawala Town, GT Karnal Road
03:30 p.m.	Composting plant at Narela Bhawana
04:15 p.m.	WTE, SLF and Leachate treatment at Narela Bhawana

Day III – August 24th 2016

Timings	Locations
08:00 a.m.	Departure from USI
09:00 a.m.	Decentralised community based composting at DLF phase I
10:30 a.m.	Decentralized community based segregated composting by RWA, Regency Park 2, DLF phase 4
11:00 a.m.	Composting of segregated household wet waste at ghaushala, AIKMS
12:30 p.m.	Lunch at NIUA
01:30 p.m.	Waste water treatment at IHC
02:15 p.m.	Biomethanation at Delhi Gymkhana
03:00 p.m.	Decentralised waste processing at GPRA, New Motibagh
04:15 p.m.	Door to Door waste collection system at Vasant Vihar

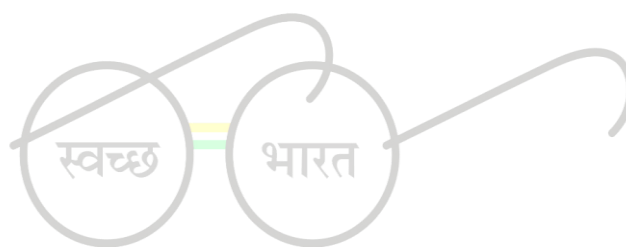
Day IV – August 25th 2016

Technical session 2

Timings	Topics	Speakers
09:00 a.m.	Recap (Assisted Discussion)& Quiz	Dr.Shyamala Mani, NIUA
09.40-10:00 a.m.	Economics of Solid Waste Management	Dr.Shyamala Mani, NIUA
10:00-10:20 a.m.	Public Private Partnership in Solid Waste Management	Mr. Pawan Aggarwal, CEO, Green Bricks Eco-Solutions, Delhi
10:20-10:40 a.m.	Daily Dump	Ms.Rozita Singh
10:40 a.m.	TEA BREAK	

Technical session 3

Timings	Topics	Co-ordinator
11:00 a.m.	Making wealth from waste- Some Business Models	Prof.R.J.Masilamani, BIMTECH, Greater NOIDA
11.30 a.m.	Group activity I	Dr. Shyamala Mani, NIUA & Prof.R.J.Masilamani, BIMTECH
12.15 p.m.	Presentation of group activity	
01.15 p.m.	LUNCH	
02.00 p.m.	Group Activity II	Dr.Shyamala Mani, NIUA & Prof.R.J.Masilamani, BIMTECH
03:00 p.m.	Presentation of group activity	
04:00 p.m.	Filling Feedback forms	
04:30 p.m.	Distribution of certificates and Valedictory	



एक कदम स्वच्छता की ओर

Batch 9

SWACHH BHARAT MISSION EXPOSURE WORKSHOP September 5th – 8th , 2016

AGENDA

Day I

September 5th, 2016

Inauguration

Timings	Topics	Speakers
12.00p.m.	Introduction & Welcome	Dr. Shyamala Mani, NIUA
12.05 p.m.	Lighting the lamp	
12.10 p.m.	Inaugural address	Mr.Saurabh Jain, Addl. Mission Director, Swachh Bharat Mission, MoUD*
12.25p.m.	Solid Waste Management Rules 2016 – An inclusive approach to Waste Management	Ms. Sanchita Jindal, Director, MoEFCC
12.55p.m.	Vote of thanks	NIUA
1:00 p.m.	Lunch	

Panel Discussion

Chair person: Dr. Shyamala Mani, NIUA

Timings	Topics	Speakers
2:00p.m.	Responsibilities of Generators and segregation at source – experiences and the NIMBY syndrome	Dr.Lakshmi Raghupathy, Consultant, Delhi
2:20 p.m.	Recommendations on Integrated Plant Nutrient Management Using City Compost	Dr.S.S.Khanna, Soil Science Expert, Delhi
2:40 p.m.	Integrating waste pickers for sustainable solid waste management	Mr.Prakash, President, Sajag Society, Delhi
3:10 p.m.	Q&A	
3.30 p.m.	Tea	

Technical session 1

Timings	Topics	Speakers
4:00 p.m.	Decentralised C&D waste management and other experiences of Development Alternatives	Dr.K.Vijayalakshmi, VP, Development Alternatives, New Delhi
4:30 p.m.	Biomethanation – TEAM Technology	Mr. Nagendra, Assistant Fellow, TERI, Delhi
4:45 p.m.	Daily Dump – Home composting	Ms.Rozita Singh, Daily Dump, Delhi NCR

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Field Trips

Day II – September 6th 2016

Timings	Locations
08:00 a.m.	Departure from USI
09:00 a.m.	Ghazipur landfill site, Ghazipur
09:45 a.m.	Ghazipur Waste to Energy
10:45 a.m.	Gulmeher – CSR supported Recycling
12:30 p.m.	C&D Waste Recycling Plant at Burari
01:45 p.m.	Lunch at Gujrawala Town, GT Karnal Road
03:30 p.m.	Composting plant at Narela Bhawana
04:15 p.m.	WTE, SLF and Leachate treatment at Narela Bhawana

Day III – September 7th, 2016

Timings	Locations
08:00 a.m.	Departure from USI
09:30 a.m.	Decentralized community based segregated composting by RWA, Regency Park 2, DLF phase 4
12:00 noon	Decentralised waste processing at GPRA, New Motibagh
1:30 p.m.	Lunch at NIUA
3:00 p.m.	Biomethanation at Delhi Gymkhana
4:15 p.m.	Decentralised composting at Vasant Vihar 'D' Block Park
5:00 p.m.	Decentralised waste water treatment at Vasant Vihar 'A' Block Park

Day IV – September 8th, 2016

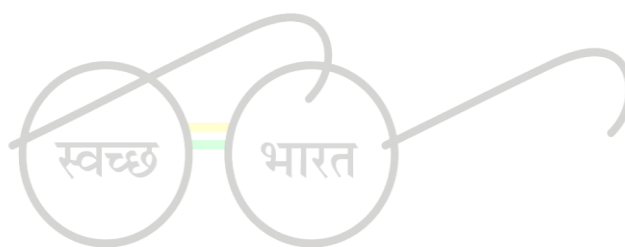
Technical session 2

Timings	Topics	Speakers
09:00 a.m.	Recap (Assisted Discussion)	Ms.Aparna Gupta & Mr.Anurag Prakash, NIUA
09.40-10:00 a.m.	Final Quiz	SBM team, NIUA
10:00-10:20 a.m.	Biomethanation Technologies for Solid Waste Management	Ms. Priyanka Gupta, Green Bricks Eco-Solutions, Delhi
10:20-10:40 a.m.	Summary and Economics of Solid Waste Management	Dr. Shyamala Mani, NIUA
10:40 a.m.	TEA BREAK	

एक कदम स्वच्छता की ओर

Technical session 3

Timings	Topics	Co-ordinator
11:00 a.m.	Making wealth from waste- Some Business Models	Prof.R.J.Masilamani, BIMTECH, Greater NOIDA
11.30 a.m.	Group activity I	Dr. Shyamala Mani, NIUA & Prof.R.J.Masilamani, BIMTECH
12.15 p.m.	Presentation of group activity	
01.15 p.m.	LUNCH	
02.00 p.m.	Group Activity II	Dr.Shyamala Mani, NIUA & Prof.R.J.Masilamani, BIMTECH
03:00 p.m.	Presentation of group activity	
04:00 p.m.	Filling Feedback forms	
04:30 p.m.	Distribution of certificates and Valedictory	



एक कदम स्वच्छता की ओर

Batch 10

SWACHH BHARAT MISSION EXPOSURE WORKSHOP September 19th – 22nd, 2016

AGENDA

Day I

September 19th, 2016

Inauguration

Timings	Topics	Speakers
12.00p.m.	Introduction & Welcome	Dr. Shyamala Mani, NIUA
12.05 p.m.	Lighting the lamp	
12.10 p.m.	Inaugural address	Mr.Saurabh Jain, Addl. Mission Director, Swachh Bharat Mission, MoUD*
12.25p.m.	Solid Waste Management Rules 2016 – An inclusive approach to Waste Management	Ms. Sanchita Jindal, Director, MoEFCC
12.55p.m.	Vote of thanks	NIUA
1:00 p.m.	Lunch	

Panel Discussion

Chair person: Dr. Shyamala Mani, NIUA

Timings	Topics	Speakers
2:00p.m	Segregation at source and home composting – experiences	Ms. Niharika Nandyal, Sampoon Composter, Delhi NCR
2:15 p.m.	Daily Dump – Home composting	Ms.Rozita Singh, Daily Dump, Delhi NCR
2:30 p.m.	Recommendations on Integrated Plant Nutrient Management Using City Compost	Dr.S.S.Khanna, Soil Science Expert, Delhi
3:10 p.m.	Integrating waste pickers for sustainable solid waste management	Mr.Sashi Pandit, Secretary, All India Kabadi Mazdoor Sangh, Delhi
3:25 p.m.	Q&A	
3.30 p.m.	Tea	

Technical session 1

Timings	Topics	Speakers
3.45 p.m.	Municipal Solid Waste with Zero Residue	Dr.S.K.Sivakumar, Neway Engineers MSW Pvt. Ltd., Chennai
4:05 p.m.	Biomethanation – TEAM Technology	Mr. Nagendra, Assistant Fellow, TERI, Delhi
4:25 p.m.	Biomethanation Technologies for	Mr.Pawan Agarwal, Green Bricks Eco-

National Institute of Urban Affairs

	Solid Waste Management	Solutions, Delhi
4:45 p.m.	Responsibilities of Generators and the NIMBY syndrome	Dr.Lakshmi Raghupathy, Consultant, Delhi

