# Sanitation Capacity Building Program

## TRAINING ON PREPARATION OF FAECAL SLUDGE AND SEPTAGE MANAGEMENT (FSSM) DETAILED PROJECT REPORT (DPR)

## TRAINING OF CONSULTANTS

MAY 30TH – JUNE 1ST, 2018

ECOSAN SERVICES FOUNDATION

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The training of consultant 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 technical experts, urban planners from different private consulting firms in India on preparation of faecal sludge and septage management (FSSM) detailed project report (DPR) at Pune.

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# Abbreviations

| | |
|---|---|
| AMRUT | Atal Mission for Rejuvenation and Urban Transformation |
| CSP | City Sanitation Plan |
| CW | Constructed Wetlands |
| DPR | Detailed Project Report |
| DTS | Decentralised Treatment System |
| ESF | Ecosan Services Foundation |
| FS | Faecal Sludge |
| FSSM | Faecal Sludge and Septage Management |
| FSTP | Faecal Sludge Treatment Plant |
| GoI | Government of India |
| GoM | Government of Maharashtra |
| NIUA | National Institute of Urban Affairs |
| PMC | Pune Municipal Corporation |
| RAS | Rapid Assessment Survey |
| SCBP | Sanitation Capacity Building Program |
| STP | Sewage Treatment Plant |
| ToC | Training of Consultants |
| ULB | Urban Local Body |

# 1 Introduction

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 & septage 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. 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 in turning the faecal sludge matter into an environmentally beneficial and profitable resource.

# 2 List of Participants and Staff

The following table presents the details of the officials, staff with whom we have discussed about the details of the Preparation of Faecal Sludge and Septage Management (FSSM) Detailed Project Report (DPR).

**TABLE 1: LIST OF PARTICIPANTS AND STAFF**

| Sr. No | Name | Designation | Consulting Firm / Department | Mobile | Email |
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| | | | | | |
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# 3 Agenda of the Training of Consultants

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

**TABLE 2: AGENDA OF THE TRAINING OF CONSULTANTS**

| 30th May, 2018 | | |
|---|---|---|
| **Time** | **Session** | **Facilitator** |
| 09.30-10.00 | Registration | |
| 10.00-10.45 | Getting to know each other | Mr. Dhawal Patil |
| **10.45-11.00** | **Coffee break** | |
| 11.00-11.45 | Planning of Integrated Faecal Sludge Management | Ms. Sreevidya Satish |
| 11.45-12.30 | Assessment of Initial Situation | Mr. Saurabh Kale |
| **12.30-13.15** | **Lunch** | |
| 13.15-14.00 | Faecal Sludge Quantification and Characterization | Mr. Saurabh Kale<br>Ms. Sreevidya Satish |
| 14.00-14.45 | Methods and Means for Collection and Transport of Faecal Sludge | Mr. Saurabh Kale |
| **14.15-15.00** | **Coffee break** | |
| 15.00-16.00 | Group Work - Collection and Transportation | Mr. Dhawal Patil |
| 16.00-16.30 | Stakeholders Analysis | Ms. Sreevidya Satish |

| 31st May, 2018 | | |
|---|---|---|
| **Time** | **Session** | **Facilitator** |
| 10.00-10.45 | Faecal Sludge Treatment - 1 | Mr. Dhawal Patil |
| **10.45-11.00** | **Coffee break** | |
| 11.00-12.00 | Faecal Sludge Treatment - II | Mr. Dhawal Patil |
| 12.00-13.00 | FSSM approach with PMC - 3S India / Saraplast India Pvt. Ltd. | Mr. Rajeev Kher, 3S India / Saraplast India Pvt. Ltd. |
| **13.00-14.00** | **Lunch** | |
| 14.00-15.15 | Designing of FSTP Components | Mr. Dhawal Patil |
| **15.15-15.30** | **Coffee break** | |
| 15.30-16.30 | Designing of FSTP Components (continue) | Mr. Dhawal Patil |

| 1st June, 2018 | | |
|---|---|---|
| **Time** | **Session** | **Facilitator** |
| 09.00-13.00 | Site Visit - | Mr. Dhawal Patil / Mr. Saurabh Kale |
| | a) DTS & CW, COEP, Pune | |
| | b) STP Sludge Management, Facility at Mhatre Bridge, Pune | |
| | b) Anaerobic digestor, Hotel Waste SWM Facility, Swarget, Pune | |
| **13.00-14.00** | **Lunch** | |
| 14:00-15:00 | Financial aspects in FSSM | Mr. Dhawal Patil |
| **15.00-15.15** | **Coffee break** | |
| 15.15-16.00 | Closing Session and Distribution of Certificates | NIUA & ESF |

# 4 Sessions

## Day 1, May 30th, 2018

The three-day training program started off with a formal inaugural session. The day was started with the initial introduction and objectives of the training program under Sanitation Capacity Building Program. After initial introduction, the participants introduction round session was hosted by Mr. Dhawal Patil, Sr. Resource Person. In the introduction round, every participant introduced themselves and Mr. Mohit Kapoor, Programme Officer introduced the participants about the Sanitation Capacity Building Program and its objectives. After introduction round, Mr. Dhawal Patil briefed about the overall agenda of the training of consultant, information of the training material in the kit and ground rules set for the training.

