Sanitation Capacity Building Program

TRAINING ON

INTEGRATED WASTEWATER AND SEPTAGE MANAGEMENT

EXPOSURE VISIT REPORT

OCT 25TH – OCT 27TH, 2017

ECOSAN SERVICES FOUNDATION

1st Floor, 24 Prashant Nagar,
721/1 Navi Sadashiv Peth,
Pune – 411030, Maharashtra, India

+91 20640 00736 | +91 20245 30061

www.ecosanservices.org

The exposure visit report is prepared to facilitate the coordination with Ecosan Service Foundation and National Institute of Urban Affairs. The report elaborates on the training given to the officials of urban local bodies from Rajasthan state on Integrated wastewater and septage management and details of the sites visited at Pune under exposure regarding the integrated wastewater and septage management practices.

Prepared by;

Ecosan Services Foundation

1st Floor, 24 Prashant Nagar,
721/1 Navi Sadashiv Peth,
Pune – 411030, Maharashtra, India

For

National Institute of Urban Affairs

1st & 2nd floor,
Urban Habitat Centre,
Lodhi Road, New Delhi – 110003, India

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Abbreviations

AMRUT	Atal Mission for Rejuvenation and Urban Transformation
CSTF	City Sanitation Task Force
DPR	Detailed Project Report
ESF	Ecosan Services Foundation
FSSM	Faecal Sludge and Septage Management
GoI	Government of India
LAP	Local Action Plan
NIUA	National Institute of Urban Affairs
RAS	Rapid Assessment Survey
SCBP	Sanitation Capacity Building Program
STP	Sewage Treatment Plant
ULB	Urban Local Body
IWSM	Integrated Wastewater and Septage Management

1 Introduction

The water and sanitation sector in India needs reforms if national and global benchmarks for service delivery are to be met with success. The current plight of the sanitation sector and the huge gaps faced by roughly 800 million Indians in accessing sanitation provisions. This highlights the need for not just institutional remodelling of the sector, but also for a novel approach, innovative ideas and urgent decentralization if the sanitation services are to reach the last common denominator. However, decentralization of treatment system (anaerobic process), leads to generation of faecal sludge. These systems need to desludged at a regular interval to maintain their performance.

Faecal sludge management (FSSM) refers to the removal, treatment, and disposal of faecal sludge from holding tanks (septic or networked through sewerage pipes). Faecal sludge is different from overall sewerage and in that it contains mostly human bodily waste rather than the waste that drains from kitchens, etc.

The Government of India's (GoI) goal is for all cities to have networked sewerage connections, which would send faecal sludge to a central location for treatment and disposal. Presently, 95% of urban local bodies (ULBs) do not have this infrastructure. This means that septic tanks or pits have to be emptied and moved to a location that will process the faecal sludge. In higher end apartment complexes and business centres, there are on-site FSSM solutions; however, it remains a challenge even here where space and options for dumping the treated waste are limited. On the other hand, in poor settlements (slums), latrines are often built so the waste just empties directly outside it. This practice not only has the potential to contaminate the water sources and pollute the environment within the slum, but also the whole surrounding area.

There is little regulatory power to monitor whether faecal sludge is processed according to environmental and health standards. Most cities in India lack the capacity to regulate treatment and dumping of waste. There is also a lack of approved sewage treatment plants (STPs) in the country to safely and effectively treat faecal sludge, if it is actually collected and able to be sent there. Twenty-Seven Indian cities have only primary treatment facilities and 49 have primary and secondary treatment facilities. Due to the lack of functioning STPs and adequate enforcement of regulations, untreated faecal sludge is disposed indiscriminately into water bodies,

drains, landfills, and vacant lands. In Bhubaneswar, Orissa for example, untreated faecal sludge is often dumped directly into the sea. As with the on-site FSSM options, city wide STPs often still have the problem of responsibly dealing with the treated sludge.

Given these issues of collection, treatment, and disposal, it is exciting that innovators are starting to look to this waste as a resource rather than burden. While there is value of innovation at each level of the sanitation chain, mostly due to the human resource and health potential in infrastructure building and collecting waste, there is additional value add in turning the faecal sludge matter into an environmentally beneficial and profitable resource.