Field Trips

Day II – September 20th, 2016

Timings	Locations
08:00 a.m.	Departure from USI
09:00 a.m.	Ghazipur landfill site, Ghazipur
09:45 a.m.	Ghazipur Waste to Energy
10:45 a.m.	Gulmeher – CSR supported Recycling
12:30 p.m.	C&D Waste Recycling Plant at Shastri Park
01:45 p.m.	Lunch at Gujrawala Town, GT Karnal Road
03:30 p.m.	Composting plant at Narela Bhawana
04:15 p.m.	WTE, SLF and Leachate treatment at Narela Bhawana

Day III – September 21st, 2016

Timings	Locations
08:00 a.m.	Departure from USI
09:30 a.m.	Decentralized community based segregated composting by RWA, Regency Park 2, DLF phase 4
12:00 noon	Decentralised waste processing at GPRA, New Motibagh
1:30 p.m.	Lunch at NIUA
3:00 p.m.	Biomethanation at Delhi Gymkhana
4:15 p.m.	Decentralised composting at Vasant Vihar 'D' Block Park
5:00 p.m.	Decentralised waste water treatment at Vasant Vihar 'A' Block Park

Day IV – September 22nd, 2016

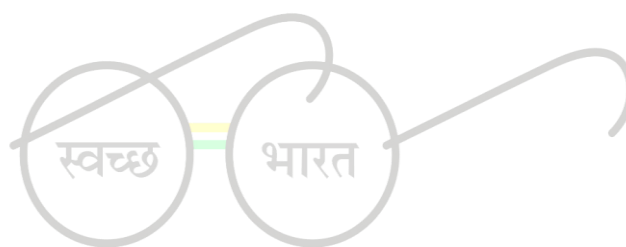
Technical session 2

Timings	Topics	Speakers
09:00 a.m.	Recap (Assisted Discussion)	Ms.Aparna Gupta & Mr.Anurag Prakash, NIUA
09.40-10:00 a.m.	Final Quiz	SBM team, NIUA
10:00-10:40 a.m.	Summary and Economics of Solid Waste Management	Dr. Shyamala Mani, NIUA
10:40 a.m.	TEA BREAK	

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Technical session 3

Timings	Topics	Co-ordinator
11:00 a.m.	Making wealth from waste - Some Business Models	Prof.R.J.Masilamani, BIMTECH, Greater NOIDA
11.30 a.m.	Group activity I	Dr. Shyamala Mani, NIUA & Prof.R.J.Masilamani, BIMTECH
12.15 p.m.	Presentation of group activity	
01.15 p.m.	LUNCH	
02.00 p.m.	Group Activity II	Dr.Shyamala Mani, NIUA & Prof.R.J.Masilamani, BIMTECH
03:00 p.m.	Presentation of group activity	
04:00 p.m.	Filling Feedback forms	
04:30 p.m.	Distribution of certificates and Valedictory	



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Batch 11

SWACHH BHARAT MISSION EXPOSURE WORKSHOP October 3rd to 6th, 2016

AGENDA

Day I

October 3rd, 2016

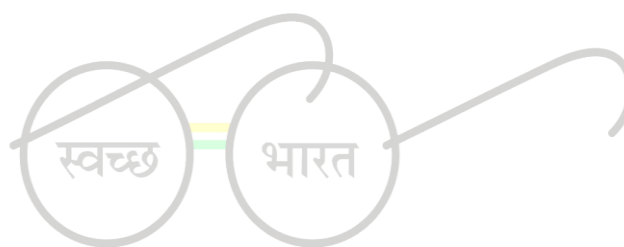
Inauguration

Timings	Topics	Speakers
12.00p.m.	Introduction & Welcome	Dr. Shyamala Mani, NIUA
12.05 p.m.	Lighting the lamp	
12.10 p.m.	Inaugural address	Mr.Saurabh Jain, Addl. Mission Director, Swachh Bharat Mission, MoUD*
12.25p.m.	Solid Waste Management Rules 2016 – An inclusive approach to Waste Management	Ms. Sanchita Jindal, Director, MoEFCC
12.55p.m.	Vote of thanks	NIUA
1:00 p.m.	Lunch	

Panel Discussion

Chair person: Dr. Shyamala Mani, NIUA

Timings	Topics	Speakers
2:00p.m	EE for segregation at source and SWM Experiences	Dr.K.Vijayalakshmi, V.P., Development Alternatives
2:15 p.m.	Daily Dump – Home composting	Ms. Monica Sharma, Daily Dump, Delhi NCR
2:30 p.m.	Recommendations on Integrated Plant Nutrient Management Using City Compost	Dr.S.S.Khanna, Soil Science Expert, Delhi
3:10 p.m.	Integrating waste pickers for sustainable solid waste management	Mr. Shashi Pandit, AIKMM, New Delhi
3:25 p.m.	Q&A	
3.30 p.m.	Tea	



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Technical session 1

Timings	Topics	Speakers
4:05 p.m.	Biomethanation – TEAM Technology	Mr. Nagendra, Assistant Fellow, TERI, Delhi
4:25 p.m.	Biomethanation Technologies for Solid Waste Management	Mr.Pawan Agarwal, Green Bricks Eco-Solutions, Delhi
4:45 p.m.	E-waste management and the NIMBY syndrome	Dr.Lakshmi Raghupathy, Consultant, Delhi

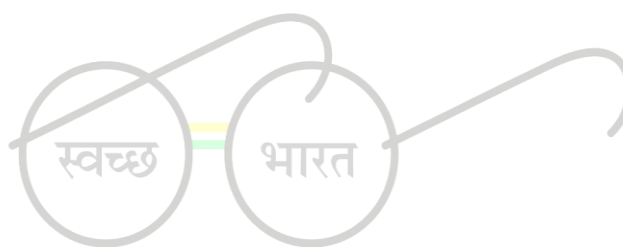
Field Trips

Day II – October 4th, 2016

Timings	Locations
08:00 a.m.	Departure from USI
09:00 a.m.	Ghazipur landfill site, Ghazipur
09:45 a.m.	Ghazipur Waste to Energy
10:45 a.m.	Gulmeher – CSR supported Recycling
12:00 p.m.	C&D Waste Recycling Plant at Shastri Park
01:00 p.m.	Containerised Biomethanation
01:30 p.m.	Lunch at Gujranwala
04:15 p.m.	Composting plant, WTE, SLF and Leachate treatment at Narela Bhawana

Day III – October 5th, 2016

Timings	Locations
08:00 a.m.	Departure from USI
09:30 a.m.	Decentralized community based segregated composting by RWA, Regency Park 2, DLF phase 4 and School at DLF Phase 4
12:30 p.m.	Decentralised waste processing at GPRA, New Motibagh
1:30 p.m.	Lunch at NIUA
3:00 p.m.	Biomethanation at Delhi Gymkhana
4:15 p.m.	Decentralised composting at Vasant Vihar 'D' Block Park
5:00 p.m.	Decentralised waste water treatment at Vasant Vihar 'A' Block Park



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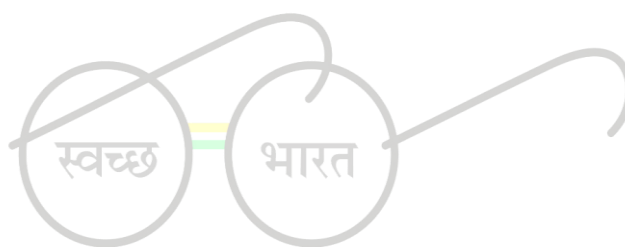
Day IV – October 6th, 2016

Technical session 2

Timings	Topics	Speakers
09:00 a.m.	Recap (Assisted Discussion)	Ms.Aparna Gupta & Mr.Anurag Prakash, NIUA
09.40-10:00 a.m.	Final Quiz	SBM team, NIUA
10:00-10:40 a.m.	Summary and Economics of Solid Waste Management	Dr. Shyamala Mani, NIUA
10:40 a.m.	TEA BREAK	

Technical session 3

Timings	Topics	Co-ordinator
11:00 a.m.	Making wealth from waste - Some Business Models	Prof.R.J.Masilamani, BIMTECH, Greater NOIDA
11.30 a.m.	Group activity I	Dr. Shyamala Mani, NIUA & Prof.R.J.Masilamani, BIMTECH
12.15 p.m.	Presentation of group activity	
01.15 p.m.	LUNCH	
02.00 p.m.	Group Activity II	Dr.Shyamala Mani, NIUA & Prof.R.J.Masilamani, BIMTECH
03:00 p.m.	Presentation of group activity	
04:00 p.m.	Filling Feedback forms	
04:30 p.m.	Distribution of certificates and Valedictory	



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Batch 12

SWACHH BHARAT MISSION EXPOSURE WORKSHOPS October 17th to 20th, 2016

AGENDA

**Day I
17th October, 2016**

Inauguration

Timings	Topic	Speaker
10.00 a.m.	Registration	
11:00 a.m.	Welcome & Introduction	Dr. Shyamala Mani, NIUA
11:10 a.m.	Lighting the lamp	
11:15 a.m.	Special address	Maj. Gen. P.K. Goswami, VSM (Retd), Dy. Dir. Admin. , USI
11:20 a.m.	Inaugural address	Maj. Gen. PJ S Sandhu (Retd), Dy. Director and Editor, USI
11.40 a.m.	Vote of thanks	Ms. Aparna Gupta, NIUA
12:00 noon	Tea Break	
12:30 p.m.	Recommendations on Integrated Plant Nutrient Management Using City Compost	Dr. S.S.Khanna, Soil Science Expert and VP of DAV, Delhi
01:15 p.m.	Lunch	

