Online training Programme on Faecal Sludge and Septage Management for Urban Local Bodies of Manipur

DECEMBER 7th – DECEMBER 9th 2020
Online training Programme on
Faecal Sludge and Septage Management for Urban Local Bodies of Manipur

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The report summarizes the online workshop conducted under Sanitation Capacity Building Platform (SCBP) during the COVID 19 pandemic. The report elaborates on the online workshop given to the technical experts, practitioners from local or state government organizations from the state of Manipur on aspects of Faecal Sludge and Septage Management (FSSM). This workshop was organized for a 3-day period which proved to be a foundation course on FSSM for all the participants from Manipur State.
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## Abbreviations

<table>
<thead>
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<th>Description</th>
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</thead>
<tbody>
<tr>
<td>AMRUT</td>
<td>Atal Mission for Rejuvenation and Urban Transformation</td>
</tr>
<tr>
<td>BIS</td>
<td>Bureau of Indian Standards</td>
</tr>
<tr>
<td>BOD</td>
<td>Biological Oxygen Demand</td>
</tr>
<tr>
<td>COD</td>
<td>Chemical Oxygen Demand</td>
</tr>
<tr>
<td>CAPEX</td>
<td>Capital Expenditure</td>
</tr>
<tr>
<td>CSP</td>
<td>City Sanitation Plan</td>
</tr>
<tr>
<td>CW</td>
<td>Constructed Wetlands</td>
</tr>
<tr>
<td>DPR</td>
<td>Detailed Project Report</td>
</tr>
<tr>
<td>DTS</td>
<td>Decentralised Treatment System</td>
</tr>
<tr>
<td>ESF</td>
<td>Ecosan Services Foundation</td>
</tr>
<tr>
<td>FS</td>
<td>Faecal Sludge</td>
</tr>
<tr>
<td>FSSM</td>
<td>Faecal Sludge and Septage Management</td>
</tr>
<tr>
<td>FSTP</td>
<td>Faecal Sludge Treatment Plant</td>
</tr>
<tr>
<td>MC</td>
<td>Municipal Council</td>
</tr>
<tr>
<td>NP</td>
<td>Nagar Panchayat</td>
</tr>
<tr>
<td>NIUA</td>
<td>National Institute of Urban Affairs</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>Operation &amp; Maintenance</td>
</tr>
<tr>
<td>OPEX</td>
<td>Operational Expenditure</td>
</tr>
<tr>
<td>PBMC</td>
<td>Port Blair Municipal Corporation</td>
</tr>
<tr>
<td>PCB</td>
<td>Pollution Control Board</td>
</tr>
<tr>
<td>Q&amp;A</td>
<td>Question &amp; Answer</td>
</tr>
<tr>
<td>SCBP</td>
<td>Sanitation Capacity Building Program</td>
</tr>
<tr>
<td>SeTP</td>
<td>Septage Treatment Plant</td>
</tr>
<tr>
<td>SOP</td>
<td>Standard Operating Procedure</td>
</tr>
<tr>
<td>STP</td>
<td>Sewage Treatment Plant</td>
</tr>
<tr>
<td>SWM</td>
<td>Solid Waste Management</td>
</tr>
<tr>
<td>ULB</td>
<td>Urban Local Body</td>
</tr>
</tbody>
</table>
1. Introduction

Water and sanitation sector in India need reforms if national and global benchmarks for service delivery are to be met with success. The current plight of the sanitation sector is such that huge gaps in the sanitation service chain are faced by majority population of India. 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. For decentralization we need to focus on on-site sanitation systems consisting of containment and treatment units such as septic tanks and anaerobic settler, baffled reactor respectively. These units need to be desludged at a regular interval in order to maintain the treatment efficiency of the unit.

Faecal sludge & Septage Management (FSSM) refers to the removal, treatment, and disposal of sludge from containment and treatment units. Faecal sludge and septage is different from domestic sewage and it contain mostly human bodily excreta 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 liquid waste to a central location for treatment and disposal. However, the centralized wastewater management is not feasible for towns where the population density is low and the financial management is not up to the mark.

