



Sanitation Capacity Building Program

**ONLINE WORKSHOP ON FAECAL SLUDGE AND SEPTAGE
MANAGEMENT (FSSM)**

DECEMBER 7TH – DECEMBER 9TH, 2020



1st Floor, 24 Prashant Nagar,
721/1 Navi Sadashiv Peth,
Pune – 411030, Maharashtra, India
+91 20640 00736 | +91 20245 30061
www.ecosanservices.org

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.

Prepared by;

Ecosan Services Foundation (ESF)

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

For

National Institute of Urban Affairs (NIUA)

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

Table of Contents

LIST OF FIGURES	III
LIST OF TABLES.....	IV
ABBREVIATIONS	V
1 INTRODUCTION.....	6
2 AGENDA	8
3 SESSIONS.....	10
3.1 DAY 1, DECEMBER 7 TH , 2020	10
3.1.1 Session 1: Introduction to Faecal Sludge and Septage Management	10
3.1.2 Session 2: Characterization of Faecal Sludge and Septage	10
3.1.3 Session 3: Quantification of Faecal Sludge & Septage	11
3.2 DAY 2, DECEMBER 8 TH , 2020	13
3.2.1 Session 4: Treatment of Faecal Sludge and Septage	13
3.2.2 Session 5: Non-Mechanized Treatment Units	13
3.2.3 Session 6: Mechanized Treatment Units	14
3.3 DAY 3, DECEMBER 9 TH , 2020	16
3.3.1 Session 7: Financial Aspects of FSSM	16
3.3.2 Session 8: Siting & Layout Planning of the FSTP	16
3.3.3 Session 9: Case Studies	17
4 FEEDBACK	19
4.1 LEARNING OUTCOME.....	19
4.2 TRAINING METHODS	19
4.3 ONLINE TRAINING PROGRAM MANAGEMENT.....	20
4.4 TESTIMONIALS BY THE PARTICIPANTS	22
5 LEARNING AND WAY FORWARD.....	23
5.1 AGENDA AND SCHEDULE	23
5.2 CONTENT.....	23
5.3 RESOURCES.....	23
5.4 TRAINING PLATFORM	24
5.5 LEARNING MANAGEMENT SYSTEM	24
ANNEXURE 1: LIST OF RESOURCE PERSONS	27

ANNEXURE 2: LIST OF PARTICIPANTS.....	28
ANNEXURE 3: MINUTE BY MINUTE AGENDA	30

List of figures

FIGURE 1 : DAY 1 OF THE TRAINING WORKSHOP	12
FIGURE 2 : DAY 2 OF THE TRAINING WORKSHOP	15
FIGURE 3 : DAY 3 OF THE TRAINING WORKSHOP	17
FIGURE 4 : MR. DEPINDER KAPUR GIVING HIS VOTE OF THANKS.....	18
FIGURE 5 : GROUP PHOTOGRAPH AT THE END OF THE WORKSHOP	18
FIGURE 6 : FEEDBACK FOR LEARNING OUTCOMES	19
FIGURE 7 : FEEDBACK FOR TRAINING CONTENT & TRAINING METHODS	20
FIGURE 8: FEEDBACK FOR ONLINE TRAINING PROGRAM MANAGEMENT.....	21
FIGURE 9: PREFERRED PLATFORM FOR CAPACITY DEVELOPMENT.....	21
FIGURE 10: CHALLENGES FACED BY THE PARTICIPANTS.....	22

List of Tables

TABLE 1: AGENDA OF THE TRAINING.....	8
TABLE 2: TESTIMONIALS FROM PARTICIPANTS	22
TABLE 3: LIST OF RESOURCE PERSONS	27
TABLE 4: LIST OF PARTICIPANTS	28
TABLE 5: MINUTE BY MINUTE AGENDA	30

Abbreviations

AMRUT	Atal Mission for Rejuvenation and Urban Transformation
BIS	Bureau of Indian Standards
BOD	Biological Oxygen Demand
COD	Chemical Oxygen Demand
CAPEX	Capital Expenditure
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
MC	Municipal Council
NP	Nagar Panchayat
NIUA	National Institute of Urban Affairs
O&M	Operation & Maintenance
OPEX	Operational Exenditure
PBMC	Port Blair Municipal Corporation
PCB	Pollution Control Board
Q&A	Question & Answer
SCBP	Sanitation Capacity Building Program
SeTP	Septage Treatment Plant
SOP	Standard Operating Procedure
STP	Sewage Treatment Plant
SWM	Solid Waste Management
ULB	Urban Local Body