Panel Discussion

Chair person: Dr. Shyamala Mani, NIUA

Timings	Topics	Speakers
2:00p.m	Solid Waste Management Rules 2016 and its Implementation	Dr. J.S.Komyotra, Director, Central Pollution Control Board, Delhi
2:45 p.m.	SWM Experiences	Mr. Jubin Jacob Babu, Development Alternatives
3:00 p.m.	Daily Dump – Home composting	Ms. Monica Sharma, Daily Dump, Delhi NCR
3:15 p.m.	Integrating waste pickers for sustainable solid waste management	Mr. Prakash Kumar, Sajag Society, New Delhi
3.30 p.m.	Tea	

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Technical session 1

Timings	Topics	Speakers
3:45 p.m.	MobiTrash	Mr. Devendra Singh Soun, Excel Industries
4:05 p.m.	Biomethanation – TEAM Technology	Mr. Nagendra, Assistant Fellow, TERI, Delhi
4:25 p.m.	Biomethanation Technologies for Solid Waste Management	Mr. Pawan Agarwal, Green Bricks Eco-Solutions, Delhi
4:45 p.m.	E-waste management and the NIMBY syndrome	Dr. Lakshmi Raghupathy, Consultant, Delhi

Field Trips

Day II – October 18th, 2016

Timings	Locations
08:00 a.m.	Departure from USI
09:00 a.m.	Ghazipur landfill site, Ghazipur
09:30 a.m.	Ghazipur Waste to Energy
10:30 a.m.	Gulmeher – CSR supported Recycling
12:00 p.m.	Chintan's Material Recovery Facility, Bhopura
1:30 p.m.	Lunch at Dilshad Garden
02:30 p.m.	C&D Waste Recycling Plant at Shastri Park
04:30 p.m.	Composting plant, WTE, SLF and Leachate treatment at Narela Bhawana

Day III – October 19th, 2016

Timings	Locations
08:00 a.m.	Departure from USI
09:30 a.m.	Decentralized community based segregated composting by RWA, Regency Park 2, DLF phase 4
12:30 p.m.	Containerised Biomethanation at DMRC, Shastri Park
1:30 p.m.	Lunch at NIUA
3:00 p.m.	Decentralised waste processing at GPRA, New Motibagh
4:00 p.m.	Biomethanation at Delhi Gymkhana
5:00 p.m.	Decentralised composting at Vasant Vihar 'D' Block Park
5:15 p.m.	Decentralised waste water treatment at Vasant Vihar 'A' Block Park



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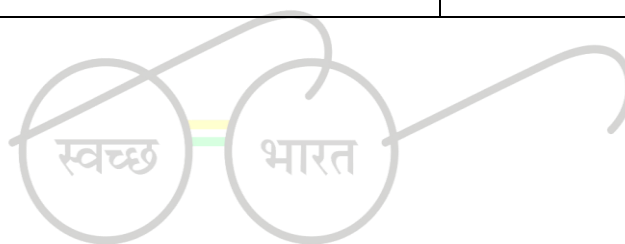
Day IV – October 20th, 2016

Technical session 2

Timings	Topics	Speakers
09:00 a.m.	Recap (Assisted Discussion)	Ms.Aparna Gupta & Mr.Anurag Prakash, NIUA
09.40-10:00 a.m.	Final Quiz	SBM team, NIUA
10:00-10:40 a.m.	Summary and Economics of Solid Waste Management	Dr. Shyamala Mani, NIUA
10:40 a.m.	TEA BREAK	

Technical session 3

Timings	Topics	Co-ordinator
11:00 a.m.	Making wealth from waste - Some Business Models	Prof. R.J.Masilamani, BIMTECH, Greater NOIDA
11.30 a.m.	Group activity I	Dr. Shyamala Mani, NIUA & Prof.R.J.Masilamani, BIMTECH
12.15 p.m.	Presentation of group activity	
01.15 p.m.	LUNCH	
02.00 p.m.	Group Activity II	Dr.Shyamala Mani, NIUA & Prof.R.J.Masilamani, BIMTECH
03:00 p.m.	Presentation of group activity	
04:00 p.m.	Filling Feedback forms	
Valedictory Function		
04:30 p.m.	SBM Oath	NIUA
04:35 p.m.	Report of the workshops	Ms. Aparna Gupta, NIUA
04:45 p.m.	Distribution of certificates and prizes	
05:00 p.m.	Valedictory address	Prof. Jagan Shah, Director, NIUA
05:15 p.m.	Vote of thanks	Prof. Shyamala Mani, NIUA
05:20 p.m.	High Tea	



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Annexure - 9

Activity-1 Analysis {Issues & Challenges}

Introduction:

The SBM Exposure workshops project successfully completed 12 Batches (May to October' 2016), wherein 224 participants not only attended lectures and visited plants to understand technologies but also contributed to Activities 1 and 2. For the ease of the participants, they were placed in 3-6 groups in each workshop totaling about 44 groups in all 12 batches.

On the last day of the workshop, participants were divided into groups of 4-5 people in each group, who first discussed among themselves and then presented the challenges and issues that they faced in their municipal area with respect to solid waste management.

On analyzing the "issues & challenges" highlighted by the participating ULBs to prioritize the most critical and the least critical ones, they were categorized them into their respective inherited types. Ten parent categories were made, each of which was further segmented based on its nature and aspect. The results of the analysis are presented below.

The Issues & challenges which relatively occur under the various parent categories are as mentioned below:

1) Land:

- a) *Land Non-availability:* It refers to the scarcity of land for "management, treatment & Disposal" of waste. The carrying capacity of land has reached its saturation levels by dedicating/allotting land for various city development projects; such as Group Housing, Commercial units, Recreational facilities and many more.
- b) *Land cost:* The cost of land is found to be remarkably high as the cities and states are going through accelerated city development plans; and so in such scenario it is exceptionally difficult to acquire land for Solid waste management facilities such as Landfill, Treatment centers.
- c) *Land litigation :* it refers to a land which is available but is under legal dispute.
- d) *Land acquisition/ opposition :* It is an issue specifically for acquiring large pieces of land in a city's outskirts.
- e) *Land use planning:* It refers to the land use plan which does not consider a land fill facility or a waste treatment center within the master plan.
- f) *Landfill site / transfer site/ collection point (Issues):* Land not available specific to collection centers and intermediate transfer sites

- g) *Land topographical constraints*: This issue refers to uneven terrain and low lying areas.

2) Finance

- a) *Lack of Funds*: It refers to non-availability of monetary resources for building new infrastructure
- b) *Allocation of Funds* : It refers to allocating specific funds in the municipal budget for various activities of the ULB including SWM
- c) *Revenue tapping*: It refers to having a control over revenue/income flow.
- d) *User Charges*: These are payments for environmental services or resources, whose provision in turn is (partly or wholly) financed by the charges.
- e) *Spot fine*: It refers to money that violator has to pay as a punishment
- f) *Tipping fee*: It is a gate fee/tipping fee, the charge levied upon a given quantity of waste received at a waste processing facility.
- g) *Salary for workers*: Insufficient salary given to the employee.
- h) *Cost recovery*: recovering the costs of any given expense
- i) *High Transportation cost*: Cost of transportation is high for carrying waste for long distances

3) Political, policies & framework Issues & Challenges:

- a) *Political interference*: Refers to unauthorized involvement of political parties in the functioning of Municipality.
- b) *Law Barriers*: An immediate *barrier* for pursuing a *legal* issue.
- c) *Implementation / Enforcement of policy*: It refers to implementing policies by the Government which has to be abided by both ULBs as well as the citizens.
- d) *PPP, Third party, Bi laterals Collaboration*: It refers to lack of Public-private partnership by the municipal corporation
- e) *Monitoring/ Evaluation* : It refers to describing and analyzing the development and implementation of policies, identifying potential gaps in the process, outlining areas for improvement, and holding policy implementers accountable for their activities.
- f) *Corruption*: It refers to dishonest or fraudulent conduct by those in power, typically involving bribery

- g) *Accounting/ Auditing/ Transparency*: It refers to the process or work of keeping financial accounts.
- h) *Hazy framework*: It refers to an ill-defined policy framework.

4) Social Issues & challenges:

- a) *Awareness* : awareness among people on the issue of solid waste management
- b) *Public participation*: Public participation in keeping their surroundings clean and contributing their bit towards a much more greener environment.
- c) *Incentive & Rewards*: Incentives and rewards in terms of appreciation, building infrastructure such as park, walking track etc.
- d) *Opposition*: Resistance by community for Solid waste management.
- e) *Public mindset (not flexible to adapt)* : It is tough to divert mind of people towards green -clean India as they are resistant to change
- f) *NIMBY: "Not in my backyard"*, it refers to a person/ community who objects to waste management processes in their own neighborhood, locality or sometimes city.
- g) *Civic sense*: It reflects the actual personality and shows the responsibility of any individual.
- h) *RWA competing approach*: It is always good to have a healthy competition which not only helps in building a clean environment but also brings a sense of togetherness.
- i) *Media Support*: such as T.V, Radio, Internet, Newspaper which helps in communicating such issues publicly and gather support.
- j) *People's attitude towards sanitary workers*: It refers to how people's attitude still haven't changed towards safai karamcharis. They still treat them as lower class people whose only work is to collect garbage.

