

Proceedings of

National Level Workshop on  
**FAECAL SLUDGE & SEPTAGE  
MANAGEMENT**

In urban areas for state pollution control boards



November 13, 2017



Prof. Bala Subramanyam welcoming the inaugural guests



Sakshi Gudwani delivering the inaugural address



Mr. Suneel Dave delivering the inaugural address



Dr. K Sreedevi delivering the inaugural address



Prof. Srinivas Chary giving an overview of FSSM



Dorai Narayana explaining FSSM Regulations in Malaysia



Rajeev Munankami explaining FSSM Regulations in Bangladesh



Dorai Narayana and Rajeev Munankami answering participants' questions



Sasanka Velidandla Technology Solutions for Safe FSSM – Biological Processes



Dr. Sumita Singhal Technology Solutions for Safe FSSM – Thermal Processes



Representatives from 5 states discussing the FSSM Actions at State Level

### Inaugural Session

The workshop commenced with inaugural addresses from Sakshi Gudwani (BMGF), Mr. Suneel Dave (Additional Director, CPCB) and Dr. K. Sreedevi, IAS (Director of Municipal Administration



Panel Discussions on Regulatory Mechanisms for FSTPs

Department, Hyderabad). The gravity of the issue of Faecal Sludge and Septage Management in terms of its potential was discussed in this session. Faecal Sludge and Septage is the main source of river water pollution. Although the Swachh Bharath Mission considerably reduced open defecation, the collected septage is disposed into water bodies, only worsening the situation. An active participation is required to face this challenge. While it is undoubtedly the role of the Urban Local Bodies to develop appropriate treatment facilities, the State Pollution Control Boards need to regulate these facilities.

### **Overview of FSSM – Prof. V Srinivas Chary**

A broad description of the NFFSM alliance, why it was formed and what the different subgroups work on was provided. It was suggested that the PCBs take up the advisory role, in addition to the regulatory role.

A brief overview of toilet typologies like leach pits and septic tanks, and FSSM related terminologies were given. Out of 4041 Urban Local Bodies, only 5 have end to end sewerage systems. The remaining towns depend on on-site sanitation. Additionally, centralized systems are very expensive and require large quantities of water. Therefore, we would need to adopt non-network methods to meet our sanitation needs.

While toilets are being built under the Swachh Bharath Mission, proper treatment and disposal is still a challenge. Proper disposal practices need to be adopted to reduce river water pollution. The importance of Shit Flow Diagrams and the need to work in moving from red to green was also discussed. The Municipal Administration would need to regulate all stages of sanitation in terms of policy and financial aspects.

The roles of the PCBs in promoting faecal sludge and septage management were clearly specified- facilitation role, advisory role and regulatory role.

### **FSSM Regulations in Malaysia – Dorai Narayana**

Malaysia's journey towards better sanitation was explained in this session. 50 years ago, bucket toilets were a common concept and sludge was directly disposed into drains or rivers. Desludging was on a demand basis. Septic tanks would fill up and overflow causing river pollution. Although sewer lines existed, they were undersized and dysfunctional. Currently, Malaysia has satisfactory sanitation infrastructure which consists of nearly 10,000 decentralized sewage treatment plants. Many of these facilities also act as sludge treatment plants.

Before 1957, Malaysia suffered from sanitation and health issues. The period between the 1960's and 1980's saw local authorities addressing basic sanitation needs to protect public health. In 1994, this responsibility was transferred from the local authorities to the central government and Sewerage Services Department was formed. The associated work was delegated to a private company, Indah water. In addition to operation and maintenance of sewerage systems, they carried out scheduled emptying of septic tanks and treatment of sludge. However, proper systems to carry out this function did not exist. Indah Water developed immediate strategies like trenching and co-treatment in STPs. Before the approval of trenching, an Environmental Impact Assessment had to be carried out and submitted to the regulators indicating site selection criteria and ground water contamination. Stringent standards were set which were difficult to comply with. People in charge of enforcing these regulations were thinly staffed. Water pollution persisted. Greywater and partially treated water was also a growing concern.