NIUA has been supporting the Rajasthan government in implementing faecal sludge management in the state. As one of the activity, the exposure visit will be organized which can give an opportunity to the state and ULB officials to understand the management of wastewater and septage at a city level. The objectives of this activity were to provide exposure to the officials about the environmental planning and execution of wastewater and faecal sludge management systems at city level and to produce case studies which can be potentially be used to their own area.

2 List of Participants and Staff

The following table presents the details of the officials, staff with whom we have dis-cussed about the details of the Faecal Sludge Management of the city.

TABLE 1: LIST OF PARTICIPANTS AND STAFF

Sr No.	Name	Designation	ULB Name	Mobile	Email
1	Abhishek Sharma	Executive Officer	Vijaynagar	9828430716	abhishekmotras.91@gmail.com
2	Amit Sharma	Junior Engineer	DLB	9252548648	as6686@gmail.com
3	Amrit Singh	Asst Engineer	Nimbaheda	9887864834	amritmnit@gmail.com
4	Ashok Kumar Jain	Executive Officer	Pratapgarh	9414021572	ashokkumarjain1971@gmail.com
5	Bhagwat Singh Parmar	Executive Officer	Deoli	9461430205	bgwtsngh@gmail.com
6	Bharat Kumar Hartiwal	Executive Officer	Mandava	9694879772	mandava.jaipur@gmail.com kmrbharat.hartiwal15@gmail.com
7	Dharmpal Jat	Commissioner	Tonk	9166834235	d.psagar@gmail.com
8	Dwarka Prasad	Executive Officer	Ratannagar	9252501259	dwarkap1986@gmail.com mun_rnagar@yahoo.in
9	Ganesh Lal Kharadi	Commissioner	Dungarpur	9413117965	npd.dpr@gmail.com
10	Mahesh Kumar Meena	XEN	DLB	9414427115	mkm.75nnj@hotmail.com
11	Mohammad Naseem Sheikh	Commissioner	Chittorgarh	9414758604	naseemsheikh604@gmail.com
12	Noor Mohammad Khan	Executive Officer	Ratangarh	9829230911	nagarpalikaratangarh@gmail.com
13	Prakash Mahawar	Jr Engineer	Dungarpur	9460801501	npd.dpr@gmail.com
14	Raghuwar Dayal Garg	Ex Engineer	Sikar	8949994508	rdgargalwar@gmail.com

15	Rakesh Kumar	Executive Officer	Bisau	9828419409	rakeshkumareo@gmail.com
16	Sahadev Dan	Executive Officer	Didwana	9887898313	sahaevdancharan@gmail.com
17	Sandeep Verma	Jr Engineer	Padampur	9785828975	sndpverma681@gmail.com
18	Satish Gupta	XEN	DLB	9829816137	scgupta183137@gmail.com
19	Shailendra Kumar Godara	Executive Officer	Padampur	9414092505 7733020201	mbpdpr@gmail.com
20	Sharvan Kumar	Commissioner	Sikar	9468596100	guniya10@gmail.com
21	Shashikant Sharma	Commissioner	Dholpur	9829519994	rmsshashi@gmail.com
22	Shrawan Ram	Executive Officer	Nagaur	8890393144	shrawan.rms@gmail.com
23	Sitaram Kumawat	Executive Officer	Ramgarh	9772466517	sitaramkumawat1988@gmail.com
24	Suresh Chandra Sharma	Executive Officer	Pipar City	9461372888	ssngraao@gmail.com
25	Vimlesh Kumar Sharma	PA	DLB	9799419019	vimsir64@gmail.com
26	Shaikh Aslam	Plant Engineer	PMC	9689931164	
27	Datta Lalege	Junior Engineer	PMC		
28	Vaibhav Ghule	Junior Engineer	PMC		
29	Prashant Magulkar	Asst. Executive Engineer	PMC		
30	Mohit Kapoor	Project Coordinator	NIUA	9879867747	mkapoor@niua.org
31	Jyoti Dash	Project Coordinator	NIUA	9718288014	jdash@niua.org
32	Sreevidya Satish	Sr. Resource Person	ESF	9535454321	sreevidya.satish@me.com
33	Dhawal Patil	Sr. Resource Person	ESF	9403682008	dhawal.patil@ecosanservices.org
34	Saurabh Kale	Sr. Resource Person	ESF	9665590631	saurabh.kale@ecosanservices.org
35	Sagar Patil	Jr. Resource Person	ESF	8805098732	sagar.patil@ecosanservices.org