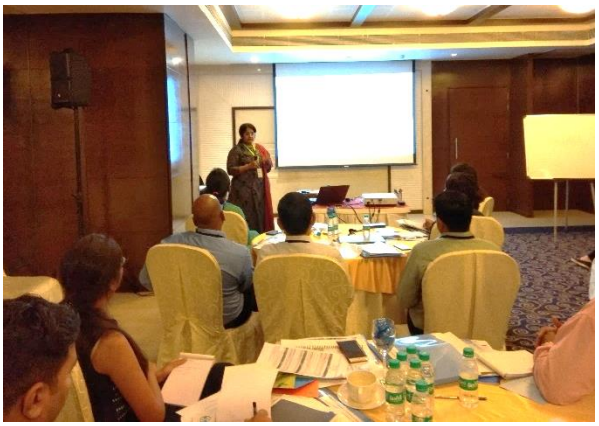
## Presentation Session

### Presentation 1: Planning of Integrated Faecal Sludge Management

After the introduction session, Ms. Sreevidya Satish, Sr. Resource Person presented the first module Planning of Integrated Faecal Sludge Management. Ms. Sreevidya Satish initiated the session with some discussion about the need for the integrated approach and the planning approach with logical framework. The key objective of this presentation was to provide brief about planning steps in faecal sludge and septage management with detailed project development stages. It also focused on the

selecting context appropriate technical options available in FSSM. The session covered the following components:

- Need for an integrated approach
    - Enabling environment
    - Participatory approach
- Planning approach and logical framework
    - FSM planning from A to Z
    - Detailed project development stage
- Selecting context appropriate technical options
    - Services
    - Selection of treatment options
    - Sanitation system scheme



## Presentation 2: Assessment of Initial Situation

The second session was started with the presentation on initial and crucial step of planning process as the Assessment of Initial Situation. The key objective of this presentation was to provide an overview of different tools and methods for data collection. It also focused on the requirement of data, characterization, evaluation and selection of treatment sites. The session was facilitated by Mr. Saurabh Kale, Sr. Resource Person covering the following components:

- Tools and Methods for Data Collection
    - Literature review
    - Semi structured interviews
    - Household level surveys
    - Qualitative field observations

    - Mapping
    - Laboratory analyses
- Data to be collected
- Characterisation, evaluation and selection of treatment sites


## Presentation 3: Quantification and Characterisation of FS

The next session was started with the presentation on Quantification and Characterisation of Faecal Sludge. The key objective of this presentation was to provide a brief overview on the necessity of quantification and different methods of quantification. It also focused on the characterisation of faecal sludge. It gives us idea about different parameters required to characterise the faecal sludge, comparison of different sludges and operation factors. The quantification session was facilitated by Mr. Saurabh Kale and the characterisation session was facilitated by Ms. Sreevidya Satish covering the following components:

- Faecal sludge quantification
    - Why quantification is necessary?
    - Sludge production method
    - Sludge collection method
        - Seasonal variation
        - Peaking factor
- FS Characterization
    - Parameters
    - Comparison of different sludges
    - Characterisation ratios
    - Operational factors

## Presentation 4: Methods and Means for Collection and Transport of Faecal Sludge

This session was started with the presentation on Methods and Means for Collection and Transport of Faecal Sludge. The key objective of this presentation was to introduce participants with different types of collection and transportation techniques of faecal sludge. It focused on the roles and responsibilities of stakeholders in faecal sludge collection and transport. It also gives us idea about different types of transfer stations available for the transport of faecal sludge. The methods and means for collection and transport of faecal sludge session was facilitated by Mr. Saurabh Kale covering the following components:

- Roles and Responsibilities of Stakeholders in Faecal Sludge Collection & Transport
- Types of collection and transportation techniques
    - Manually operated mechanical emptying
    - Motorized emptying
- Transfer Stations
    - Fixed transfer station
    - Mobile transfer station