5) Technology & Infrastructure Issues & Challenges

- a) *Collection system/centers/ Transportation stations*: It refers to collection points from where waste is collected and segregated.
- b) *Cost effective technology / Unavailability*: It refers to the technology and its services received for the money spent.
- c) *Sanitary landfills*: are sites where waste is isolated from the environment until it is safe. It is considered when it has completely degraded biologically, chemically and physically

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- d) *Machinery & Equipments*: Non-availability of correct machinery & equipments used in the process of solid waste management.
- e) *Non- operational facility*: It refers to building of huge infrastructure for the development of SWM but unfortunately they aren't in a workable state.
- f) *Transport facility*: Non-availability of proper transport vehicle which can carry waste to the collection center.
- g) *Decentralized facility*: Non-availability of decentralized facility for solid waste management
- h) *Plant utilization (Optimum use)*: Plants which are built for waste management aren't optimally utilized.
- i) *E-waste*: such as discarded electronic appliances such as mobile phones, computers, and televisions.
- j) *Biomedical waste*: It refers to waste which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biological.
- k) *Lack of Infrastructure*: Lack of funds in the municipal corporation/ ULB and no involvement with PPP results in poor development of infrastructure for SWM.
- l) *Fly Ash*: Ash produced in small dark flecks by the burning of garbage, RDF, powdered coal or other materials and carried into the air.

6) Process Issues & Challenges

- a) *Generation/ Disposal*: It refers to littering and dumping of waste unethically.
- b) *Collection* : It refers to collection of waste from various sources of waste generation
- c) *Segregation*: It refers to segregating waste into different categories such as Dry, Wet, domestic hazardous, insanitary waste etc.
- d) *Hauling*: To transport the waste from one place to another.
- e) *Recycling* : Recycling reusable waste such as plastic
- f) *Management*: Managing of waste from the point of collection to the disposal in a responsible manner.
- g) *Outdated system*: It refers to outdated technology used in the process of collection & disposal of waste.
- h) *Treatment (Sewage/ Leachate)*: Sewage treatment is the process of removing contaminants from wastewater, primarily from household sewage.

- i) *Operation & Maintenance of plants*: It refers to a formulated plan of training, cleaning, work practices, and surveillance to maintain a plant in good condition
- j) *Marketing & Reuse*: The product such as manure which is procured from processing wet waste and selling it at a reasonable rate in the market.

7) Environmental Issues & Challenges

- a) *Ground water contamination*: This refers to the percolation of Leachate through landfills into the groundwater; the process is much more accelerated in the areas where the water level is very high.
- b) *Air Pollution*: This refers to mostly to open burning of waste & other transferable traces of polluted air.
- c) *Aesthetic* : It refers to the health of the people around and its environment
- d) *Land pollution*: It refers to Dumping & heaping of solid waste on land.
- e) *Water pollution (Canals, Nalaas, Drains)*: It refers to discharge of untreated sewage & direct dumping of solid waste into the rivers.

8) Topographical Issues & Challenges

- a) *Hilly*: Hilly topography has constraints to hauling of vehicles due to its sloppy nature; the chances of Landslides are far more certain.
- b) *Coastal* : The coastal areas are typically prone to get polluted due to untreated solid waste, sewage flowing into the canals, rivers.
- c) *Plains*: The plain areas are easily prone to Open dumping sites.

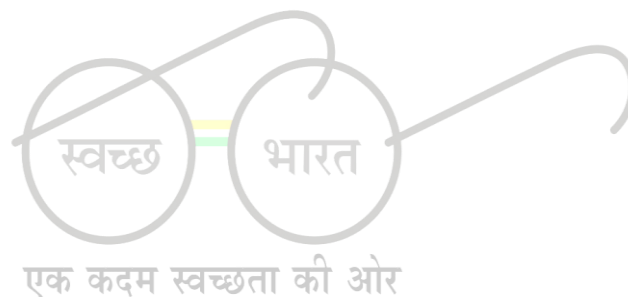
9) Waste Generators related Issues & Challenges

- a) *Slum*: People residing in slum generate huge amount of waste and lack in civic sense.
- b) *Residential colonies* : People residing in residential colonies litter waste in community centers & park
- c) *Commercial*: Places like restaurants, theatre, shopping complex generate huge amount of waste.
- d) *Industrial*: Chemical & e-waste generated from industries
- e) *Floating population*: Floating population create a havoc during festive season leading to more accumulation of waste

f) *Agricultural*: such as fertilizers & Pesticides.

10) HR & Admin. Issues & Challenges

- a) *Capacity building*: It refers to training the ULBs, Third party, Project in-charge and "safai karamcharis".
- b) *Manpower/ labor*: It refers to any labor related issues.
- c) *Resource availability*: Lack of material and financial resources
- d) *HR management*: It maintains overall work discipline & responsible to responds to any official grievances.
- e) *Expertise &Skills*: It deals with the issues such as unskilled/ un-trained staff.
- f) *Health safety*: This refers of ensuring the workers with PPE (Personal Protective Equipments), Accidental insurance and Compensation of death loss.
- g) *Time management*: It refers to tracking daily work hours of each employee by Biometric records.
- h) *Motivation (Workers)*: This refers to the motivational drives by trainings, counseling; wherein the team leader plays a significant role.



Analysis of Activity -1 : Issues & Challenges

Land

According to the analysis among land issues, Land unavailability (50%) is the area of high concern, while the second most critical land aspect is Topographical constraints (18%). The remaining land issues as highlighted by the participants are Land cost (5%), Land litigation (3%), Land acquisition (8%), Land-use planning (8%) and location of Landfill site (8%).

Table 6 : Land Aspect

Land Issues & Challenges	Percentage
Land Unavailability	50
Land cost	5
Land litigation	3
Land acquisition/ opposition	8
Land use planning	8
Landfill site / transfer site/ collection point (Issues)	8
Land topographical constraints	18
Total	100

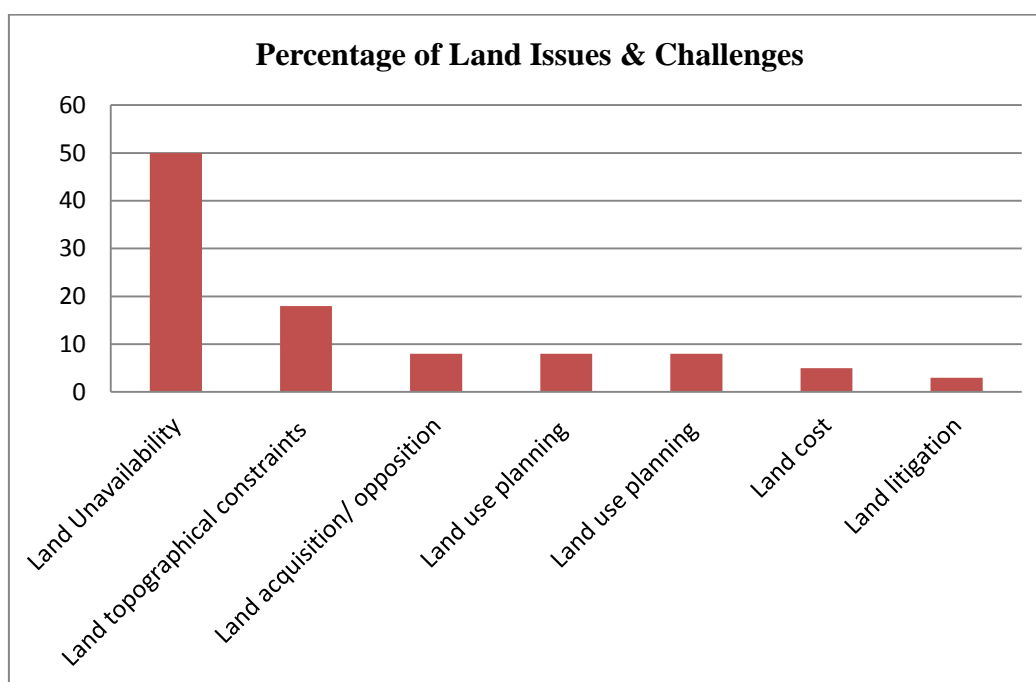


Figure 11: Analysis of Land issues & challenges

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Financial Issues

The analysis shows that among Financial issues, Lack of Funds holds a major concern in various municipalities (44%) and the second most important concern is of User charges (18%). The remaining issues such as Allocation of funds (8%), Revenue tapping (10%), difficulty in implementing Spot Fine (4%), Tipping fee (4%), Paying regularly salary of workers (7%), Cost recovery (3%) and High Transportation cost (2%).

Table 7 : Financial Aspect

Financial Issues & Challenges	Percentage
Lack of Funds	44
Allocation of Funds	8
Revenue tapping	10
User Charges	18
Spot fine	4
Tipping fee	4
Salary for workers	7
Cost recovery	3
High Transportation cost	2
Total	100

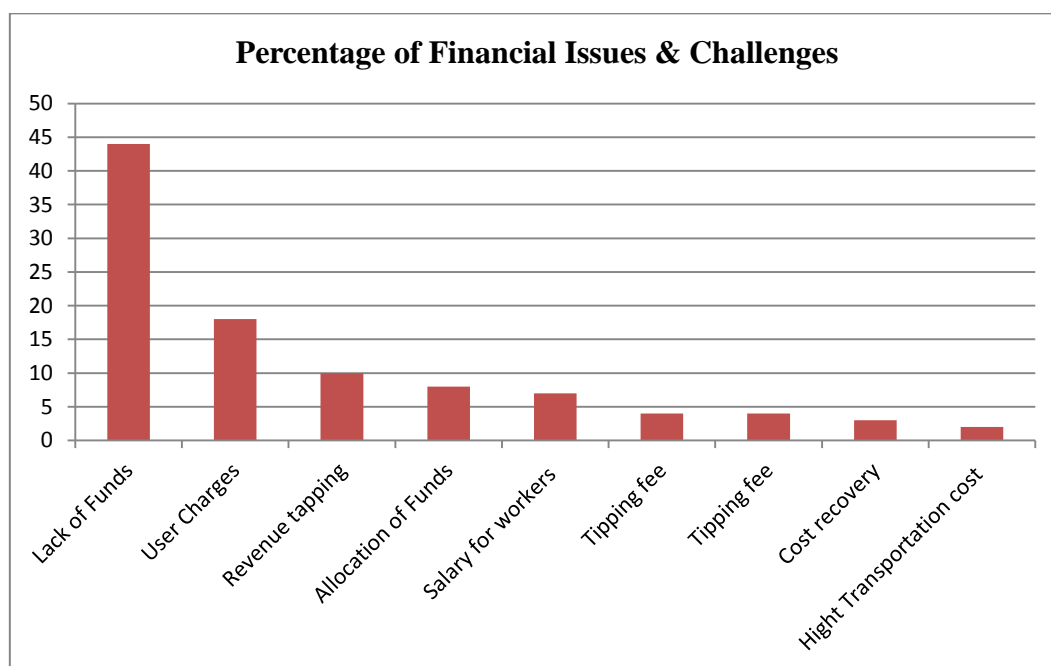


Figure 12 : Analysis of Financial Issues & Challenges

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HR & Admin Issues

According to the analysis, among HR & Administration, Lack of Manpower or labor holds a major concern in various municipalities (36%) and the second most important concern is of Capacity Building & HR Management (16%) respectively. The remaining issues are such as Resource availability (4%), Expertise & skills (13%), Health Safety (5%), Time Management (3%) and Motivation in workers (7%).