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

Day	Session	Topic	Contents	Duration [min]
7 December 2020	1	Introduction to Faecal Sludge and Septage Management	Sanitation System Approach; Wet Sanitation Systems; Sanitation Service Chain; Challenges in Sanitation Services	90
	2	Characterisation of Faecal Sludge and Septage	Parameters for characterizing; Categories of sludges; Operational factors affecting the characteristics	
	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	90
	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	
	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	90

	8	Siting & Layout Planning of FSTP	Site characterization & evaluation; Site selection criteria; Safety planning at treatment plant; Importance of layout planning & examples	
	9	Case Studies	Septage treatment plant, Bhubaneswar; 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.

3.1.1 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.

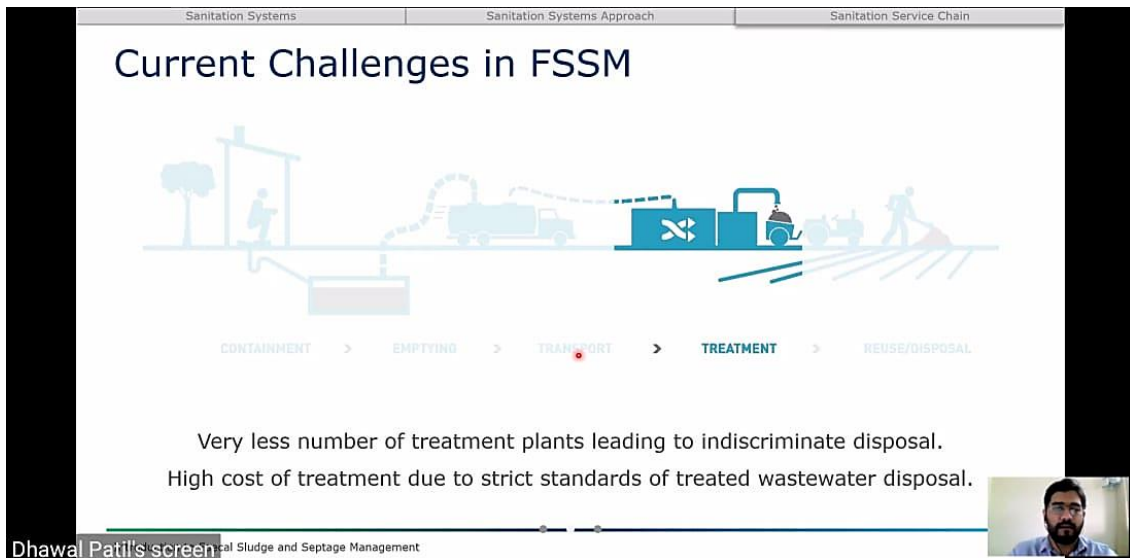


FIGURE 1 : DAY 1 OF THE TRAINING WORKSHOP

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? A: 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? A: 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.