It was understood that such stringent standards cannot exist when infrastructure, people and regulatory systems are not ready for it. Therefore, an incremental approach was adopted. A License to Contravene (LTC) could be issued by the environmental agency which allow treatment plants not to comply with the set standards for a specific time period for a specific reason such as design deficiencies and breakdowns. A certain fee is to be paid depending on the total load discharged. Standards for Total Maximum Daily Load (TMDL) that a water body can take were set. Infrastructure and management needed through the accreditation of people running the plant were looked into. An avenue of negotiation between the environmental and economic regulators was created through the assessment of costs against benefits for the set standards. Standards for discharge from STPs were classified into 2 categories- Standard A for drinking purposes, and Standard B for all other purposes. 3 time-based categories were created. Infrastructure built before 1999 had to comply with relaxed standards. Higher standards needed to be complied in the period between 1999 and 2010. New STPs established after the standards were set have to completely comply which includes standards for nitrogen and phosphorous. All STPs have to be upgraded in a specified time frame to meet the new standards.

A profile of the population served was shown. Regional STPs are city wide systems serving 23% of the urban population. Decentralized small scale systems serve 46% of the population. No specific standards for septic tanks have been set as it comprises more of a management approach (scheduled emptying).

It was stated that most cities in Malaysia have a combination of sewage and sludge management programs. Only 1 city has 100% sewerage system. This particular city was planned from scratch. Even in the capital, 90% is connected to sewer lines while 10% use septic tanks.

Partnership between the regulators and operators can be demonstrated through the regulation that was passed to disinfect all STP facilities before discharge. This was impractical as there are close to 10,000 STPs, many of which are remote and unmanned. Through negotiations between the regulators and national company working on this, it was decided that this regulation only applied to STPs discharging into sensitive water bodies and contributing significantly to water pollution.

For large facilities with a huge impact, regulations through effluent monitoring would be most appropriate. Medium size facilities follow a self-regulation theory design through operational procedure and an accredited operator. Dispersed and small facilities like septic tanks only look at design and operation. Sampling is not required.

Moving forward, Malaysia is going to launch the National Sewerage Planning Policy which focuses on 2 premises – Basic sanitation to ensure public health is assured for all, and Protection of water resources.

### **Environmental Regulations in Bangladesh – Rajeev Munankami**

The progress towards Faecal Sludge and Septage Management in Bangladesh was discussed in this session. Only 3% of the population in Bangladesh is covered under the sewer system. Open Defecation in Bangladesh is less than 1%. Although people are brought to a point to defecate, what is to be done when the containment fills up is still a challenge. An analysis was carried out with the type of toilet against the economic status of the people. It was found out that the wealthiest have maximum access to safe sanitation and good maintenance.

Khulna, the third largest city in Bangladesh is working on a waste water master plant. By, 2030, this \$150 million project is expected to cover 30% of the population of Khulna city. The funds to meet the needs of the remaining population is still under question.

In Bangladesh, more than 85% of septic tanks are still manually emptied. There have been 38 reported deaths of manual emptiers in the last year. In order to ensure a safe working environment, recently a circular was issued by the local division which entails emptiers to be trained, enlisted and certified by the local government.

Bangladesh's accomplishments in the last 3 years was also touched upon. In 2014, the National Water Supply Sanitation strategy for FSM was introduced. An FSM tax was also created which allowed local bodies to charge up to 12% of the property tax on top of tariff, for the introduction of FSM services such as maintaining treatment plants and planning for future

infrastructure. The National Plan document of 2016 includes FSM. On November 4, 2017, an Institutional and Regulatory framework for FSM was launched by the government of Bangladesh, which consisted of 4 volumes for Dhaka, city corporation, municipalities and rural areas.

One of the challenges Bangladesh is currently facing is the lack of coordination between the different organizations. There is a lack of manpower in the Department of Environment. The Institutional and Regulatory framework that was recently launched entails the Department of Environment facilitating and providing technical advisory support to the local bodies. The Bangladesh Environment Conservation Act requires any project to have clearance from the Department of Environment for industrial waste. FSTPs are more owned by the local government and Bangladesh is still working on improving coordination between the Department of Environment and local government institutions. While most FSTPs constructed within the premise of a landfill site have taken clearance from the Department of Environment, site selection for future cities will be a challenge.

The management plan which includes pre-treatment, different management and technology options were discussed. Resource recovery options were covered in this session. The Bangladesh National Building Code specifies the design of the septic tank and the number of people it is designed for. A government circular was passed making it mandatory to submit a sanitary plan with plumbing and structure of the septic tank, to obtain approval. Manual emptiers need to be certified to carry out emptying processes. For treatment and disposal, there are Bangladesh Standard Guidelines for sludge management.