Table 8 : Human Resource Aspects

HR & Admin. Issues & Challenges	Percentage
Capacity building	16
Manpower/ labor	36
Resource availability	4
HR management	16
Expertise & Skills	13
Health safety	5
Time management	3
Motivation (Workers)	7
Total	100

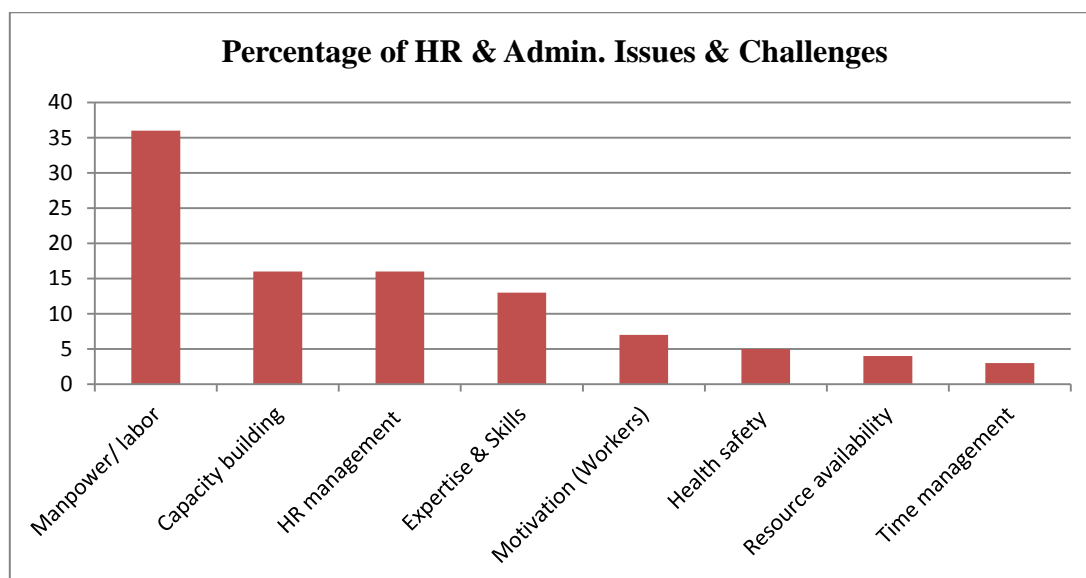


Figure 13 : Analysis of H.R Issues & Challenges

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Process Issues

According to the analysis, among Process issues and challenges, source segregation holds a major concern in various municipalities (33%) and the second most important concern is of Collection of waste (19%). The remaining issues are such as Generation/ Disposal (12%), Hauling (12%), Recycling (5%), Management (12%), Outdated systems (2%), Treatment (sewage/Leachate) (2%), Unavailability of O & M Plants (1%), Marketing and Reuse (2%).

Table 9 : Process Aspects

Process Issues & Challenges	Percentage
Generation/ Disposal	12
Collection	19
Segregation	33
Hauling	12
Recycling	5
Management	12
Outdated system	2
Treatment (Sewage/ leachate)	2
O & M of plants	1
Marketing & Reuse	2
Total	100

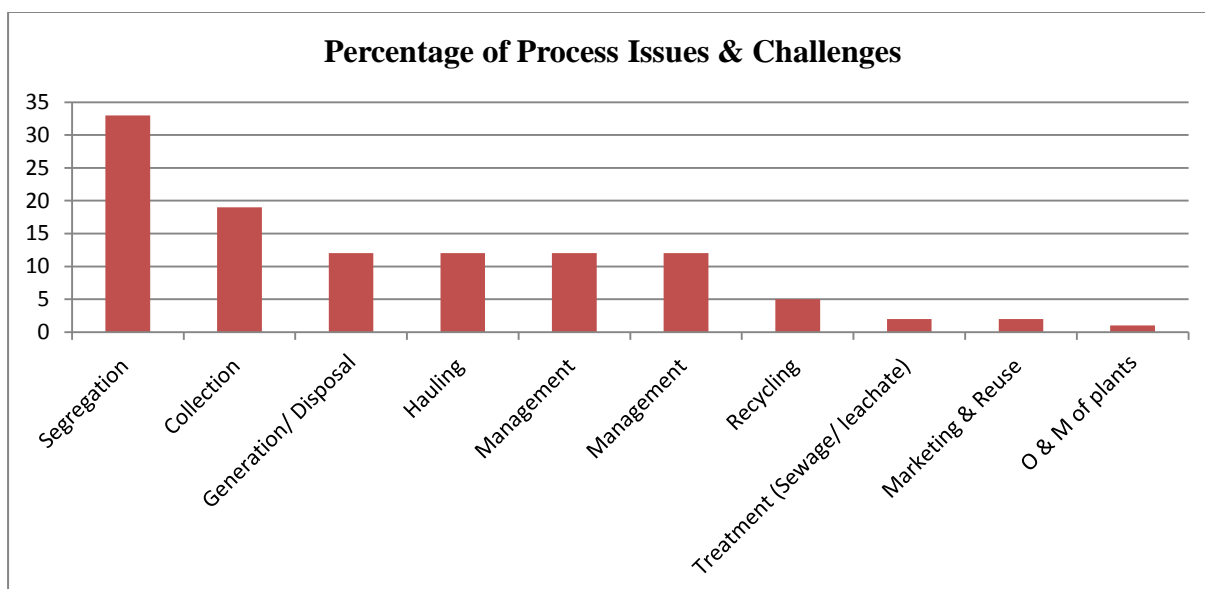


Figure 14 : Analysis Of Process Issues & Challenges



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Technology & Infrastructure Issues

According to the analysis, among Technology and infrastructure issues & challenges, lack of Cost effective technology holds a major concern (19%) and the second most important concern is of Collection system (15%). The remaining issues are such as Sanitary Landfill (8%), Machinery & Equipments (9%), Non-operational Facilities (7%), Transport Facilities (5%), Decentralized Facilities (1%), Optimum utilization of plant (8%), E-waste management (6%), Biomedical waste (4%), Lack of Infrastructure (12%), Infrastructure pending proposals (5%) and Fly ash management (1%)

Table 10 : Technology & Infrastructure Aspect

Technology & Infrastructure Issues & Challenges	Percentage
Collection system/centers/ Transportation stations	15
Cost effective technology / Unavailability	19
Sanitary landfills	8
machinery & Equipments	9
Unoperational facility	7
Transport facility	5
Decentralized facility	1
Plant utilization (Optimum use)	8
E-waste	6
Biomedical waste	4
Lack of Infrastructure	12
Infra. Devp / pending proposals	5
FlyAsh	1
Total	100

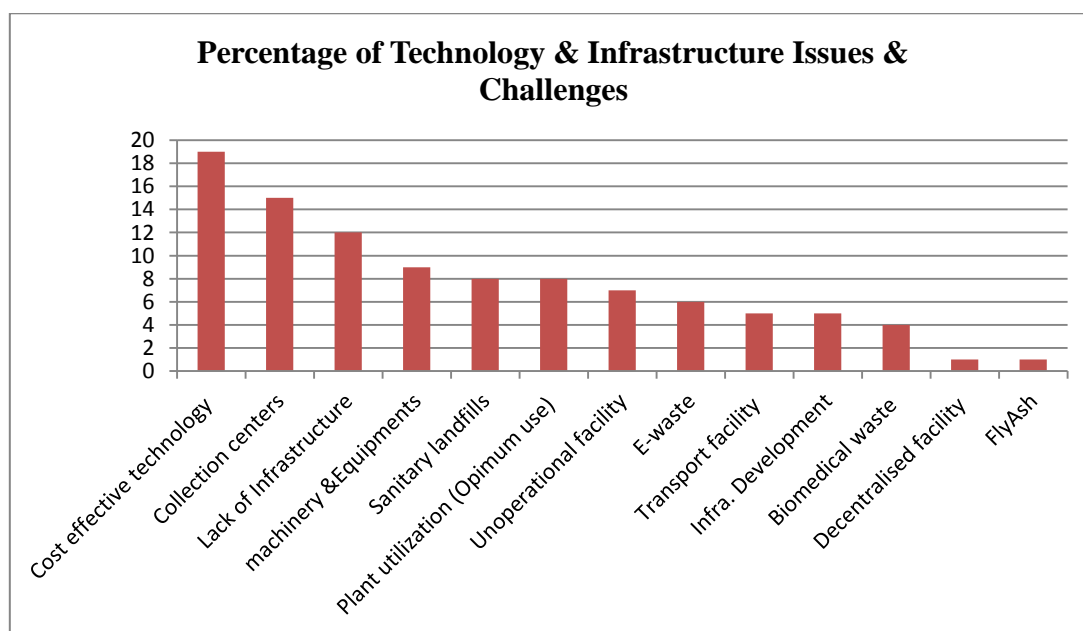


Figure 15 : Analysis of Technology & Infrastructure Issues & Challenges.