3 Agenda of the Exposure Visit

The following table represents the details of the scheduled discussion sessions, site visits

TABLE 2: AGENDA OF THE EXPOSURE VISIT

Time	Day 1: October 25th, 2017
9.30 am-10.00 am	Registration
10.00 am-10.30 am	Welcome Introduction, setting ground rules! Understanding expectations, aims and objectives.
10.30 am- 11.00 am	Towards ODF cities and beyond!
11.00 am-11.30 am	*Coffee Break*
11.30 am-12.30 pm	Sustainable Sanitation and Water Management
12.30 pm-1.30 pm	Lunch
1.30 pm- 2.15 pm	Designing of Sanitation Systems
2.15 pm- 3.30 pm	Exercise: Identifying your system!
3.30 pm- 4.00 pm	Coffee Break
4.00 pm- 4.45 pm	Sanitation Systems and Technologies
4.45 pm- 5.00 pm	Group Discussions: Identifying appropriate systems for your city

Time	Day 2: October 26th, 2017
9.30 am-10.00 am	Assembly for site visit
10.00 am- 11.00 am	Site Visit: Soil Scape Filter (Indrashanushya Citizen Centre)
11.00 am- 12.30 pm	Site Visit: STP Activated Sludge Process (Baner Road)
12.30 pm- 1.30 pm	Lunch
1.30 pm- 3.30 pm	Site Visit: Organic waste management plant (Peshwe Park)
3.30 pm- 4.00 pm	Coffee Break
4.00 pm- 5.00 pm	Case study: NaWaTech Natural Wastewater treatment Technologies for coping with urban water shortages

Time	Day 3: October 27th, 2017
9.00 am-9.30 am	Assembly for site visit
9.30 am- 11.30 am	Site Visit: Sewage Cure (College of Engineering, Pune)
11.30 am-12.30 pm	Lunch
12.30 pm	Departure to the Pune Airport for Jaipur, Ahmedabad

4 Sessions

Day 1, October 25th, 2017

The day was started with the initial introduction, aim and objectives of the training program and exposure visit under Sanitation Capacity Building Program. The session was hosted by Ms. Sreevidya Satish, Sr. Resource Person. After introduction, Ms. Sreevidya briefed about the overall agenda of the training and exposure visit and provided the information of the training material and ground rules set for the training.

Presentation Session

Presentation 1: Towards ODF cities and beyond

After the introduction round, Ms. Sreevidya presented the first module Towards ODF cities and beyond. The key objective of this presentation was to provide an overview of the current sanitation facts of India. It also focused on the current challenges in sanitation sector. The session covered the following components:

- Sanitation facts – India
- National Programs and Policies
- What is Integrated Wastewater and Septage Management (IWSM)?
- Need and Challenges in Sanitation Sector

Presentation 2: Sustainable Sanitation and Water Management

The second session was started with the presentation on Sustainable Sanitation and Water Management. The key objective of this presentation was to provide an overview of concept of sustainable sanitation and its management. It also focused on the ecological sanitation and closing the loop. The session was facilitated by Mr. Dhawal Patil, Sr. Resource Person covering the following components:

- Waste Products – black water, grey water, excreta, faecal sludge, domestic wastewater and stormwater
- Parameters for characterizing the wastewater – solids, organic constituents, nutrients, pathogens and other parameters
- Understand your system
- Ecological Sanitation – hygienically safe, economical and closing the loop
- Resource Management – centralized and decentralized approaches
- Planning of sanitation systems
- Closing the loop – urban water cycle, urban nutrient cycle loop