Presently, majority of the urban local bodies (ULBs) do not have this required infrastructure for end-to-end management of liquid waste for its complete population. This means the sludge from the containment units have to be emptied and moved to a location that will process it further making it safe for reuse or disposal. This ensures that part of the pollution load is reduced and the health of the onsite containment units is maintained.

Most cities in India lack the capacity to regulate the emptying, conveyance, treatment and dumping of faecal sludge and septage. 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.

This online certificate course was developed to understand all aspects of Faecal sludge and Septage Management across the service value chain.

Course Objective

To build the capacities of the participants so that they can understand, analyze and apply the learnings in the real-life scenario for technical and financial planning of faecal sludge and septage management at a city level including designing of faecal sludge and septage treatment plant.

A 3-day foundation course with total duration of 4.5 hours was designed for online delivery. In order to engage the participants and ensure that capacity is built to the level of understanding FSSM, the course was developed using a case methodology and had a mix of presentations, case studies, information videos, etc. In order to successfully complete the course with certification, the participants had to attend all the sessions.
## 2. Agenda

Following is the day wise agenda of the training. A detailed minute to minute agenda is available in the annexure.

Table 1: Agenda of the Training

<table>
<thead>
<tr>
<th>Day</th>
<th>Session</th>
<th>Topic</th>
<th>Contents</th>
<th>Duration [min]</th>
</tr>
</thead>
</table>
| 7 December 2020      | 1       | Introduction to Faecal Sludge and Septage Management | Sanitation System Approach  
Wet Sanitation Systems  
Sanitation Service Chain  
Challenges in Sanitation Services |                |
| 7 December 2020      | 2       | Characterisation of Faecal Sludge and Septage | Parameters for characterizing Categories of sludges  
Operational factors affecting the characteristics | 90             |
| 7 December 2020      | 3       | Quantification of Faecal Sludge and Septage | Need of quantification of sludge  
Methods of quantification of sludge  
Operational factors to be considered while quantification |                |
| 8 December 2020      | 4       | Treatment of Faecal Sludge and Septage | Treatment targets and specific objectives  
Approaches for faecal sludge and septage management  
Treatment mechanisms  
Driving factors for selection of treatment mechanisms |                |
| 8 December 2020      | 5       | Non-mechanized Treatment of Faecal Sludge and Septage | Stages of treatment of faecal sludge and septage  
Non mechanized treatment units-  
Settling Thickening Tank, Anaerobic Digester, Unplanted Drying Beds. | 90             |
| 8 December 2020      | 6       | Mechanized Treatment of Faecal Sludge and Septage | Stages of treatment of faecal sludge and septage  
Mechanized treatment units-  
Dewatering technology,  
Drying technology,  
Thermal treatment. |                |
| 9 December 2020      | 7       | Financial aspects of FSSM | Financial components of FSSM  
Financial and contracting models |                |
| 9 December 2020      | 8       | Siting & Layout Planning of FSTP | Site characterization & evaluation  
Site selection criteria  
Safety planning at treatment plant  
Importance of layout planning & examples | 90             |
|                      | 9       | Case Studies | Septage treatment plant  
Bhubaneshwar  
FSTP Port Blair  
FSTP Rudrapur |                |
|                      |         | Total duration [hours] | | 4.5 |
3. Sessions

3.1 Day 1, December 7th, 2020
The online training workshop was kicked off with a formal introduction of the Sanitation Capacity Building Platform. The training and online platform for all the practitioners hosted by NIUA was introduced by Mr. Dhawal Patil. Sr. Resource Person, ESF. The session began with the introduction to the course, course outline, structure and objectives of the online training program on treatment of faecal sludge and septage management under Sanitation Capacity Building Program (SCBP). The ZOOM platform was introduced to the participants. The lead trainer instructed all the participants to follow the WhatsApp group for regular updates about reference material, case studies, relevant videos, etc.

1.1.1 Session 1: Introduction to Faecal Sludge and Septage Management
Mr. Dhawal Patil, Sr. Resource Person, ESF was the lead trainer for all the 3 days of this workshop. The lead trainer explained about the importance of this session and how managing this waste is of utmost necessity in today’s world.