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Political policies & Framework issues:

According to the analysis, among Political policies & Framework, Political Interference holds a major concern (27%) and the second most important concern is of PPP, Third-party, Bilateral Collaboration(25%). The remaining issues are such as law Barrier's/ Outdated Policies (5%), Implementation/ Enforcement of Policies (18%), Monitoring/ Evaluation (5%), Corruption (6%), Accounting/ Audit/ Transparency (6%), Hazy framework (8%).

Table 11 : Political Aspects

Political, policies & framework Issues & Challenges	Percentage
Political interference	27
Law Barrier's / Outdated policies	5
Implementation / Enforcement of policy	18
PPP, Third party, Bi laterals Collaboration	25
Monitoring/ Evaluation	5
Corruption	6
Accounting/ Auditing/ Transparency	6
Hazy framework	8
Total	100

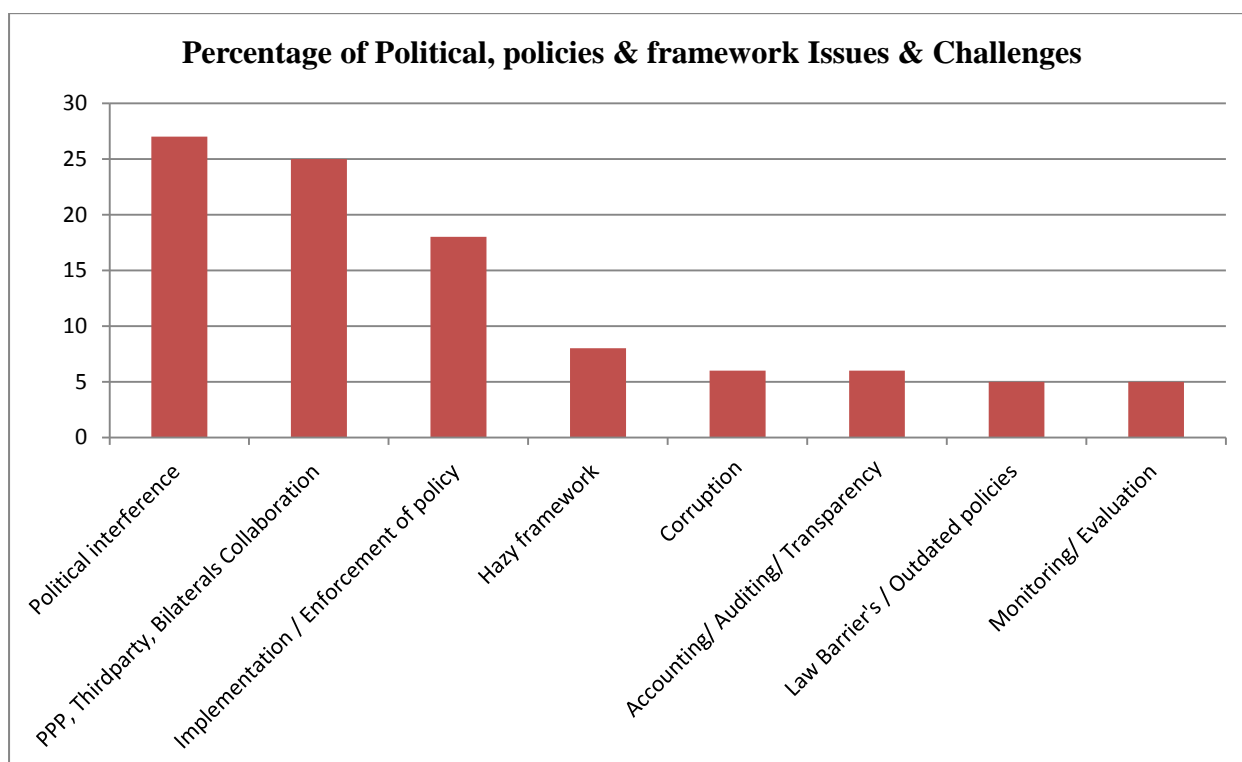


Figure 16 : Analysis of Political, Policies & framework Issues & Challenges

Social Issues

According to the analysis, among social issues, Awareness among the citizens holds a major concern (37%) and the second most important concern is Inactive Public Participation (19%). The remaining issues are such lack of incentives & rewards (3%), Opposition to change (9%), Public mindset (11%), NIMBY (5%), Lack of civic sense among the citizens (7%), RWA competing approach (3%), lack of media support (1%) & People Attitude towards Sanitary Worker (5%)

Table 12 : Social Aspects

Social Issues & Challenges	Percentage
Awareness	37
Public participation	19
Incentive & Rewards	3
Opposition	9
Public mindset (not flexible to adapt)	11
NIMBY	5
Civic sense	7
RWA competing approach	3
Media Support	1
People Attitude towards Sanitary Workers	5
Total	100

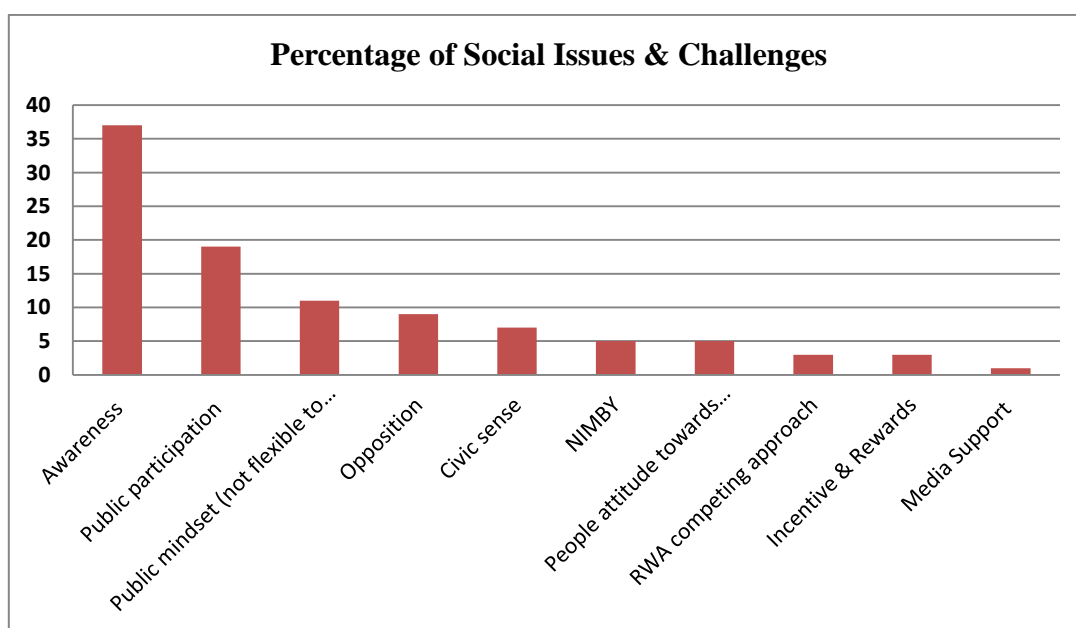


Figure 17 : Analysis of Social Issues & Challenges

Waste Generator issues

According to the analysis, among Waste Generators related issues & challenges, Slum Generators holds a major concern of about (35%) and the second most important concern is Floating population and migrants flowing into the city during festive seasons generating waste up to (30%). The remaining issues are such as waste generated by Residential/Unauthorized colonies (12%), Commercial waste generators (6%), Industrial waste generators (12%) and Agricultural waste generators (5%).

Table 13: Waste Generator level Aspects

Waste Generators related Issues & Challenges	Percentage
Slum	35
Residential/unauthorized colonies	12
Commercial	6
Industrial	12
Floating & Migrants	30
Agricultural	5
Total	100

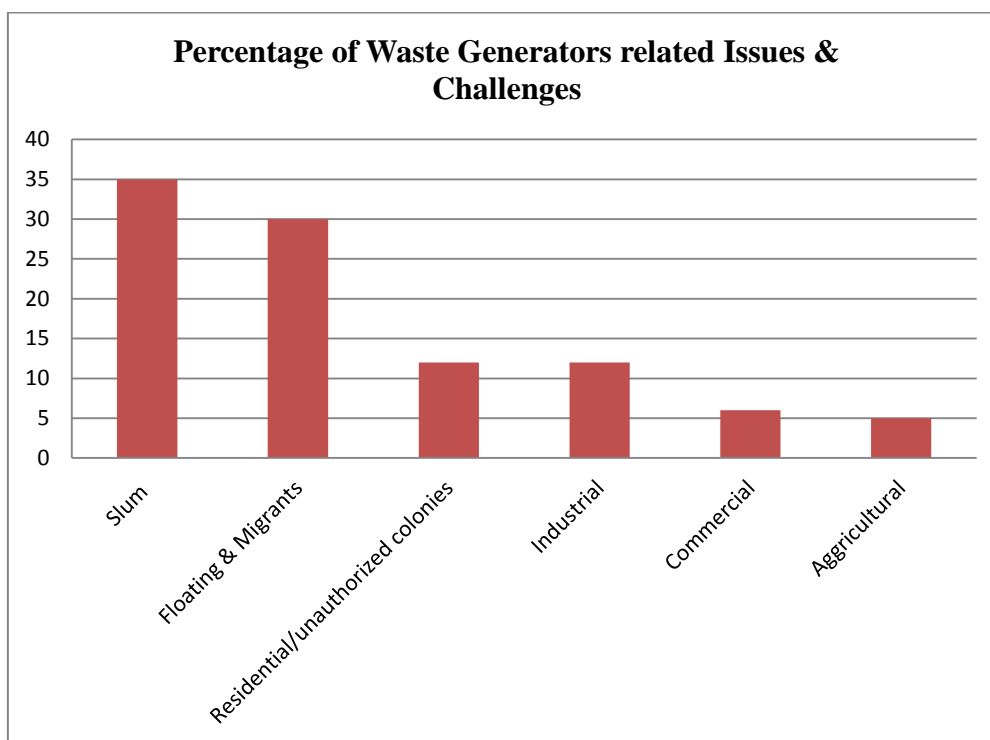


Figure 18 : Analysis of Waste generators Issues & Challenges

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Topographical issues

According to the analysis, among Topographical issues & challenges, Uneven Hilly Terrain holds a major concern for the ULBs (58%) due to difficulties in hauling of vehicles carrying waste from one place to another and collecting waste from the valley is problematic and the second most important concern is of waste management in Coastal Regions (33%). The remaining issues are related to Plain areas (9%).