Presentation 3: Designing of Sanitation Systems

The session was started with the presentation on Designing of Sanitation Systems. The key objective of this presentation was to provide a brief overview of the sanitation systems and functional groups. It also focused on the decentralised systems and the systematic planning approach required in the designing. The session was facilitated by Mr. Dhawal Patil, Sr. Resource Person covering the following components:

- Designing of sanitation systems – functional groups, the ideal system, the appropriate system
- Decentralised system – shift in paradigm, limitations of centralised systems, features and constraints of decentralised systems
- Systematic planning – need of systematic planning, the best planning model, framework for strategic planning

Group Work: Understand your system

After the presentation, the group work was carried out with the participants on the understanding of the system. Mr. Dhawal Patil distributed the participants in five groups focusing the five different cities. The groups were distributed as group 1: Dhoulpur, group 2: Mandava, group 3: Pune, group 4: Nimbahera, group 5: Didwana. The group activity helped the participants to define boundaries and identify water components of their locality.

Mr. Dhawal Patil carried out the group activity and took an example of "The Case of Unsustainaville". Unsustainaville is in a plain, next to a river and some miles upstream from the sea. It has an industrial area to the North of the city, a central business district and some high-income areas. To the East, there are also some low-income areas that

are not well developed. To the South, on the outskirts of the city, are some agricultural areas.

This group work gave participants a comprehensive understanding of the local water and sanitation cycle by identifying the components (source, transport, use, etc.) and the existing links between them. In the discussion with the participants, each component is discussed with the participants and scenario of the cities were discussed with groups.

Presentation 4: Sanitation Systems and Technologies

This session was started with the presentation on Sanitation Systems and technologies. The key objective of this presentation was to provide a brief overview of the different sanitation systems and its objectives. It also focused on the emergency sanitation infrastructure. The session was facilitated by Mr. Dhawal Patil, Sr. Resource Person covering the following components:

- Sanitation and its objectives
- Functional Groups – User Interface, Collection and storage/treatment, conveyance, semi centralised treatment, use and/or disposal
- Sanitation systems
- Emergency sanitation infrastructure

Day 2, October 26th, 2017

Site Visit: Peshawe Park Solid Waste Management Plant, Pune

In the first session of second day, we have visited the study site Solid Waste Management Plant at Peshwe Park which is of total 5TPD capacity. The plant Engineer explained the treatment process, treatment units, Operation and Maintenance (O&M) activities.

It is located near Saras baug at Swargate. The organic waste generated in the nearby hotels and restaurants is collected in the collection truck. Then it is transported to the same plant. Treatment units are such as follows,

1. Inlet dumping station
2. Segregation (manual)
3. Electronic Shredder
4. Primary Digester
5. Secondary Digester
6. Scrubber
7. Gas collection balloons
8. Electricity Generator set

Segregation process is carried out manually at this plant. After digestion the generated gas is passed through scrubber to dissolve harmful gasses like CO_2 and H_2S. Total 15 number of staff involved in the whole operation of the plant. The electricity generated from this plant is used for around 40 number of street lights which are there on nearby street.

The participants discussed about the functioning of the plant. After understanding each and every processes and units, participants asked many questions and doubts about the functioning and feasibility of the plant. Some participants compared the cost of operation and other O&M activities of this plant with few similar plants in Rajasthan.

Site Visit: Indradhanushya Citizenship Centre, Pune

In the next session, we have visited the Indradhanushya citizenship centre where the Soil Scape filter treatment system is installed. The total capacity of the plant is about

50 KLD. Mr. Dhawal Patil explained the treatment process, treatment units, Operation and Maintenance (O&M) activities step by step to the participants.

The plant is located on the bank of Ambil nalha. The stormwater (mixed sewage) from this *nalha* is collected in the intake well through gravity and then treated with the help of Soil Scape Filter treatment system. It's a decentralised treatment system and the treated water is reused in gardening activity in this garden and another nearby garden. This technology is natural wastewater treatment technology with minimal operational cost.