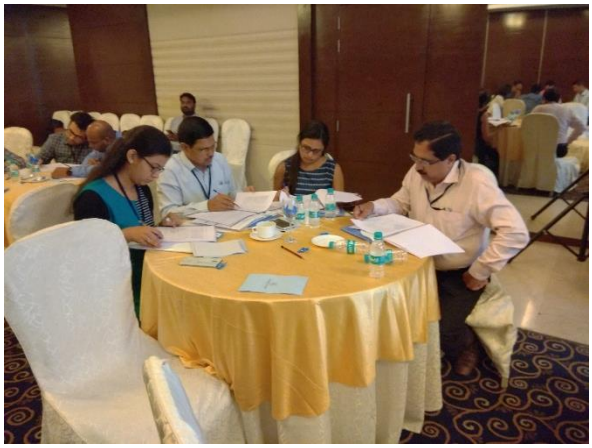
After this session, a group activity was carried out on collection and transportation of faecal sludge. This group activity helped the participants to design the requirements of collection and transport. In this activity, participants were distributed in five different groups and they have given five different scenarios with input details.

**TABLE 3: EXERCISE SCENARIOS**

| *Scenarios* | Type and details | Population |
|---|---|---|
| *Scenario A* | City in Union Territory (Island) | 1,20,000 |
| *Scenario B* | Peri-urban area of Well Developed City | 20,000 |
| *Scenario C* | Small Town | 32,000 |
| *Scenario D* | Village | 3,200 |
| *Scenario E* | Town and Village (Combined) | 35,200 |

Facilitator asked participants to review and understand the allotted scenario. Participants analysed their scenario group wise and visualised the current status of sanitation and practices of faecal sludge and septage management as per the given

city profile. After visualisation, they have started working on the first section of the exercise the collection and transport of faecal sludge for their city. In the exercise of collection and transportation, they have covered the type of desludging proposed, frequency of desludging, number of units to be served, quantity of septage received per day, total septage to be collected and number of vacuum trucks. After the initial group activities, each group discussed their own points with the facilitators and Mr. Dhawal facilitated the final discussions in collection and transportation group exercise.




## Presentation 5: Stakeholders Analysis

The session was started with the presentation on stakeholders analysis. The key objective of this presentation was to understand the identification and characterisation of stakeholders and their engagement. It also focused on the participation levels, involvement tools, milestones and cross-cutting tasks with respect of stakeholders engagement. The session was facilitated by Ms. Sreevidya Satish covering the following components:

- Stakeholders Analysis
    - Identification of stakeholders
    - Characterisation of stakeholders
    - Influence and interest
- Stakeholders Engagement
    - Participation levels
    - Involvement tools
    - Milestones and cross-cutting tasks
    - Distributing and formalising roles and responsibilities

## Day 2, May 31st, 2018

### Presentation 6: Faecal Sludge Treatment - I

This second day session was started with the presentation on Faecal Sludge Treatment. The key objective of this presentation was to understand the treatment mechanism with respect of faecal sludge treatment. It also focused on the design aspects of faecal sludge treatment system based on the initial situation and the characteristics of faecal sludge. The session was facilitated by Mr. Dhawal Patil, Sr. Resource Person covering the following components:

- Faecal Sludge Treatment Mechanism
    - Physical mechanisms
    - Biological mechanisms
    - Chemical mechanisms
- Design of FS treatment Plant
    - Selection of context appropriate combination of faecal sludge treatment technologies

### Presentation 7: FSSM approach with PMC - 3S India / Saraplast India Pvt. Ltd.

This session was started with the presentation on FSSM approach with Pune Municipal; Corporation. The session was facilitated by Mr. Rajeev Kher, Founder, 3S India or Saraplast India Pvt. Ltd. The key objective of this session was to introduce FSSM service company which is working in 10 different cities all over India. Mr. Rajeev explained their business model and introduced the services they are providing in different cities. He also introduced their new approach for the FS collection and transportation

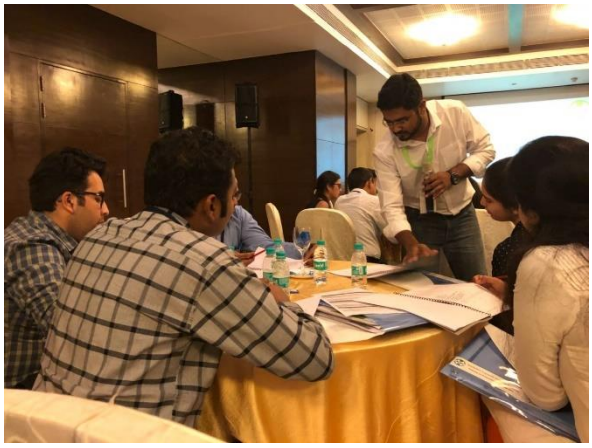
through developing the mobile application. The mobile application for improving the quality and reliability of demand desludging services.