Table 14 : Topographical Aspects

Topographical Issues & Challenges	Percentage
Hilly	58
Coastal	33
Plain	9
Total	100

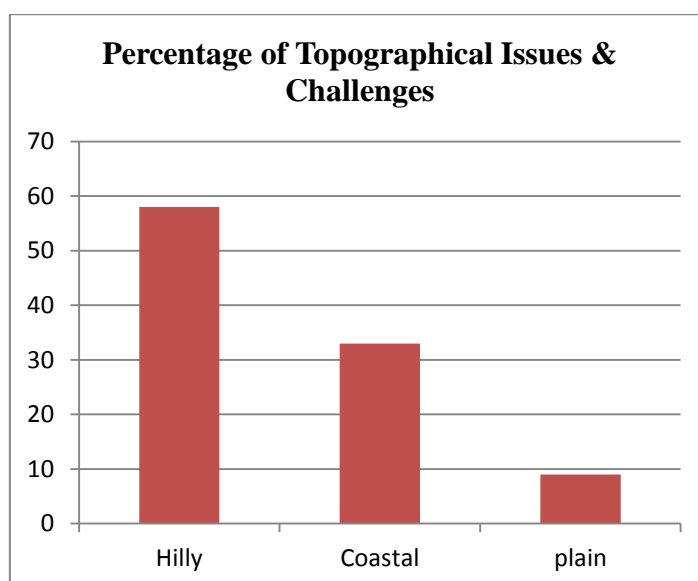
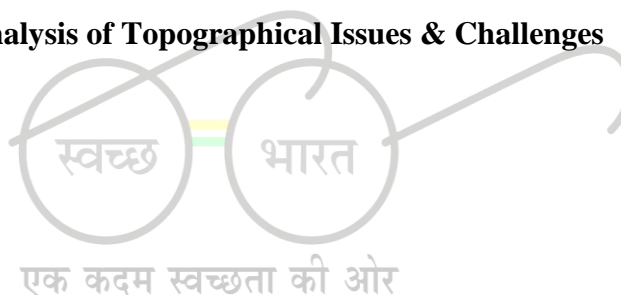


Figure 19: Analysis of Topographical Issues & Challenges



Environmental Issues

According to the analysis, among Environmental issues & challenges, Land Pollution holds a major concern for the ULBs (32%) and the second most important concern is of Aesthetic issues (28%). The remaining issues are Ground water contamination (12%), Air pollution (4%) and Water pollution (24 %).

Table 14: Environmental Aspects

Environmental Issues & Challenges	Percentage
Ground water contamination	12
Air Pollution	4
Aesthetic	28
Land pollution	32
Water pollution (Canals, Nalaa's, Drains)	24
Total	100

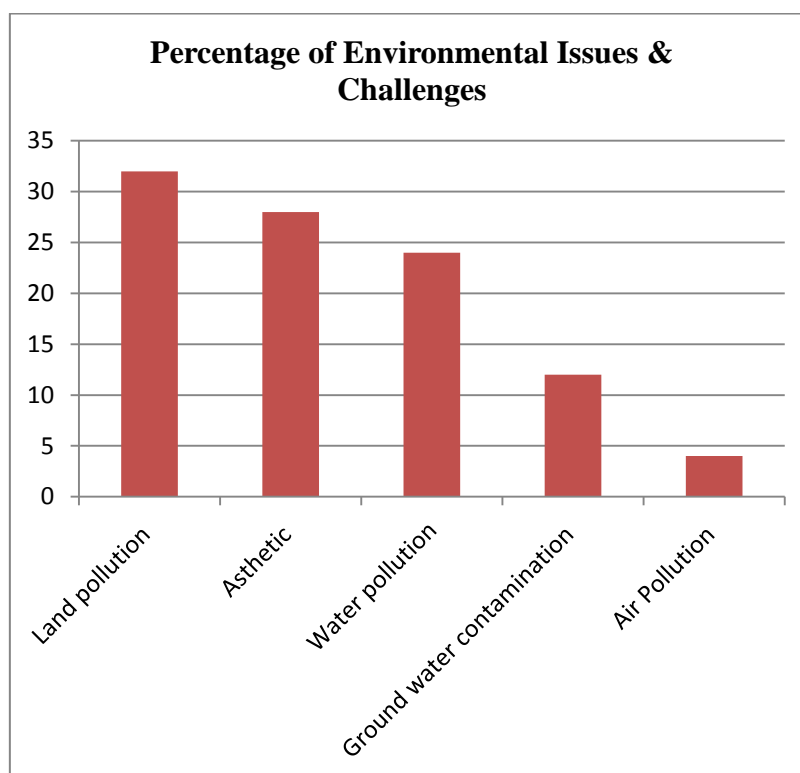


Figure 20 : Analysis of Environmental Issues & Challenge



CONCLUSION

As per percentage pattern of various Issues and challenges, it is evident that the most significant area to be looked at is "process issues & challenges" which itself holds a major share of 66% overall. 'Technology & Infrastructure', 'HR & Admin' and 'Social Issues', as the second, third and fourth most vital aspects which should be developed and taken care of. The other related 'issues & challenges' such as Political policies & framework, Financial issues, Land related issues, Environmental issues, Topographical issues and Waste generators cannot be tracked out as those are equally important aspects of integrated Solid Waste Management.

Table 15 : Percentage pattern of all Aspects

Percentage pattern of Issues & Challenges	No. of Groups out of 44	Percentage of each challenge out of 44
Process Issues & Challenges	29	66
Technology & Infrastructure Issues & Challenges	26	59
HR & Admin. Issues & Challenges	24	55
Social Issues & Challenges	23	52
Political, policies & framework Issues & Challenges	21	48
Financial Issues & Challenges	20	45
Land Issues & Challenges	18	41
Environmental Issues & Challenges	11	25
Waste Generators related Issues & Challenges	9	20
Topographical Issues & Challenges	5	11