Session started with types of sanitation systems and its approaches and difference between Sewered and Non-sewered sanitation system. Following were the points of discussion from the slide-deck:

- Sanitation System Components- Wet & Dry Systems
- Sanitation Systems Approach & Sanitation Service Chain
- Hybrid Sanitation System Model
- Current Challenges in FSSM
- Different sanitation systems
- Summary – Sanitation system approach helps to break down the system and understand its nuances

3.1.2 Session 2: Characterization of Faecal Sludge and Septage
The second session began with the presentation on basics of FSSM. Following were the points of discussion:

- Parameters, Fractionation of Solids; COD
- Comparison of Septage & Sewage
- Types of Sludge- Faecal Sludge; Septage & Sewage
- Characterization of Sludge on Ratios of Sewage, Septage and Public Toilet Sludge, Characterization Ratios
- Operational Factors – Toilet Usage, Storage Duration, Climatic Conditions, Infiltration and Exfiltration, Equipment’s Used.
- Sampling procedures
- Summary- Characteristics of the sludge can change from city to city & varies with multiple factors

Following were some questions raised during the session:

- Q: Could the septage samples be tested at wastewater testing labs?
  Ans: The samples could be sent where wastewater tests were undertaken. However, due to its high concentration those samples need to be diluted first before testing and after some mathematical formulation/considerations, their results could be analysed.

3.1.3 Session 3: Quantification of Faecal Sludge & Septage
Following contents were discussed in the 3rd session for the day by the lead trainer:

- Why quantification is necessary?
- Methods of Quantification- Sludge Production & Sludge Collection Methods (Assumptions for the calculations should be based on some logical reasoning, sludge production method is not reliable)
Challenges faced
- Stakeholders & Data Collection
- Seasonal Variations, Peaking Factor

Following were some questions raised during the session:

- Q: What is the better method of sludge conveyance?
  Ans: Sludge collection method is a more reliable method than sludge production method.

![Figure 1: Day 1 of the training workshop]

After the Q&A session, the lead trainer urged all the participants to join the WhatsApp group created where all the videos, case studies, presentations pertaining to FSSM would be shared with everyone. Participants also were keen to know more about the household checklist questionnaire about the data collection which was discussed during the previous session.

3.2 Day 2, December 8th, 2020
Mr. Dhawal Patil welcomed all the participants for day 2 of the training workshop & resumed with the day 2 sessions.

3.2.1 Session 4: Treatment of Faecal Sludge and Septage
The following contents were covered in this part of the session:

- Treatment Targets
- Treatment Objectives- Dewatering, Pathogen Removal, Nutrient Recovery, Stabilization
- Approaches for FSSM- Deep Row Entrenchment, Co-treatment in STP
- Treatment Mechanisms
- Treatment Stages
- Treatment Chain Layout
- Selection of Treatment Units

3.2.2 Session 5: Non-Mechanized Treatment Units
Following contents were discussed in this session:

- Geo-bags
- Settling Thickening Tank- O&M
- Anaerobic Digester- Concept, Zones in Digester, O&M
- Planted Drying Beds
- Unplanted Drying Beds- O&M
- Co composting
- Extended Storage
Following were some of the questions raised during the session:

- Q: Are the planted drying beds readily used in India?
  Ans: It needs a lot of years to remove the dried sludge. For smaller capacity, the planted drying beds are readily being used atleast in India.

- Q: What is the cost of a screw press machine? How much power does it require?
  Ans: Around 10 to 15 lakhs based on the different capacities. The capacity can typically be around 5KW HP.

### 3.2.3 Session 6: Mechanized Treatment Units

Following contents were discussed in the session:

- Screw Press
- Belt Press- Performance
- Solar Drying- Performance Range, Operational & Design Consideration
- Belt Dryer
- Paddle Dryer- Operational & Design Consideration
- Pyrolysis
- Dry Pyrolysis
- Bio char

Following questions were raised during the session:

- Q: What care should be taken while implementing FSSM using gradient slope?
  Ans: You need to provide appropriate gradients for the pipe while transferring sludge from one unit to another.

- Q: What sort of environmental clearances are required before setting up a FSTP?
  Ans: It depends from state-to-state pollution control boards. All the consents need to be considered according to the capacities of the FSTP.

- Q: What can be done for odour control at a solid waste management plant composting?
  Ans: Aerate the pile of solid waste from time to time for composting needs to be controlled looking at the temperature. If it still persists, then microbial culture which consists of aerobic microbes can be sprayed on the waste pile to keep it in check.