## Presentation 8: Faecal Sludge Treatment - II

This session was started with the presentation on Faecal Sludge Treatment technologies. The key objective of this presentation was to introduce with different faecal sludge treatment technologies and components of the faecal sludge treatment plant. It also focused on an appropriate treatment system and treatment chain. The session was facilitated by Mr. Dhawal Patil, Sr. Resource Person covering the following components:

- Co-treatment of FS in STP
- Deep row entrenchment
- Anaerobic digestion
- Unplanted drying beds
- Planted drying beds
- Geotubes
- Sludge incineration
- Thermal drying and pelletising
- Mechanical dewatering
    - Centrifuge
    - Screw press
    - Belt press
    - Frame filter press
- Co-composting

After this session, participants carried out a designing exercise on the faecal sludge treatment components as per the given scenarios. This group activity helped the participants to design the faecal sludge treatment system with the different treatment units / components. In this activity, Mr. Dhawal Patil explained the participants about how to understand the treatment mechanisms as per the characteristics of the faecal sludge and how to select the treatment system components.

Participants were distributed in five different scenario-based groups. Participants analysed their scenario group wise and visualise the current status of faecal sludge and its characteristics. After visualisation, they have proposed the appropriate faecal sludge treatment system for their scenario and designed the components of the system. Participants enthusiastically designed the system and understood the designing criterias. Mr. Dhawal facilitated the final group activity discussions and helped the participants to understand each aspect of designing the treatment system.

## Day 3, June 1st, 2018

## Exposure Visit

### Site Visit: STP Sludge Management Facility at Erandwane, Pune

In this session of third day, participants have visited the STP sludge management facility, Mhatre Bridge, Erandwane of total 50 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 Erandwane 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 chain used to treat wastewater and sludge produced is as follows,

| Wastewater treatment chain | Sludge treatment chain |
|---|---|
| Intake well | Thickener tank |
| Bar screen for solid waste removal | Aerobic digestor |
| Grit removal tank | Centrifuge dewatering unit |
| Primary clarifier | Disposal using heavy motorised vehicle. |
| Activated sludge process reactor (2 no.) | |
| Secondary clarifier | |
| Chlorine contact channel | |
| Disposal in nallah leading to Mula River. | |

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 regarding the costing and area requirement. The participants discussed about the functioning and feasibility of the plant.

The site visit helped the participants to get deeper understanding and working of the Activated Sludge Process based STP and sludge management facility at the plant.

## Site Visit: Anaerobic Digestor, Hotel Waste Management Plant, Peshwe Park, Pune

In the second session of third day, we have visited the study site Anaerobic Digestor, Hotel 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 area. 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 queries and doubts about the functioning and feasibility of the plant.

Participants also visited one of the plant nearby where used and empty coconut shells from central market area are shredded and the strands by-product is reused for making ropes by the private agencies.

## Site Visit: Sewage Cure (DTS & Constructed Wetland System), College of Engineering Pune

In the third session, participants have visited the Sewage Cure (Decentralized Treatment System and Constructed Wetland) Plant situated at College of Engineering Pune. Mr. Dhawal Patil and Mr. Saurabh Kale 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.

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.