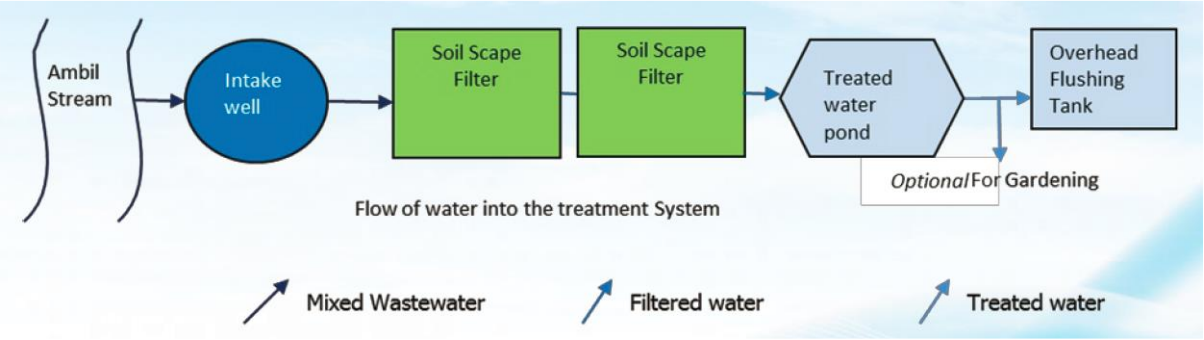

FIGURE 1: FLOWCHART OF SOIL SCAPE FILTER

The participants discussed about the functioning and feasibility of the plant. They found this system suitable with the perspective of Rajasthan. They also compared the cost of operation and other O&M activities of this plant for the scenario of Rajasthan.

Site Visit: Sewage Treatment Plant at Baner, Pune

In this session of second day, participants have visited the sewage treatment plant, Baner road of total 30 MLD capacity. The plant Engineer explained the treatment process, treatment units, Operation and Maintenance (O&M) activities step by step. This STP covers the areas of Baner, Pashan and Aundh from PMC. All the sewage generated from the residential and commercial buildings from these areas is conveyed to this STP by a closed sewer network. The plant is built on the bank of the river Mula. Treatment units are such as follows,

1. Bar Screen Chamber
2. Grit Removal
3. Equalisation Tank
4. Reactor Tanks (4 nos.)
5. Chlorine Contact Tank
6. Sludge Dewatering Unit

Operation of complete plant is carried out by automatic mode. PLC SCADA technology is used for the automation and each process operates on sensors. Total 40 number of staff is involved in the whole operation. The treated water from this STP is discharged into the irrigation canals from which it is being used by farmers downward side of the Pune.

The participants got an opportunity to communicate about the function of the plant directly with the plant Engineer. After understanding each and every processes and units, participants asked many questions and doubts to the Engineer. The participants discusse about the functioning and feasibility of the plant. They have compared the cost of operation and other O&M activities of this plant with few similar plants in Rajasthan.

Day 3, October 27th, 2017

Site Visit: DTS & Constructed Wetland, College of Engineering Pune

In the first session on the last day, participants have visited the Decentralized Treatment System and Constructed Wetland Plant situated at College of Engineering Pune. Mr. Dhawal Patil and Mr. Sagar Patil explained the background of the system, treatment process of the system, treatment units, operation and maintenance (O&M) activities step by step to the participants.

This plant is located in the centre of the city area called Shivajinagar. The hostel campus of College of Engineering Pune has total residence capacity of 2000 students. They have new and old hostel blocks and in new hostel block segregation of black and grey water has been installed, while in old hostel blocks segregation system is not installed.