Height of layers & specifications

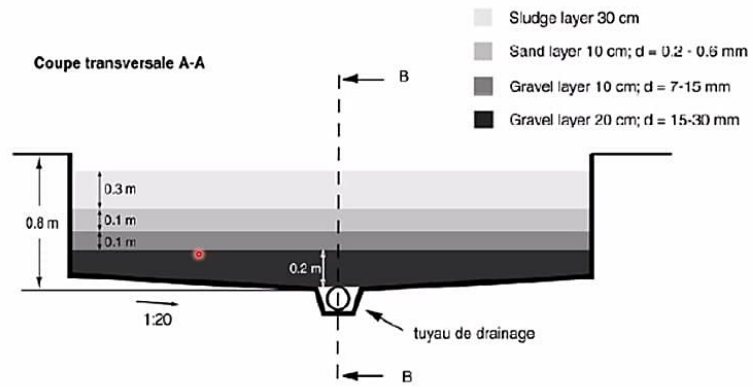


FIGURE 2 : DAY 2 OF THE TRAINING WORKSHOP

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

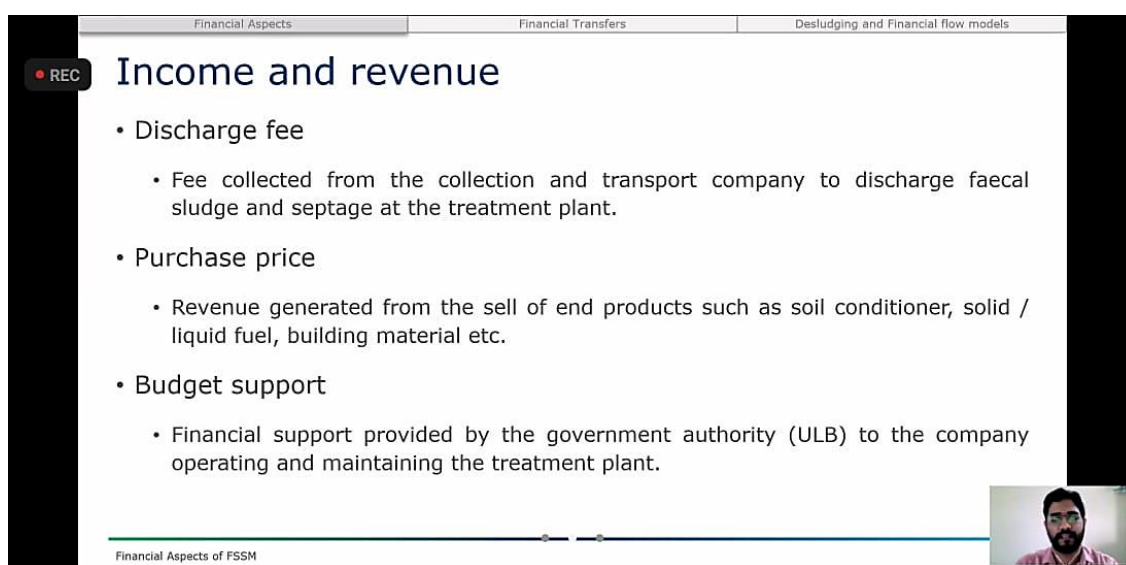
3.3.3 Session 9: Case Studies

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



The screenshot shows a presentation slide titled "Income and revenue" with a "REC" icon in the top left corner. The slide is part of a presentation with tabs for "Financial Aspects", "Financial Transfers", and "Desludging and Financial flow models". The content lists three revenue sources:

- Discharge fee
 - Fee collected from the collection and transport company to discharge faecal sludge and septage at the treatment plant.
- Purchase price
 - Revenue generated from the sell of end products such as soil conditioner, solid / liquid fuel, building material etc.
- Budget support
 - Financial support provided by the government authority (ULB) to the company operating and maintaining the treatment plant.

A small video inset of a man is visible in the bottom right corner of the slide. The footer of the slide reads "Financial Aspects of FSSM".