- Q: Is co-treatment possible in waste to energy plant?
  Ans: It is recommended only for faecal sludge not septage. If septage is also put, the methane generation is very less and further the overall efficiency is disturbed.

![Figure 2 : Day 2 of the training workshop](image)

After the end of the session, the lead trainer also urged all the participants to ask questions and join the WhatsApp group to acquire all the resource materials.
3.3 Day 3, December 9th, 2020
The lead trainer welcomed all the participants for the last day of the training workshop.

3.3.1 Session 7: Financial Aspects of FSSM
The objective of the session was to introduce financial aspects pertaining to FSSM & following contents were covered in this session:

- Capital Expenditure
- Operational Expenditure- Direct Costs & Indirect Costs
- Income & Revenue- Discharge Fee, Purchase Price & Budget Support
- Annualized Cost
- Cost Analysis of FSTPs in India
- Life Cycle Cost Analysis of FSTPs in India
- Common Public FSSM Model
- Private Model
- Licensing Model
- Demand Desludging & Scheduled Desludging
- Sanitation Tax Model
- Incentivized Disposal Model

3.3.2 Session 8: Siting & Layout Planning of the FSTP
Following were the contents discussed during the session:

- Identification of Treatment Sites
- Site Eligibility Criteria
- Characterization & Evaluation
- Hierarchy of Control Measures
- Importance of Layout Planning
- Considerations while Layout Planning
- Good Practices at FSTPs: Septage Receiving Stations, Screens, Tanks & Ponds, Sludge Drying Beds, Constructed Wetlands
- Mechanical Equipment
- Sludge Storage Yard

3.3.3 Session 9: Case Studies
The lead trainer explained the following 3 case studies with the participants:

- Septage Treatment Plant, Bhubaneshwar
- FSS Treatment Plant, Port Blair
- FSTP Rudrapur

Following contents were discussed in these case studies:

- Layouts & Treatment Units of each of the treatment plants.
Following questions were raised after the session:

- Q: What would be the CapEx & OpEx costs & what's minimum requirement for land?
  Ans: CapEx would cost around 1 crore while the OpEx would cost around 2 crores considering the example of Port Blair FSTP case study for capacity of 42 KLD spread over 400 sq.m as it was fully a mechanized treatment system. For natural treatment systems, the land requirement would be pretty high.

- Q: How much HRT was required in treatment units?
  Ans: Around 24 to 48 hours for anaerobic treatment & 20 hours for anaerobic filter. Also, it's depended on the characteristics of the sludge and on the BOD & COD levels.

- Q: What was the size for anaerobic digester?
  Ans: It depends on the incoming volatile solids.

For the conclusion of this workshop, Mr. Depinder Kapur, Sr. Domain Expert & Team Lead, SCBP-NIUA gave the closing addressing by thanking the trainers, organizers from SCBP team & all the Manipur officials for their participation and wished for more engagements with the state of Manipur in tackling faecal sludge & septage management which marked the end of the training workshop.
Figure 5: Group photograph at the end of the workshop
4. Feedback

Providing feedback towards the training workshop was voluntary. Around 50% (23 responses) of the participants have shared their feedbacks. Considering the feedback carried out for overall training, following inferences were drawn.

4.1 Learning Outcome
The graph below represents the learning outcomes of the participants where they have rated about their learnings from this training program. The ratings are out of 5. It has overserved that all participants have liked the course content which is related to their current work profiles and the course has improved their understanding about the FSSM.

**Figure 6 : Feedback for learning outcomes**

The course content was very relevant for your present job /department. The course has resulted in improved understanding of the subject. The course has improved skills /understanding.
### 4.2 Training Methods

The graph below shows the ratings for the various aspects while conducting this training workshop. The total ratings are out of 5. It can be observed that all the ratings are in the range of 4 - 5, which infers that all the participants were satisfied with the training content and methodology for delivery.