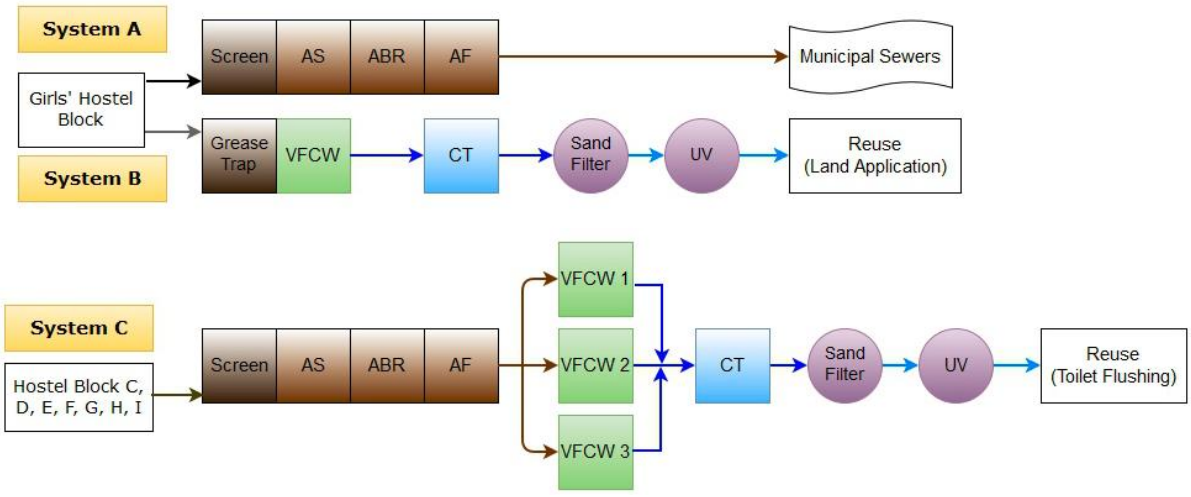

FIGURE 2: DTS AND CONSTRUCTED WETLAND

It is a decentralised treatment system and the treated water is reused in toilet flushing and gardening activity in the hostel campus. This technology is natural treatment technology with minimal operational cost. Requirement of electricity, skilled labours is very minimum.

Participants got an opportunity to communicate about the functioning of the plant directly with the management. After understanding each and every processes and units, participants discussed about the cost of operation and other O&M activities of this plant. They found this system suitable for the bulk generators whoever can manage their wastewater at the source.

Feedback and Wrap-up Session

The participants were satisfied with the overall training and exposure visit and they found it to be very relevant to their day-to-day functions and responsibilities, as evident from the feedback conducted by the participants. They were observed to be motivated to go back with a good understanding of the Integrated Wastewater Management and concrete ideas for implementation in their respective cities. The participants were asked to evaluate the workshop on five parameters – content of

the training, training methods, trainers, relevance of the training to their work and the venue.

In the closing session, Mr. Dhawal Patil Sr. Resource Person, ESF thanked all the participants and the National Institute of Urban Affairs for their support on successfully organising the training cum exposure visit at Pune. The participants also thanked the organizers, NIUA for the very useful training. The participants were awarded certificates for their participation. Mr. Dhawal Patil and Ms. Sreevidya Satish, Sr. Resource Person felicitated the participants with Certificate of Participation. They thanked the participants for their active participation and making the training cum exposure visit a success.

ANNEXURES

Attendance Sheet

National Institute of Urban Affairs

Integrated Wastewater & Septage Management

Exposure Visit | Pune | October 25th – 27th, 2017

ecosan SERVICES FOUNDATION

Sr No.	Name	ULB Name	Signature		
			Oct 25th, 2017	Oct 26th, 2017	Oct 27th, 2017
1	Abhishek Sharma	Vijaynagar ASIND			
2	Amit Sharma	DLB			
3	Amrit Singh	Nimbaheda			
4	Ashok Kumar Jain	Pratapgarh			
5	Bhagwat Singh Parmar	Deoli			
6	Bharat Kumar Hartiwal	Mandava			
7	Dharmpal Jat	Tonk			
8	Dwarka Prasad	Ratannagar			
9	Ganesh Lal Kharadi	Dungarpur			
10	Krishnakumar Gupta	Dungarpur	← ABSENT/CANCELLED →		