FIGURE 3 : DAY 3 OF THE TRAINING WORKSHOP

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 4 : MR. DEPINDER KAPUR GIVING HIS VOTE OF THANKS

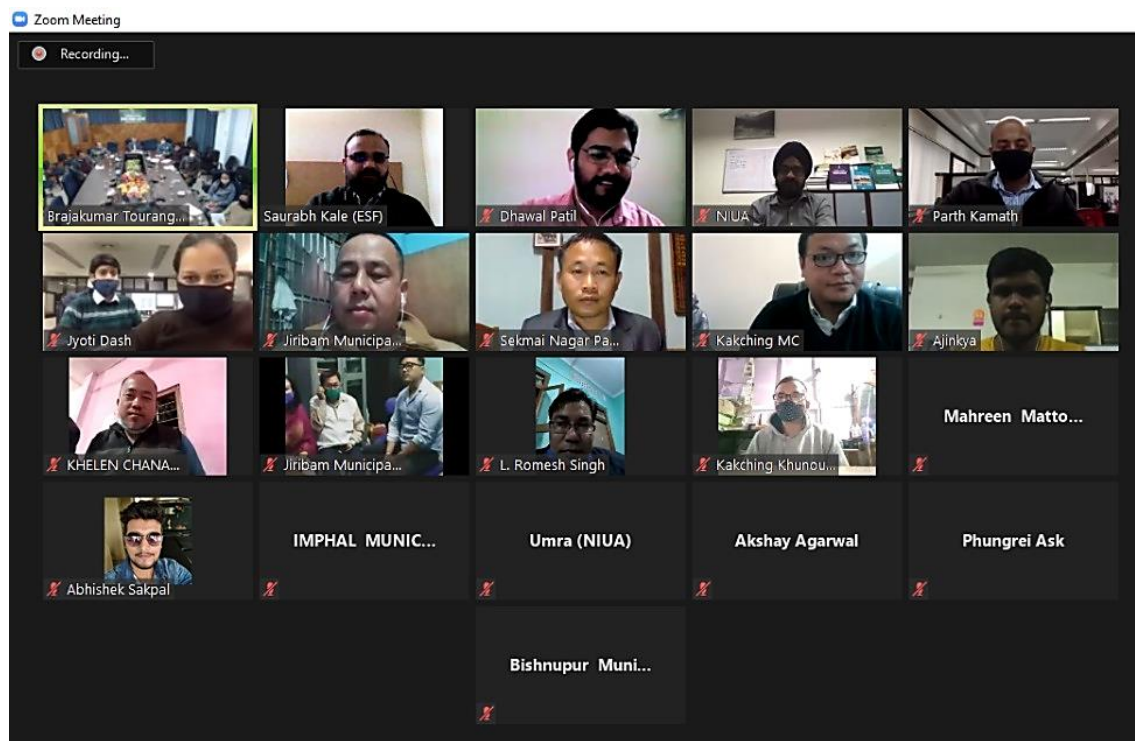


FIGURE 5 : GROUP PHOTOGRAPH AT THE END OF THE WORKSHOP

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 the 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.

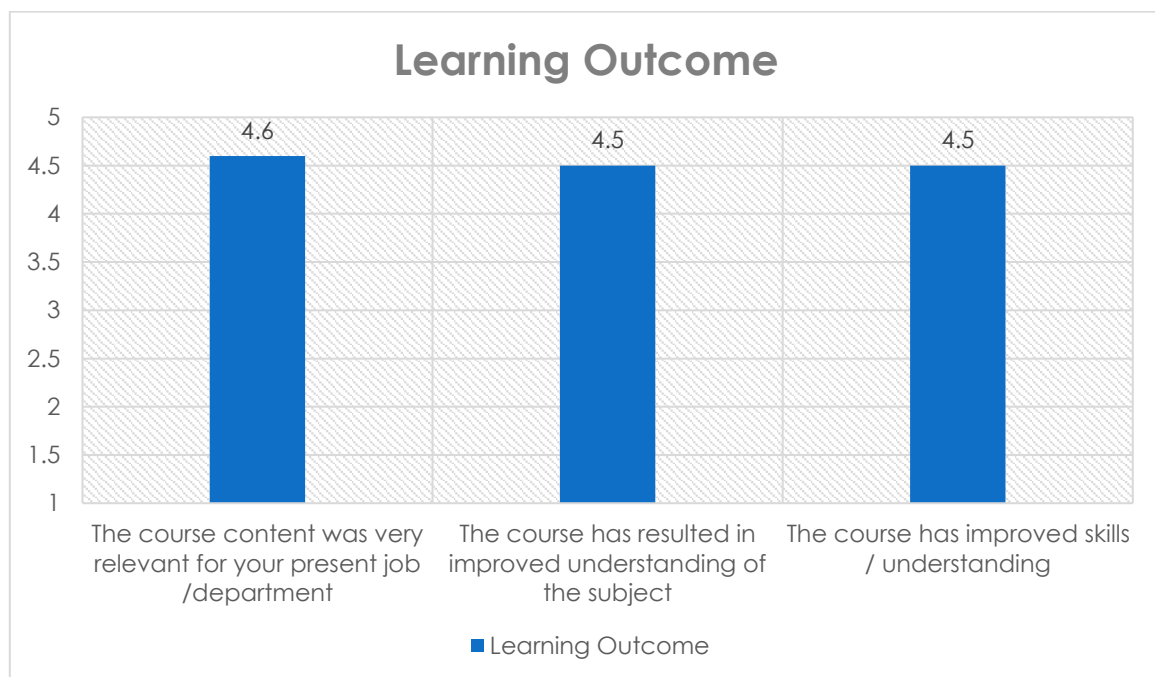


FIGURE 6 : FEEDBACK FOR LEARNING OUTCOMES

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.