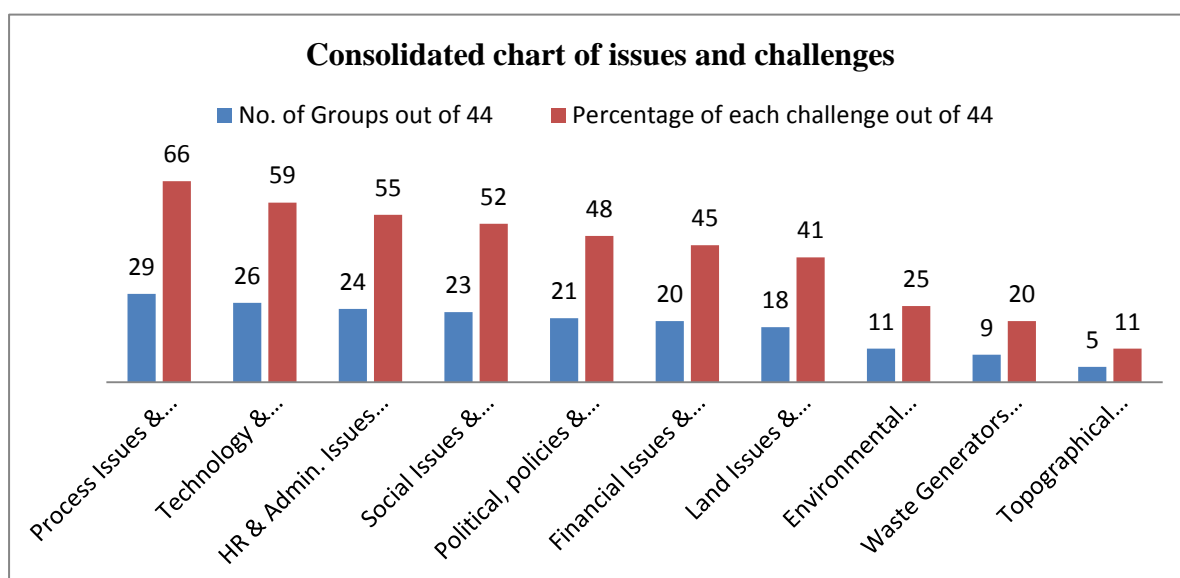


Figure 21: Consolidated chart analysis of Issues & challenges

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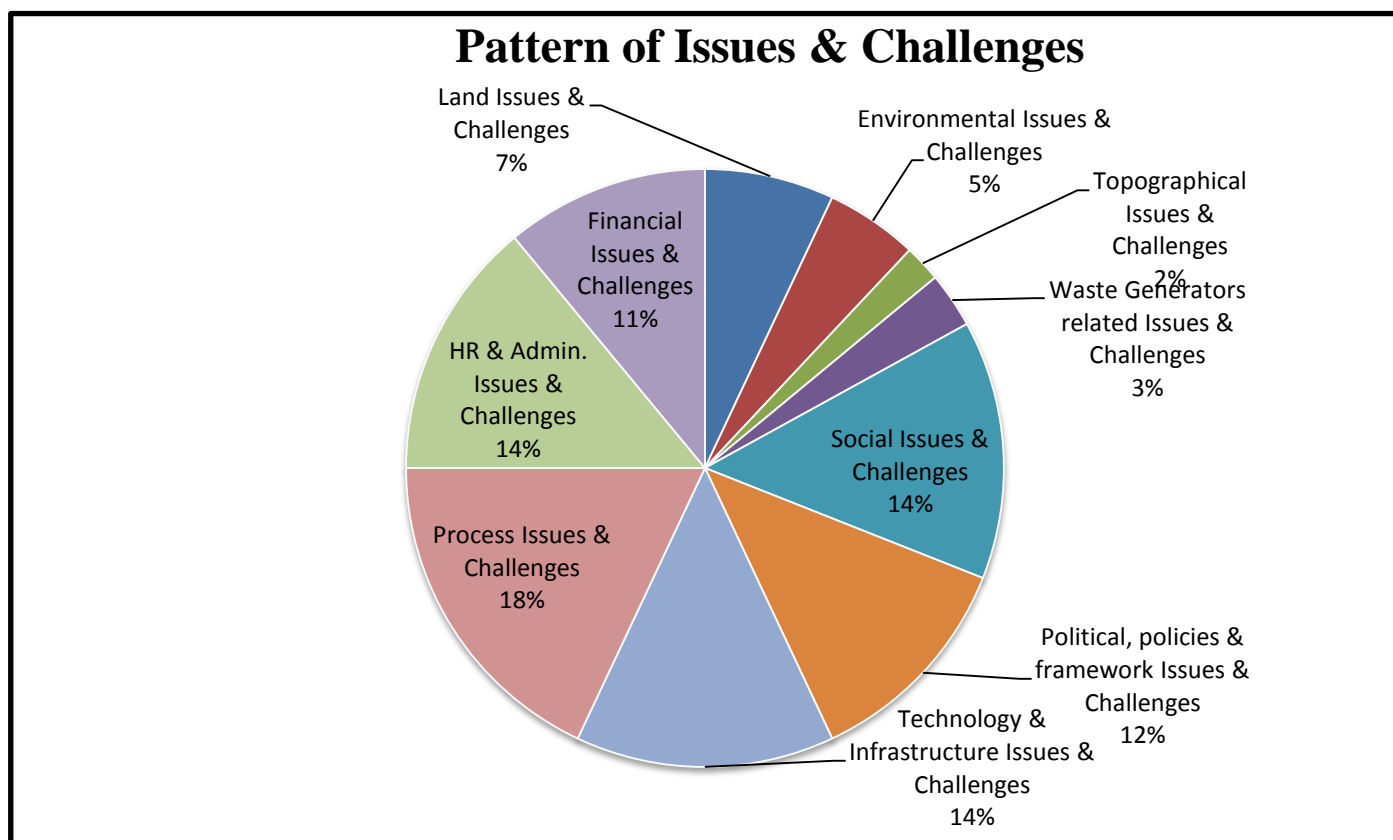
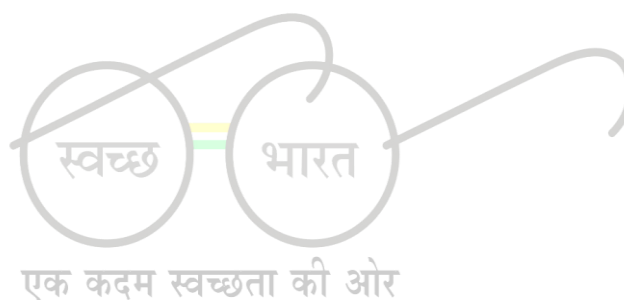


Figure 22 : Cumulative Analysis of Issues & challenges



Annexure-10

Activity -2 {Chart Analysis of Cost effective Technologies}

Introduction:

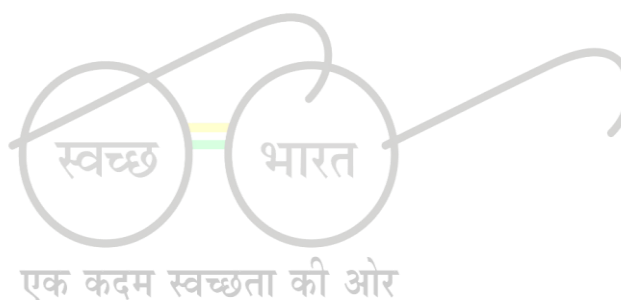
The second group activity required participants to design plans for their own cities or hypothetical cities of a particular population. This is done to see if they have understood the main concept of this workshop and encourages them to plan to bring about changes in their municipal areas after visiting different plants in Delhi.

On analyzing their proposals individually & giving them scores according to the frequency distribution of each proposal stated by the ULBs. We came to a conclusion that among **10 proposals**, which were (Decentralized Composting, Segregation of Dry Waste, Green Bhandu, Biomethanation, Home composting, Plastic Fuel, C&D waste treatment, Hazardous waste treatment, Sewage Treatment plant & Pelletisation); **Decentralized composting** rank 1st, **Segregation of dry waste** rank 2nd & **Green Bhandu** rank 3rd.

The results of the analysis are presented below.

Table 16 : Project Proposals

Sno.	Project Proposed for SWM	Scores	Rank
1	Decentralized Composting	22	1st
2	Segregation of Dry Waste	5	2nd
3	Green Bhandu	4	3rd
4	Bio Methenation	3	
5	Home Composting	2	
6	Plastic to fuel	2	
7	C&D waste treatment	2	
8	Hazardous waste Treatment	2	
9	Sewage Treatment Plant	1	
10	Pelletisation	1	
		44	



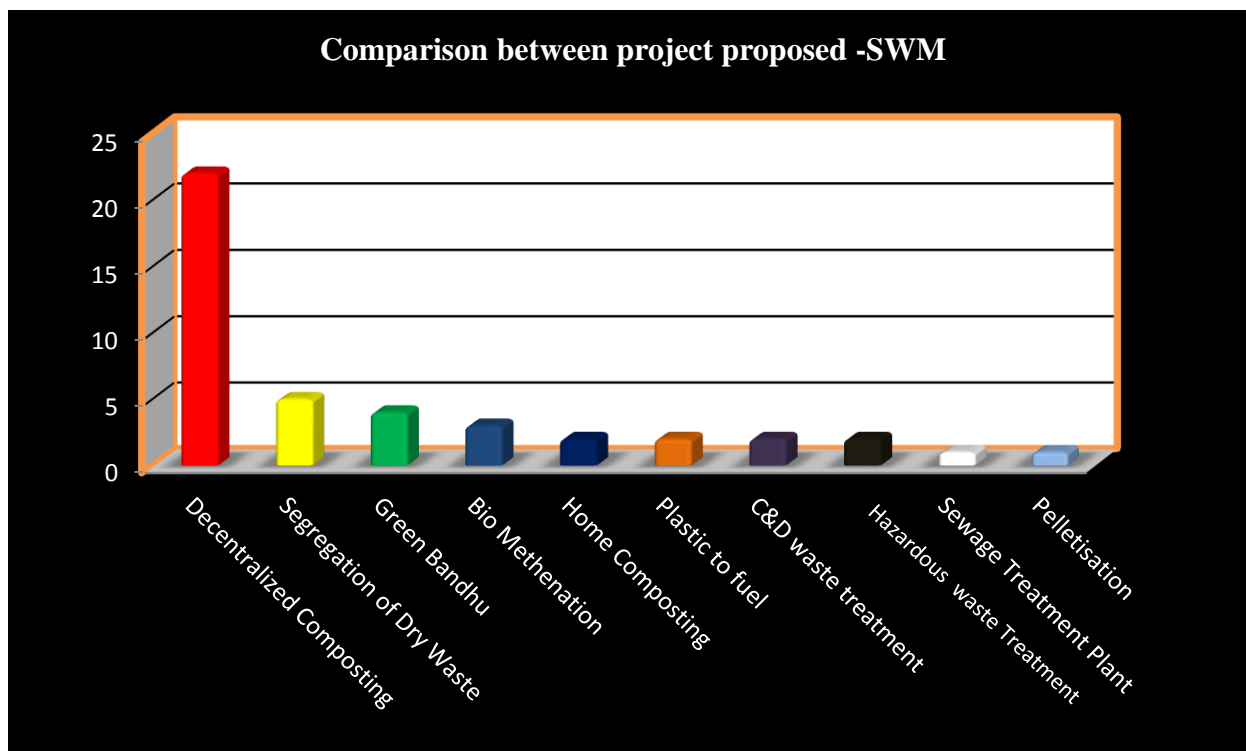


Figure 23 : Comparison Between Project Proposed-SWM

The analysis shows that among different project proposal of cost effective technology stated by 44 groups with regards to SWM, **Decentralized Composting** is the best cost effective proposal stated by 22 groups. The second most cost effective proposal is **Segregation of Dry Waste** stated by 5 groups . The Third most cost effective proposal is **Green Bandhu** which is stated by 4 groups. Remaining cost effective proposal are such as Biomethanation (3), Home composting (2), Plastic to Fuel (2), C & D waste treatment (2), Hazardous waste treatment (2), Sewage Treatment plant (2) and Pelletisation (2).