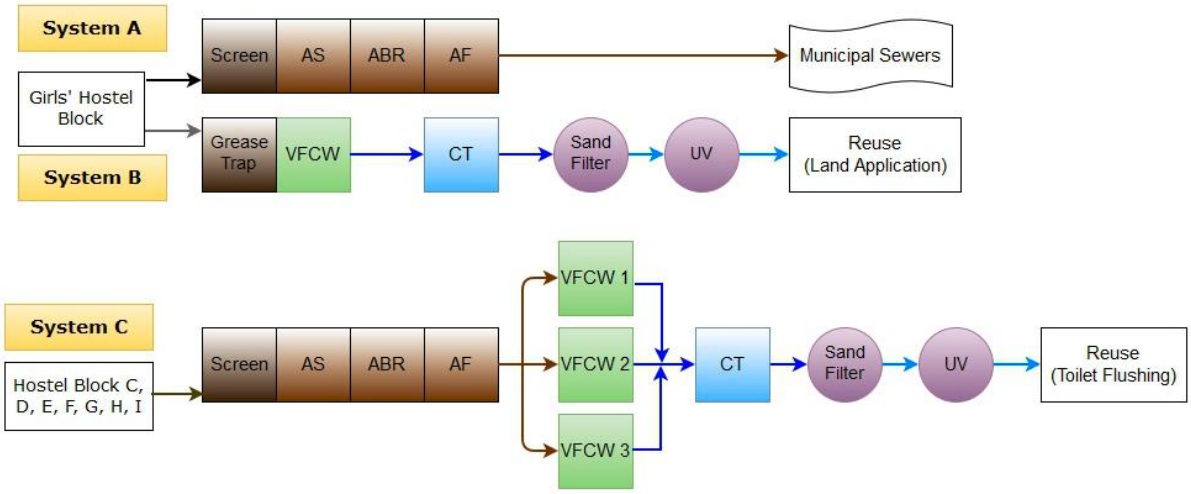



FIGURE 1: DTS AND CONSTRUCTED WETLAND

Participants got an opportunity to communicate about the functioning of the plant directly with the campus management. After understanding each and every processes and units, participants discussed about the cost of the operation and other O&M activities of this plant. They raised many queries about the suitability of the plant at the urban scenario and its feasibility for the institutional level. Some participants showed interest to reflect this kind of system at their training institute campus.

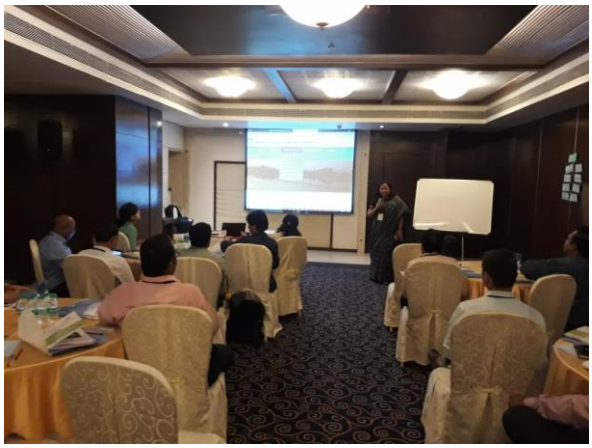
## Presentation 9: Financial Aspects in FSSM

This third day session was started with the presentation on Financial Aspects in Faecal Sludge and Septage Management. The key objective of this presentation was to provide a brief overview of the financial aspects and financial flow models for FSSM. In this session, participants worked on the financial aspects of the FSTP on annual capital cost basis. The session and exercise were facilitated by Mr. Dhawal Patil, Sr. Resource Person covering the following components:

- Financial aspects
    - Capital expenditure
    - Operational expenditure
    - Income and revenue
    - Annualised costs
- Financial flow models
    - Discrete model
    - Integrated model
    - Sanitation tax model

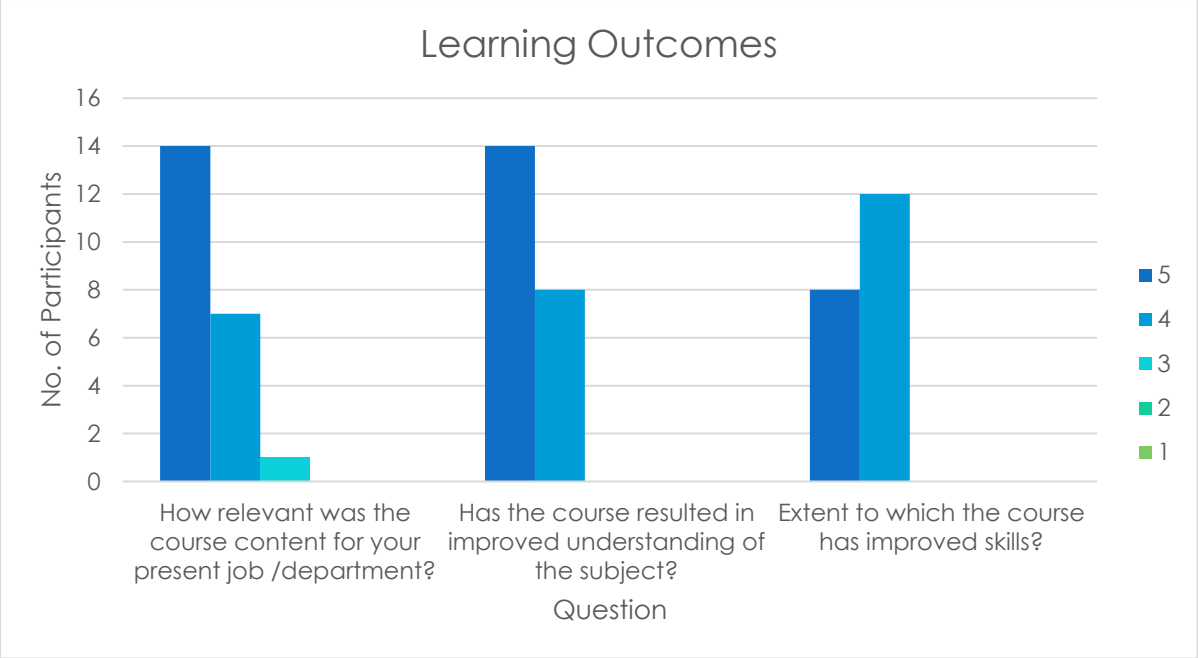
- Licence model
- Incentivised model

In this session, Ms. Jyoti Dash, Programme Officer, NIUA briefly explained the financing arrangements available under AMRUT program for the implementation of faecal sludge and septage management and for non-AMRUT cities the funding availability under finance commissions.