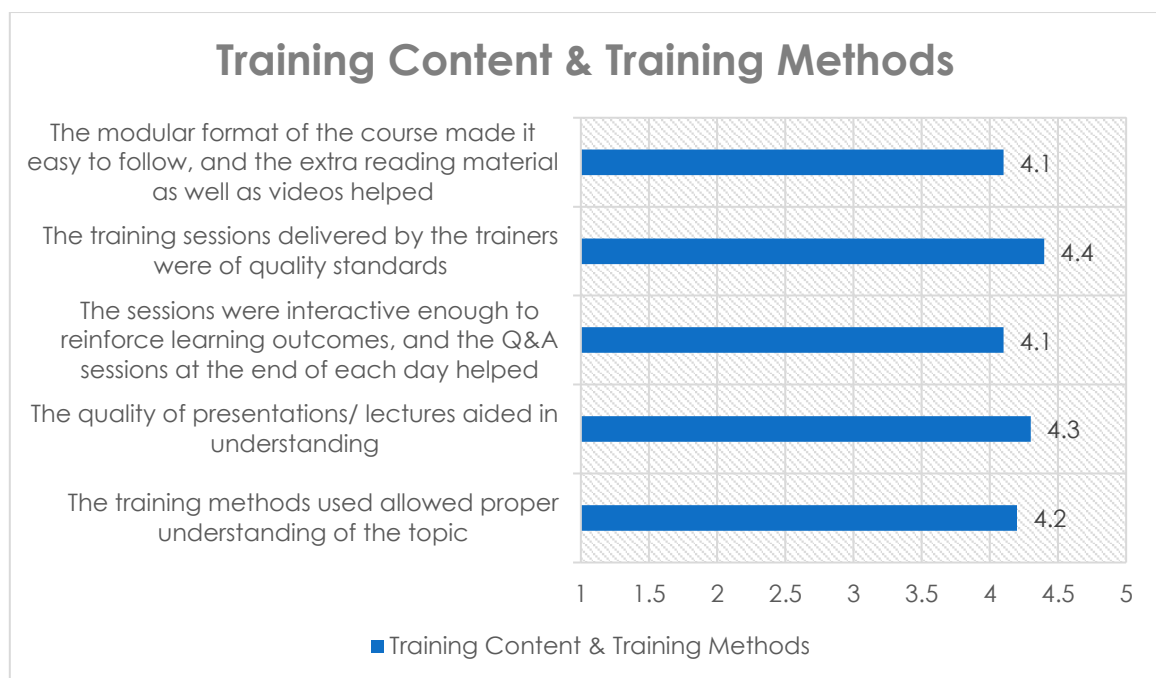


FIGURE 7 : FEEDBACK FOR TRAINING CONTENT & TRAINING METHODS

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 & it's 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.