3 treatment plants have been established in 3 cities in Bangladesh using simple technologies. All of these plants cost less than \$200,00 and comply with the given standards. Under the leadership of the government of Bangladesh, the FSM network is working together in moving forward.

## Open Discussion

Dorai Narayana's and Rajeev Munankami's presentations were followed by discussions between the participants and these two esteemed speakers.

Some of the discussions that took place are presented below:

1. **Participant:** How is final disposed sludge treated in your country?

**Rajeev:** In Bangladesh, the local government chooses the technology. In some towns, sludge is recovered and used as a fertilizer. Municipal waste and faecal sludge are co-composted in some cases. Co-composted faecal sludge can be used as a soil conditioner.

Final treated products have also been used for city beautification. Biogas can be used to generate energy.

**Dorai:** This is still an area that requires improvement in Malaysia. It is often looked at as a problem to solve instead of an opportunity. While significant potential exists for the reuse of treated faecal sludge, there is a lack of government policies on the application of solids as bio-effluents. It has been determined that there is no negative effect for use of treated faecal sludge for food crops. Wet sludge can be used for forestry applications. There is a potential for use in cash crops and ex-mining areas. Biosolids can be used for bioremediation.

2. **Participant:** Are there any studies on the health aspects of people who handle sludge and liquid effluent for irrigation?

**Dorai:** Very strict health and safety policies have been adopted in the last 15 years in Malaysia. It has become a part of the workers' culture now. All contractors coming in contact with faecal sludge and septage have to undergo annual medical check-ups, focusing mainly on the related diseases. Guidelines and policies exist which incorporates the method of handling it, the appropriate personal protective equipment to be used, and the preventive measures to be taken.

**Rajeev:** In Bangladesh, the main challenge is faced in the initial node. Behavioral Change Communication is an important component.

3. **Participant:** is there any time frame associated with the License to Contravene?

**Dorai:** License to contravene is granted on a case by case basis. An application needs to be submitted with the reason for non-compliance and a time period for rectification. Also, the areas of compliance must be indicated. During the time period, self-monitoring should be carried out and results must be submitted. A certain fee is payable dependable on the load.

4. **Participant:** During Dorai Narayana talk, it was mentioned not to look at Faecal Sludge as an industry? Can this point be elaborated?

**Dorai:** If the Department of Environment comes across a non-compliant factory, it can shut it down. The same practice cannot be followed in case of Faecal Sludge Treatment Plants. The problem would have to be solved through negotiable mitigation instead of an enforcement action.

5. **Participant:** Is Bangladesh's FSSM model applicable to all climatic conditions?

**Rajeev:** It is possible to build FSTPs in cold climates

6. **Participant:** How is auditing carried out for STPs and what are the parameters assessed?

**Dorai:** Per the law, all STPs have to comply at all times. In case of bigger STPs, sampling is carried out more than once a day and this information is available online. So, the DoE can monitor these plants. In case of smaller STPs, the DoE cannot look at the results daily. Accredited operators exist to monitor these plants. They are audited once a month depending on its type, location and size. In addition to regulatory sampling, the operator carries out operational sampling.

7. **Participant:** What is involvement of third party in monitoring, measuring and enforcement? What is the process for accreditation in Malaysia? As we are moving towards compliance management in India, what can we learn from Malaysia?

**Dorai:** In Malaysia, labs are accredited by the Chemistry Department of Malaysia. These labs are recognized by the regulators. Samples are analysed by 3 accredited labs operated by Indah water. The operators themselves have accredited labs. Therefore, the analysis is recognized as official. If needed, regulators can also send independent samples to other accredited labs.

8. **Participant:** What is the experience of Bangladesh and Malaysia in terms of funds for Operation and Maintenance?

**Rajeev:** Funds for infrastructure are obtained from the annual developmental plan and developmental partners. 75 FSTPs in Bangladesh have been built with loans from the World Bank, Islamic Development Bank and the Asian Development Bank. For Operation and Maintenance costs, taxes would need to be imposed.

**Dorai:** O & M costs are only part of the issue. Even if there is an STP in place, if the waste generated from all the areas are not well connected, it does not make the situation better. In 1194, Indah water in Malaysia submitted a business model where there planned on charging everyone a certain amount to meet capital and operational expenditure. However, by 1999, the company was unable to meet capital and operational expenditure needs as the tariff was insufficient and the people not paying the said amount. Today, Indah Water is government owned and operations are carried out through government subsidy.