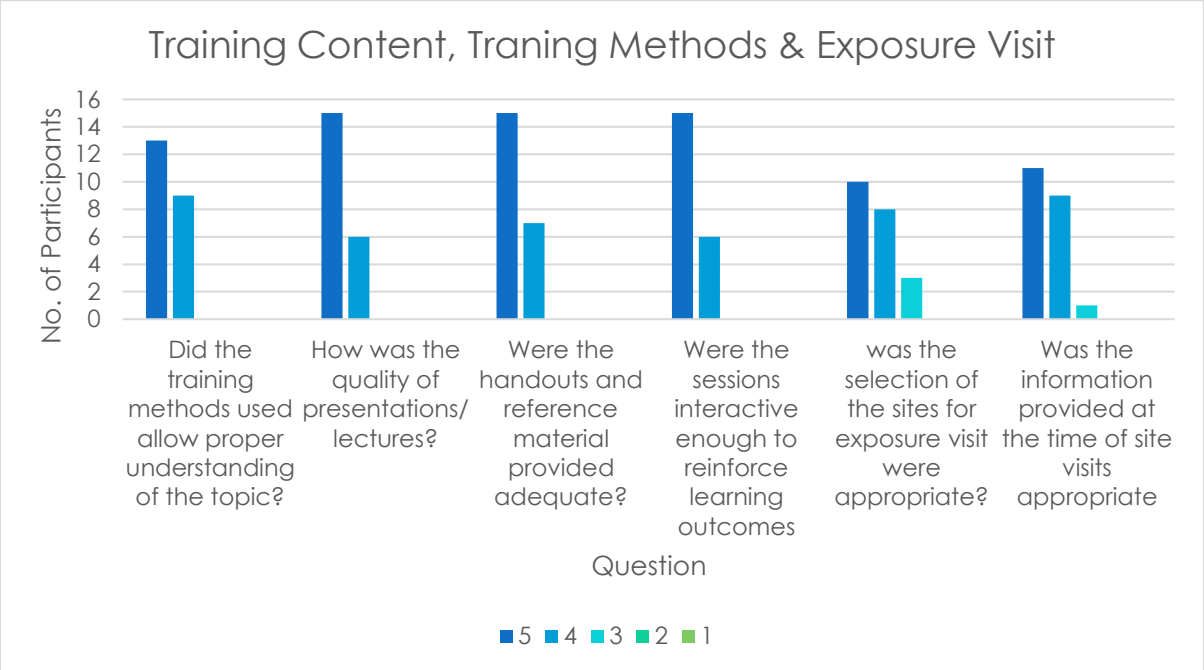


## Feedback and Wrap-up Session

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 stages of Faecal Sludge and Septage Management in Detailed Project Report and concrete ideas for implementation in the cities where consultants are working. 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. Followings graphs are showing the answers given by participants for the questionnaire.