Attendance Sheet

National Institute of Urban Affairs

Integrated Wastewater & Septage Management

Exposure Visit | Pune | October 25th – 27th, 2017

ecosan SERVICES FOUNDATION

Sr No.	Name	ULB Name	Signature		
			Oct 25th, 2017	Oct 26th, 2017	Oct 27th, 2017
11	Mahesh Kumar Meena	DLB			
12	Mohammad Naseem Sheikh	Chittorgarh			
13	Noor Mohammad Khan	Ratangarh			
14	Prakash Mahawar	Dungarpur			
15	Raghuwar Dayal Garg	Sikar			
16	Rakesh Kumar	Bisau			
17	Sahadev Dan	Didwana			
18	Sandeep Verma	Padampur			
19	Satish Gupta	DLB			
20	Shailendra Kumar Godara	Padampur			

Attendance Sheet

National Institute of Urban Affairs

Integrated Wastewater & Septage Management

Exposure Visit | Pune | October 25th – 27th, 2017

ecosan SERVICES FOUNDATION

Sr No.	Name	ULB Name	Signature		
			Oct 25th, 2017	Oct 26th, 2017	Oct 27th, 2017
21	Sharvan Kumar	Sikar			
22	Shashikant Sharma	Dholpur			
23	Shrawan Ram	Nagaur			
24	Sitaram Kumawat	Ramgarh			
25	Suresh Chandra Sharma	Pipar City			
26	Vimlesh Kumar Sharma	DLB			
27	Sreevidya Satish	ESF			
28	Mohit Kapoor	NIUA			
29	Jyoti Dash	NIUA			
30	Shereh Aslam	PMC			

Attendance Sheet

National Institute of Urban Affairs

Integrated Wastewater & Septage Management

Exposure Visit | Pune | October 25th – 27th, 2017

ECOSAN SERVICES FOUNDATION

	NAME	ULB NAME	25th Oct	26th Oct	27th Oct
31	Datta Lalege	PMC (J.E)			
32	Vaibhav Ghule	PMC (JE)			
33	Prashant Nagalkar	PMC (A.E)			
34	Dhawal Patil	ESF			
35	Saurabh Kale	ESF			
36	Sagar Patil	ESF			
37					
38					
39					
40					

Attendance Sheet

Integrated Wastewater & Septage Management

National Institute of Urban Affairs | Ecosan Services Foundation

Exposure Visit | October 25th – 27th, 2017

FEEDBACK FORM

General Information	
Name	डॉ. सहदेव दान चारण
Designation	अधिशाषी अधिकारी नगरपालिका डीडवाना नागौर (राज.)
City	डीडवाना
Contact No.	9887898917
Email Id	Sahdevdancharan@gmail.com

Learning Outcomes (tick for the appropriate option)	Very Good	Good	Average	Poor	Very Poor
How relevant was the course content for your present job /department?	✓				
Has the course resulted in improved understanding of the subject?	✓				
Extent to which the course has improved skills?	✓				
Training Content, Training Methods, Exposure Visits (tick for the appropriate option)					
Did the training methods used allow proper understanding of the topic?	✓				
How was the quality of presentations/ lectures?	✓				
Were the handouts and reference material provided adequate?	✓				
Were the sessions interactive enough to reinforce learning outcomes	✓				
Was the selection of the sites for exposure visit appropriate?	✓				

Feedback Form

Was the information provided at the time of site visits appropriate?	✓				
Training Facilities and Program Management (tick for the appropriate option)					
Quality of training venue and facilities at the venue Convenience of location	✓				
Quality of accommodation facilities provided, if applicable	✓				
Quality of food and overall service	✓				
Travel and logistics management	✓				
Overall support provided during the program	✓				
Any other qualitative feedback regarding the training facilities and management	प्रशिक्षण प्रोग्राम नगरपालिका अधिकारियों के लिए अत्यधिक महत्व पूर्ण है तथा प्रशिक्षण से जुड़ा हुआ अच्छी तरह से व्यवस्था का प्रबंध किया गया है धन्यवाद				