**Figure 7: Feedback for training content & training methods**

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>The modular format of the course made it easy to follow, and the extra reading material as well as videos helped</td>
<td>4.1</td>
</tr>
<tr>
<td>The training sessions delivered by the trainers were of quality standards</td>
<td>4.4</td>
</tr>
<tr>
<td>The sessions were interactive enough to reinforce learning outcomes, and the Q&amp;A sessions at the end of each day helped</td>
<td>4.1</td>
</tr>
<tr>
<td>The quality of presentations/lectures aided in understanding</td>
<td>4.3</td>
</tr>
<tr>
<td>The training methods used allowed proper understanding of the topic</td>
<td>4.2</td>
</tr>
</tbody>
</table>

### 4.3 Online Training Program Management

The graph below displays the overall ratings pertaining to the online training program management. The total ratings are out of 5. All the participants were satisfied with this whole training scheduling & its management. In terms of overall duration of the workshop, many participants felt that more no. of days could be added to learn in an efficient & productive way.

**Figure 8: Feedback for online training program management**

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication and overall support provided during the program was of high standard</td>
<td>4.1</td>
</tr>
<tr>
<td>Duration of the course was appropriate for online format, in terms of daily sessions</td>
<td>3.8</td>
</tr>
</tbody>
</table>
The graph below showcases the overall preference of the participants for their capacity building trainings. No surprises here that over 66% of the participants preferred face to face trainings over any form of online trainings.

Figure 9: Preferred platform for capacity development

The graph below displays an overview about the challenges faced by the participants during this online training workshop & their delivery. Majority of the participants pointed about the frequent network disruptions as the main issue which they had faced during the online workshop.

Figure 10: Challenges faced by the participants

Challenges Faced in the Online Training Delivery

- No issues: 3
- Frequent disruption due to network issues: 8
- Getting used to various online platforms like ZOOM, TEAMS etc: 7
- Difficult to attend during office hours: 5
4.4 Testimonials by the participants

The table below represents some of the valuable comments that have been shared from the participants in their feedback forms.

Table 2: Testimonials from participants

<table>
<thead>
<tr>
<th>SR. NO</th>
<th>NAME OF THE PARTICIPANT</th>
<th>ORGANIZATION</th>
<th>Testimonial</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ch Khelen Singh</td>
<td>Mayang Imphal Municipal Council</td>
<td>Such type of workshop cum training is highly necessary for every ULBs in India. So, after relaxation of lock down please organise an exposure visit for more effectiveness.</td>
</tr>
<tr>
<td>2</td>
<td>Tunglut Khamminthang</td>
<td>Municipal Administration Housing and Urban Development (MAHUD), Government of Manipur</td>
<td>Will try to implement it here at Kakching Municipal Council (where I have been posted right now). For any practical difficulties I will contact NIUA for help. Thanks for the much-needed session.</td>
</tr>
<tr>
<td>3</td>
<td>A Manmohan Singh</td>
<td>Jiribam Municipal Council</td>
<td>Very insightful workshop about FSSM &amp; looking forward to have more trainings in the future.</td>
</tr>
</tbody>
</table>
5. Learning and Way Forward

In a face-to-face training programs, the participants are motivated to attend the training and learn. In this case, the participants are away from the day-to-day work and hence, it is relatively easy to capture their attention and maintain their interest for the trainers. The trainer as well as trainees are connected in person and hence, the learning is accelerated and ensured. Following are the learning from the online training conducted:

5.1 Agenda and schedule
1. The agenda should be tailored for the target audience. A training program having focussed topic for appropriately targeted audience has more impact.
2. The schedule of the session needs to be carefully planned. If the sessions are to be conducted during weekdays, the time slot should be either start of the working hours or the end of the working hours. This allows the participants to manage their time well with the daily work.
3. The orientation training having 5-6 session in case of face-to-face training should be condensed into 3-4 sessions (60 – 90 in each) and conducted over a duration of 2-3 days.

5.2 Content
1. The content of the sessions needs to adopted for the online delivery of the sessions. It is recommended to use more pictorial and illustrations to state the point. The flow of the topics plays an important role to retain the attention. The session should begin with easy to grasp concepts leading into more detailed and important points. Each session should focus on not more than 5 points.
2. The duration of the session can be up to 90 min, provided the session is a good mix of PowerPoint presentation, audio visual aids such as information videos, case studies etc.