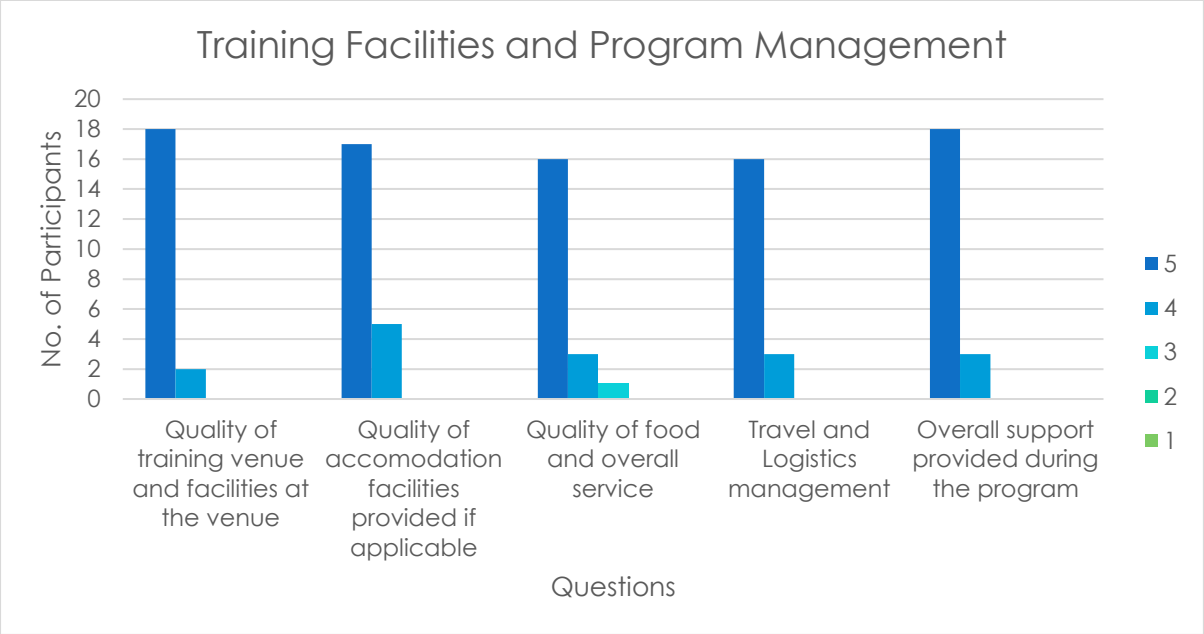



Out of 22 participants 95% participants feel the content is relevant to their current work profile and participants found the course has improved their skills sets.




All the participants were completely satisfied with the methods used for training and group work for communicating the topic. 95% of the participants felt that the quality of the presentations was up to the mark and sessions were interactive to reinforce the learning outcomes. This also facilitated interstate exchange of ideas and experiences. Participants were satisfied with the reference material given to during the training. However, there were no suggestions given for improvement during the verbal

feedback session. Although 82% of the participants were satisfied with selection of sites for the exposure visit, 90% of the participants were satisfied with the explanation provided during the site visit.




All the participants were quite satisfied with the training facility and overall program management.

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 of consultants at Pune. The participants also thanked the organizers, NIUA for the very useful training. The participants were awarded certificates for their participation. Dr. Dayanand Panse felicitated the participants with Certificate of Participation. They thanked the participants for their active participation and making the training a success.

# ANNEXURES

## Attendance Sheet

National Institute of Urban Affairs

### Preparation of Faecal Sludge and Septage Management (FSSM) Detailed Project Report (DPR)

Training | Pune, India | May 30th – June 1st, 2018

ecosan SERVICES FOUNDATION

| Sr No. | Name | Organization | Signature | | |
|---|---|---|---|---|---|
| | | | May 30th, 2018 | May 31st, 2018 | June 1st, 2018 |
| 1 | Ms. Anjali Shukla | UADD | | | |
| 2 | Ms. Apoorva Gangrade | IPE Global | | | |
| 3 | Mr. Binod Kumar Sahoo | Orissa Water Supply & Sewerage Board | | | |
| 4 | Mr. Chandra Naik | ATI, Mysore | | | |
| 5 | Mr. Deepak Hatwalne | EGIS India Consulting Engineers Pvt. Ltd. | | | |
| 6 | Mr. Deepak Jain | Shah Technical Consultant | | | |
| 7 | Mr. Harpal Solanki | All India Institute of Local Self Government | | Absent | |
| 8 | Mr. Hemant Pabale | Tata Consulting Engineers Ltd. | | | |
| 9 | Mr. J. S. Jayakumar | Suchitwa Mission | | | |

National Institute of Urban Affairs

# Preparation of Faecal Sludge and Septage Management (FSSM) Detailed Project Report (DPR)

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Training | Pune, India | May 30th – June 1st, 2018

| | | | | | |
|---|---|---|---|---|---|
| 10 | Ms. Nony Gupta | IPE Global | | | |
| 11 | Mr. Parag Subhash Somwanshi | UADD - State PMU for SBM MP (U) (KPMG India) | | | |
| 12 | Mr. Praveen Yadav | IPE Global | | | |
| 13 | Mr. Rajiv Reddy | PricewaterhouseCoopers Pvt. Ltd (PwC) | | | |
| 14 | Mr. Ramprakash Yadav | Tata Consulting Engineers Ltd. | | | |
| 15 | Ms. Rupali Rathore | KPMG PVT LTD | | | |
| 16 | Mr. Sasikumar Eswaramurthy | Indian Institute For Human Settlements ( IIHS) | | | |
| 17 | Mr. Satyam Narayan | IPE Global | | | |
| 18 | Ms. Shalini Singh | Urban Administration and Development Department, Madhya Pradesh | | | |
| 19 | Ms. Shalini Tamar | Urban Development Department Madhya Pradesh | | | |
| 20 | Mr. Tariq Ahmed | Shah Technical Consultant | | | |