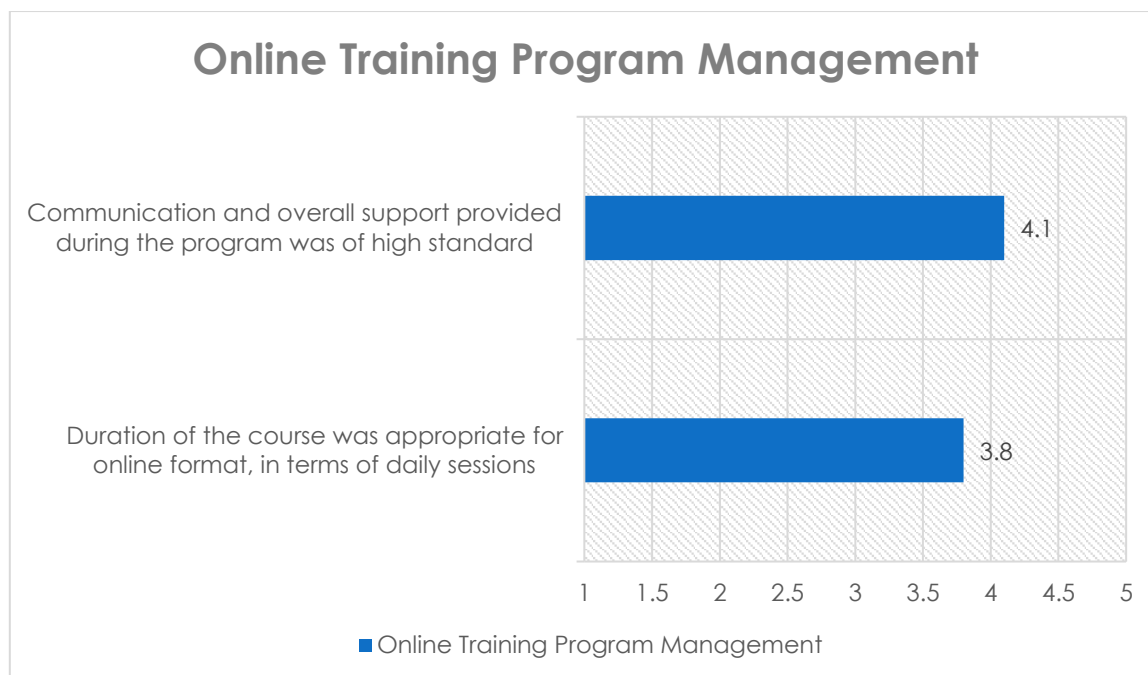


FIGURE 8: FEEDBACK FOR ONLINE TRAINING PROGRAM MANAGEMENT

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.

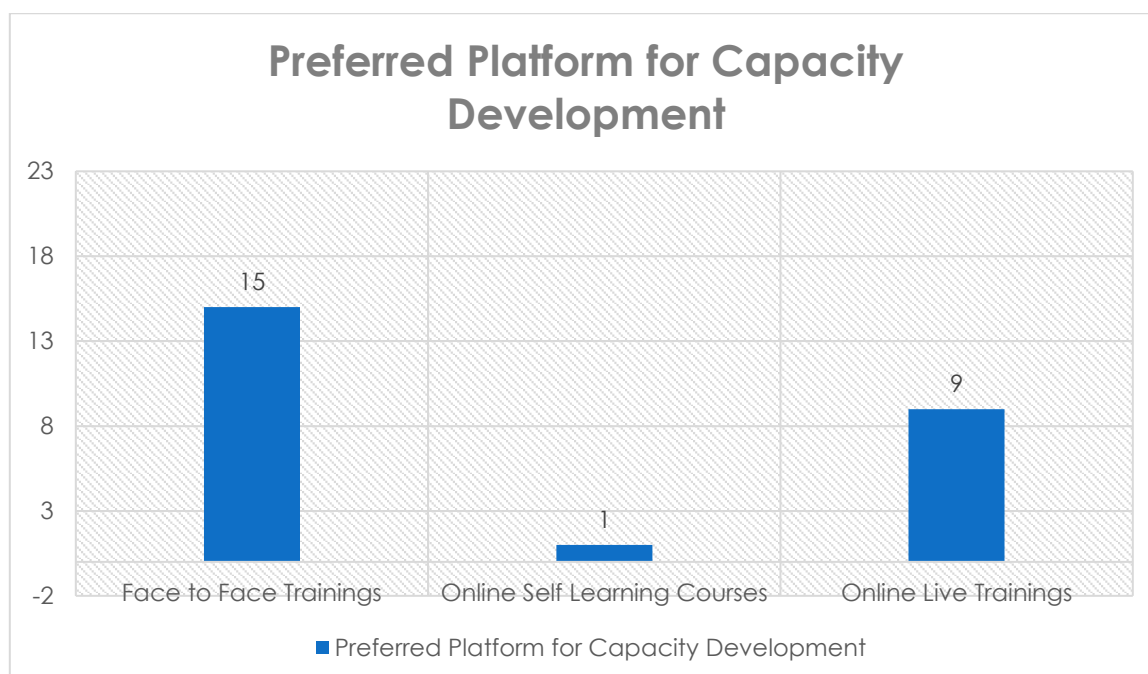


FIGURE 9: PREFERRED PLATFORM FOR CAPACITY DEVELOPMENT

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.