5.3 Resources
1. For an online training program, it is recommended that there is moderator. The moderator’s job is to put together different elements of the session together and to introduce to the participants. Moderator also plays an important role in case there is technical glitch at the resource person's end.
2. For each session of the training program, it is recommended to have at least 2 resource persons. While one resource person is engaged in the delivering the session, the other resource person can answer the queries, which the participants are posting in the chat box. Clarifying the queries of the participants when they are raised is important to maintain their interest in the session. The questions, which are not related to the topic of discussions are noted by the moderator and discussed with the lead trainer after the presentation is done.

5.4 Training Platform
1. The platforms used for conducting the online sessions and feedback play an important role to determine the user experience of the participants. A good user experience ensures and maintains interest of the participants in the various elements of the training program.
2. ZOOM was used during this training. The platform is user friendly and was easy for the participants to adapt.
3. Zoom do not consume higher bandwidth and also gives an option to switch off the audio video of the participants by the host. Thus, improving the audio video quality of the online sessions. It also has features such as breakout rooms, white board, dedicated Q&A box, chat box for participants.
4. For feedbacks, there are multiple platforms, however Google Forms are the most convenient platform. Feedbacks can be used not only to improve the further training but also to allow the participants to self-assess their individual learnings from the training program.
5.5 Learning Management System

A Learning Management System (LMS) or a portal can be developed which will eliminate the need of using different tools and platforms. The LMS can integrate the following tools:

1. Training calendar with brief about each training consisting of Introduction to the course, resource persons, profile of the organizers etc.
2. Registration portal with online payment gateway.
3. A repository of the resources pertaining to all the trainings (accessible only after registration to the training).
4. Integrated online training platform to live delivery of the sessions.
5. Question and answer section dedicated for participants to post queries during the training.
6. Exercise can be also converted in to an online format where in the participants have tools such as calculator, etc ready on the screen for use.
7. To reduce the number of queries, hints can be provided at certain stages of the exercise which will help the participants to smoothly carry out the exercise.
8. Forums on discussing the topics and sharing of knowledge during and after the training.
9. Quiz platform for the participants to attempt the quizzes.
10. Feedback portal for the training.

The LMS not only improves the user experience for the participants during the training but also eases the efforts of the organizer to put together various lists containing information of the participants and the results from various platform. Such a platform can be also made mobile friendly, so that participants can use the forum and other tools easily.
Annexure 1

List of Resource Persons

Table 3: List of Resource Persons

<table>
<thead>
<tr>
<th>SR NO.</th>
<th>NAME OF THE RESOURCE PERSON</th>
<th>ORGANIZATION</th>
<th>ROLE</th>
<th>PROFILE PHOTO</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Mr Dhawal Patil</td>
<td>Ecosan Services Foundation</td>
<td>Lead Trainer</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Mr Saurabh Kale</td>
<td>Ecosan Services Foundation</td>
<td>Lead Trainer</td>
<td></td>
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</table>
# Annexure 2

## List of Participants

The following table presents the details of the officials, staff with whom we have discussed about the treatment systems for Faecal Sludge and Septage Management (FSSM).