National Institute of Urban Affairs

# Preparation of Faecal Sludge and Septage Management (FSSM) Detailed Project Report (DPR)

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Training | Pune, India | May 30th – June 1st, 2018

| | | | | | |
|---|---|---|---|---|---|
| 21 | Mr. Vidyasagar Gupta | Ernst & Young LLP | | | |
| 22 | Mr. Vivek Raj Pandey | IPE Global | | | |
| 23 | Ms. Mrudula Mankikar | CEPT University | | | |
| 24 | Ms. Jyoti Dash | National Institute of Urban Affairs | | | |
| 25 | Mr. Mohit Kapoor | National Institute of Urban Affairs | | | |
| 26 | Mr. Dhawal Patil | Ecosan Services Foundation | | | |
| 27 | Mr. Saurabh Kale | Ecosan Services Foundation | | | |
| 28 | Ms. Sreevidya Satish | Ecosan Services Foundation | | | |
| 29 | Ms. Pallavi Deshmukh | Ecosan Services Foundation | | | |
| 30 | Ms. Mrunal Karve | Ecosan Services Foundation | | | |
| 31. | Mr. Nirmal Thakre | Ecosan Services Foundation | | | |

Attendance Sheet

National Institute of Urban Affairs

**Training on**
**Preparation of Faecal Sludge and Septage Management (FSSM)**
**Detailed Project Report (DPR)**

Pune, India

May 30th – June 1st, 2018

ECOSAN SERVICES FOUNDATION

## FEEDBACK FORM

| General Information | |
|---|---|
| Name | BINOD KUMAR SAHOO |
| Designation | PROJECT DIRECTOR |
| Organization | ORISSA WATER SUPPLY & SEWERAGE BOARD |
| City and State | BHUBANESWAR, ODISHA |
| Contact No. | |
| Email Id | |

| Learning Outcomes (tick for the appropriate option) |  |  |  |  |  |
|---|---|---|---|---|---|
| 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? | ✓ | | | | |

National Institute of Urban Affairs

# Training on Preparation of Faecal Sludge and Septage Management (FSSM) Detailed Project Report (DPR)

ecosan SERVICES FOUNDATION

Pune, India

May 30th – June 1st, 2018

| | | | | | |
|---|---|---|---|---|---|
| Were the sessions interactive enough to reinforce learning outcomes | ✓ | | | | |
| Was the selection of the sites for exposure visit appropriate? | | | ✓ | | |
| 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<br>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 | At present hardly any full scale FSSM is at place in any of the City in India. Some septage treatment plants have been constructed here & there mostly on pilot scale basis. All these plants should be studied in detail & performance with respect to design parameters should be recorded & compiled for future guidance. Collection & transportation of fecal sludge in some of the towns have been systemized. However, a uniform procedure to be adopted in all towns with their specific requirement taken into view. | | | | |

National Institute of Urban Affairs

# Training on Preparation of Faecal Sludge and Septage Management (FSSM) Detailed Project Report (DPR)

Pune, India

May 30th – June 1st, 2018

ecosan SERVICES FOUNDATION

## FEEDBACK FORM

| General Information | |
|---|---|
| Name | RAMPRAKASH YADAV |
| Designation | MANAGER (CIVIL) |
| Organization | TATA CONSULTING ENGINEERS LIMITED |
| City and State | PUNE, MAHARASHTRA |
| Contact No. | 9405465123 |
| Email Id | yrbmtech@gmail.com, rbyadav@tce.co.in |

| Learning Outcomes (tick for the appropriate option) |  |  |  |  |  |
|---|---|---|---|---|---|
| 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? | | ✓ | | | |

Feedback Form

National Institute of Urban Affairs

# Training on Preparation of Faecal Sludge and Septage Management (FSSM) Detailed Project Report (DPR)

ecosan SERVICES FOUNDATION

Pune, India

May 30th – June 1st, 2018

| | | | | | |
|---|---|---|---|---|---|
| Were the sessions interactive enough to reinforce learning outcomes | ✓ | | | | |
| Was the selection of the sites for exposure visit appropriate? | ✓ | | | | |
| 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<br>Convenience of location | ✓ | | | | |
| Quality of accommodation facilities provided, if applicable | NA | | | | |
| 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 | well contended & well planned. | | | | |



Feedback Form

Write down the knowledge gaps and skill gaps in FSSM and IWSM with respect to your perspective at the organisation level.

| | Knowledge Gaps | Skill Gaps |
|---|---|---|
| National Level | ↳ Quantification<br>↳ Optimization of transport cost<br>↳ Technical understanding of equipment. | ↳ Decision making in site selection<br>↳ Fewer case studies in the country.<br>↳ Less no. of vendors of mechanical equipment. |
| State Level | | |
| City Level | ↳ No concrete steps towards reuse of end products.<br>↳ Energy generation understanding not thorough. | ↳ Lack of funds in O&M part of the plant.<br>↳ Quality benchmark not set & followed. |