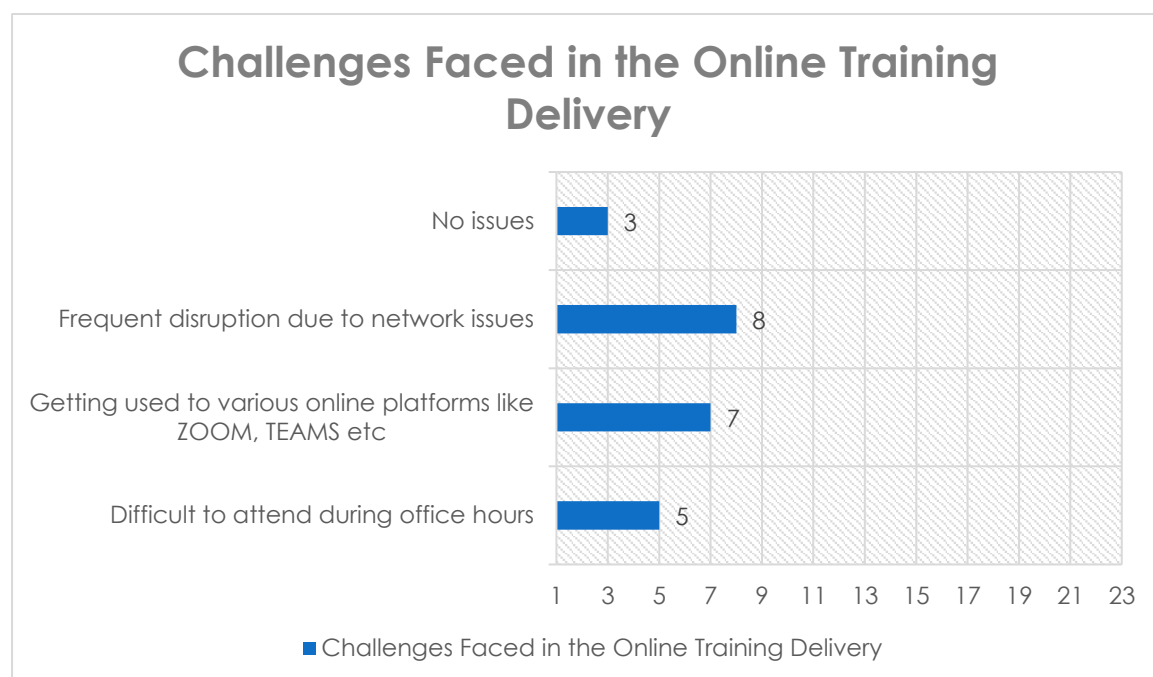


FIGURE 10: CHALLENGES FACED BY THE PARTICIPANTS

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

SR. NO	NAME OF THE PARTICIPANT	ORGANIZATION	Testimonial
1	Ch Khelen Singh	Mayang Imphal Municipal Council	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.
2	Tunglut Khamminthang	Municipal Administration Housing and Urban Development (MAHUD), Government of Manipur	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.
3	A Manmohan Singh	Jiribam Municipal Council	Very insightful workshop about FSSM & looking forward to have more trainings in the future.

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

Annexure 1: List of Resource Persons

TABLE 3: LIST OF RESOURCE PERSONS

SR NO.	NAME OF THE RESOURCE PERSON	ORGANIZATION	ROLE	Profile Photo
1.	Mr Dhawal Patil	Ecosan Services Foundation	Lead Trainer	
2.	Mr Saurabh Kale	Ecosan Services Foundation	Lead Trainer	