**Table 4: List of Participants**

<table>
<thead>
<tr>
<th>No.</th>
<th>Name of ULB/ Organisation</th>
<th>Nominations</th>
<th>Designation</th>
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<tbody>
<tr>
<td>1</td>
<td>Samurou MC</td>
<td>L. Romesh Singh</td>
<td>Executive Office</td>
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<tr>
<td>2</td>
<td>Shikhong Sekmai MC</td>
<td>Ch. Ningtamba Meetei</td>
<td>Executive Officer</td>
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<tr>
<td>3</td>
<td>Lamlai MC</td>
<td>Y. Peeter Singh</td>
<td>Executive Officer</td>
</tr>
<tr>
<td>4</td>
<td>Thongkhong Laxmi MC</td>
<td>MM Ziaur Rahaman</td>
<td>Executive Officer</td>
</tr>
<tr>
<td>5</td>
<td>Wangjing Lamding MC, Heirok NP</td>
<td>Awungshi Phungrei</td>
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</tr>
<tr>
<td>6</td>
<td>Sekmai NP</td>
<td>Ch. Ananda Angomcha</td>
<td>Executive Officer</td>
</tr>
<tr>
<td>7</td>
<td>Lilong Tbl MC</td>
<td>M. Victor</td>
<td>Executive Officer</td>
</tr>
<tr>
<td>8</td>
<td>Nambol MC</td>
<td>Th. Rabindra Singh</td>
<td>Executive Officer</td>
</tr>
<tr>
<td>9</td>
<td>M. Brajagopal Singh</td>
<td>O. Chaoba Singh</td>
<td>Executive Engineer</td>
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<tr>
<td>10</td>
<td>L. Memtombi Devi</td>
<td>M. Memtombi Devi</td>
<td>Sanitary Inspector</td>
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<td>11</td>
<td>Andro MC</td>
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<td>Jiribam MC</td>
<td>M. Surjit Singh</td>
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<tr>
<td>14</td>
<td>A Manmohan Singh</td>
<td>A Manmohan Singh</td>
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<td>15</td>
<td>S. Linthoingambi Devi</td>
<td>S. Linthoingambi Devi</td>
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<td>17</td>
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<td>U. Romesh Singh</td>
<td>M. Bainte</td>
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<tr>
<td>19</td>
<td>RK Somorjit Singh</td>
<td>RK Somorjit Singh</td>
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<td>20</td>
<td>Bishnupur MC</td>
<td>Kh. Kanta Singh</td>
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<tr>
<td>21</td>
<td>N. Hemlet Singh</td>
<td>N. Hemlet Singh</td>
<td>Assistant Engineer</td>
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<tr>
<td>22</td>
<td>Th. Ingotomba Singh</td>
<td>Th. Ingotomba Singh</td>
<td>Computer Operator</td>
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<td>23</td>
<td>N. Anita Devi</td>
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<td>S. Roben Singh</td>
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<td>Samuel Moirangthem</td>
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<td>L. Rupendra</td>
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<td>Dr. W. Roshan</td>
<td>Assistant Environment Engineer</td>
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<td>Environment &amp; CC</td>
<td>S.K. Gainaimei</td>
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<td>Y. Satyajit</td>
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<td>Dr. Bharati</td>
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<td>Ms. Sarjubala</td>
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<td>N. Tonny</td>
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<td>48</td>
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<td>Ramananda</td>
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# Annexure 3

## Minute by Minute Agenda

<table>
<thead>
<tr>
<th>Date</th>
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<td>7 December 2020</td>
<td>S1</td>
<td>Introduction to Faecal Sludge and Septage</td>
<td>Sanitation System Approach Wet Sanitation Systems Sanitation Service Chain Challenges in Sanitation Services</td>
<td>Mr. Dhawal Patil</td>
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<td>S2</td>
<td>Characterization of Faecal Sludge and Septage</td>
<td>Parameters for characterizing categories of sludges Operational factors affecting the characteristics</td>
<td>Mr. Dhawal Patil</td>
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<td>S3</td>
<td>Quantification of Faecal Sludge &amp; Septage</td>
<td>Need of quantification of sludge Methods of quantification of sludge Operational factors to be considered while quantification</td>
<td>Mr. Dhawal Patil</td>
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<td>Q1</td>
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<td>8 December 2020</td>
<td>S4</td>
<td>Treatment of Faecal Sludge &amp; Septage</td>
<td>Treatment targets and specific objectives Approaches for faecal sludge and septage management Treatment mechanisms Driving factors for selection of treatment mechanisms</td>
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<td>S5</td>
<td>Non-mechanized treatment units</td>
<td>Stages of treatment of faecal sludge and septage Non mechanized treatment units- Settling Thickening Tank, Anaerobic Digester Unplanted, Drying Beds.</td>
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<td>Mechanized treatment units</td>
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<td>S7</td>
<td>Financial aspects of FSSM</td>
<td>Financial components of FSSM, Financial and contracting models</td>
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<td>S8</td>
<td>Siting &amp; Layout Planning of FSTP</td>
<td>Site characterisation and evaluation, Site selection criteria, Safety planning at treatment plant, Importance of layout planning and examples</td>
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<td>S9</td>
<td>Case Studies</td>
<td>Septage treatment plant Bhubaneshwar, FSTP Port Blair, FSTP Rudrapur</td>
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<td>Question &amp; Answer</td>
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Notes:
Online Workshop on Fecal Sludge and Septage Management (FSSM)