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

Nº.	Name of ULB/ Organisation	Nominations	Designation
1	Samurou MC	L. Romesh Singh	Executive Office
2	Shikhong Sekmai MC	Ch. Ningtamba Meetei	Executive Officer
3	Lamlai MC	Y. Peeter Singh	Executive Officer
4	Thongkhong Laxmi MC	MM Ziaur Rahaman	Executive Officer
5	Wangjing Lamding MC, Heirok NP	Awungshi Phungrei	Executive Officer
6	Sekmai NP	Ch. Ananda Angomcha	Executive Officer
7	Lilong Tbl MC	M. Victor	Executive Officer
8	Nambol MC	Th. Rabindra Singh	Executive Officer
9		O. Chaoba Singh	Executive Engineer
10		M. Memtombi Devi	Sanitary Inspector
11	Andro MC	Thaikhupou Pamei	Executive Officer
12	Jiribam MC	M. Surjit Singh	Executive Officer
13		M. Brajagopal Singh	Sanitary Officer
14		A Manmohan Singh	Section Officer
15		S. Linthoingambi Devi	Sanitary Inspector
16	Lamsang NP	K. Japeth	Executive Officer
17	Moirang MC	Salvador T Baite	Executive Officer
18		U. Romesh Singh	Sanitary Officer
19		RK Somorjit Singh	Computer Operator
20	Bishnupur MC	Kh. Kanta Singh	Executive Officer
21		N. Hemlet Singh	Assistant Engineer
22		Th. Ingotomba Singh	Computer Operator
23	Mayang Imphal	N. Anita Devi	Executive Officer
24		Ch. Khelen Singh	Assistant Engineer
25		N. Somila Devi	Sanitary Inspector
26	Kakching MC	Tunglut Khamminthang	Executive Officer
27		N. Ramchandra Singh	Executive Engineer
28		Gobardhon Singh	Sanitary Inspector
29	Thoubal MC	H. Pradeep Kumar Singh	Executive Officer
30		Y. Kullachandra	Executive Engineer
31		S. Roben Singh	Sanitary Inspector

32	Imphal MC	Samuel Moirangthem	Assistant Municipal Commissioner
33		L. Rupendra	Deputy Sanitary Officer
34		Th. Deepak Singh	Section Officer
35		Ph. Noren Singh	Assistant Sanitary Inspector
36	Kakching	Helem Pamei	Executive Officer
37	Khunou MC	Tikendrajit Singh	Computer Operator
38	Sugnu MC	Helem Pamei	Executive Officer
39		Amarjeet Singh	
40	MAHUD	M. Nando Singh	Joint Director
41	Manipur Pollution Control Board	Dr. W. Roshan	Assistant Environment Engineer
42	Environment & CC	S.K. Gainaimei	Programme Officer
43		Y. Satyajit	Project Scientist
44		Dr. Bharati	
45		Ms. Sarjubala	Project Engineer
46		Salam Goldie	
47		N. Tonny	
48		Ramananda	

Annexure 3: Minute by Minute Agenda

TABLE 5: MINUTE BY MINUTE AGENDA

Date	Session	Topic	Contents	Resource Person	Duration [min]
7 December 2020	S1	Introduction to Faecal Sludge and Septage Management	Sanitation System Approach; Wet Sanitation Systems; Sanitation Service Chain; Challenges in Sanitation Services	Mr. Dhawal Patil	25
	S2	Characterization of Faecal Sludge and Septage	Parameters for characterizing categories of sludges; Operational factors affecting the characteristics		25
	S3	Quantification of Faecal Sludge & Septage	Need of quantification of sludge; Methods of quantification of sludge Operational factors to be considered while quantification		30
	Q1	Question & Answer			10
8 December 2020	S4	Treatment of Faecal Sludge & Septage	Treatment targets and specific objectives; Approaches for faecal sludge and septage management; Treatment mechanisms; Driving factors for selection of treatment mechanisms	Mr. Dhawal Patil	30
	S5	Non-mechanized treatment units	Stages of treatment of faecal sludge and septage; Non mechanized treatment units- Settling Thickening Tank,		25

			Anaerobic Digester Unplanted, Drying Beds		
	S6	Mechanized treatment units	Stages of treatment of faecal sludge and septage; Mechanized treatment units- Dewatering technology, Drying technology, Thermal treatment		25
	Q2	Question & Answer			10
9 December 2020	S7	Financial aspects of FSSM	Financial components of FSSM; Financial and contracting models	Mr. Dhawal Patil	30
	S8	Siting & Layout Planning of FSTP	Site characterisation and evaluation; Site selection criteria; Safety planning at treatment plant; Importance of layout planning and examples		30
	S9	Case Studies	Septage treatment plant Bhubaneshwar; FSTP Port Blair; FSTP Rudrapur		20
	Q3	Question & Answer			10

End Page