9. **Participant:** Are there any types of site criteria for setting up of treatment plants?

**Rajeev:** Bangladesh has developed a tool kit which provides a starting point for identifying a plan in treating faecal sludge in any town.

**Dorai:** Siting criteria exists for sewage treatment plants and sludge treatment plants. Factors like groundwater characteristics, streams into which effluent will be discharged, beneficial uses, and whether it is likely to create problems is looked into. Environmental Impact Assessment is to be carried out for sludge treatment facilities and sewage treatment plants. Continual monitoring programmes are required to ensure no permanent impact is created.

10. **Participant:** Stringent standards like BOD 10 exists in India. Is it possible to achieve these standards?

**Dorai:** Any stringent standards can be achieved. However, the cost of applying these standards and the need for these stringent standards need to be assessed. Adopting an incremental approach would avoid wastage of national money.

11. **Participant:** Are there any standards for the amount of nutrients to be recovered or retained in the treated effluent in Bangladesh or Malaysia?

**Rajeev:** There are currently no standards in Bangladesh relating to nutrients. However, a fertilizer guideline exists. These guidelines need to be met for use as a fertilizer.

Professor V Srinivas Chary concluded this session by stating that there is a good support system for FSSM in India. All the projects funded under AMRUT have a 5 year O &M built into it. Citizens of India are willing to pay for desludging activities. An incremental approach for treatment can be systematically planned and passed on to the users.

### **Technology Solutions for Safe FSSM: Biological Processes – Sasanka Velidandla**

The complexity of treating faecal sludge as opposed to waste water was discussed. Different treatment approaches would have to be adopted for the two entities.

The faecal sludge treatment technologies including pre-treatment, solid-liquid separation, dewatering, stabilisation, and pathogen reduction were described.

Different requirements and how these were met were reviewed. The process of sludge treatment and how no water comes out of the system were explained. This helped overcome local objections (NIMBY). Odour prevention was ensured by using typically anaerobic devices. Nothing is exposed till it reaches the drying bed, after which all the volatile solids are gone. The operator does not come in contact with the sludge. There are three valves in the treatment plant. Only one operator would be required to handle these valves. This keeps operation and maintenance costs low. This also takes care of the technical skill required and the capacity needed to handle this plant. No electricity is used during operation. Electricity is only used by the sludge pump for desludging. Additionally, 100% reuse takes place.

The FSTP in Leh was discussed. A private operator put in the capital to build the plant and run the trucks. The operator would earn his capital and profits from user fees guaranteed by the municipality based on performance. The specifications and processes of the FSTP were detailed. The plant operates for 6 months of the year. Very little desludging is required in the winter

months. The major challenge is faced in the summer months when population increases due to increased tourists. 50% of Leh is covered by sewerage systems. This FSTP would serve the remaining 50%.

Faecal sludge is very small in quantity. There are simple and cost-effective ways to deal with it. However, it was stressed that effective faecal sludge and septage management would require sufficient support to achieve the desired outcomes.

### **Technology Solutions for Safe FSSM: Thermal Processes – Dr. Sumita Singhal**

This session started with a brief overview of Tide Technocrats and the thermal based approach they follow in their treatment plants. Septage would need to be treated due to its high variability in nature.

Urbanization, water supply frequency and availability, cultural or traditional practices, awareness levels on water conservation, availability of alternate disposal for greywater, availability of soak-pits post septic tanks, desludging intervals, size of septic tanks and water added during desludging, are key parameters affecting septage variability.

The Faecal Sludge and Septage treatment process through the following 6 stages was explained in detail.

1. Receipt, screening and grit removal
2. Pasteurization
3. Dewatering
4. Drying of Sludge
5. Waste Water Treatment
6. Pyrolysis

It was explained that solid-liquid separation of septage is required as it contains around 95% water, which can be segregated and recycled. The water that is segregated in the Dewatering stage goes to the waste water stream and is treated in the waste water treatment plant. The remaining sludge is dried and sent to the pyrolyser, where the end product can be used for power generation or converted to biochar for use in agriculture.

The key features of adopting the thermal treatment approach were discussed. These included biosafety, value added outputs, remote monitoring of plant, low footprint, emissions under permissible limits, low costs, low land, water, energy and manpower requirements.

The plant's environmental monitoring plan which comprises of both the baseline study and the operational study was discussed. Finally, the CFE conditions on the FSTP was shown to comply with the standard rules and regulations of air quality, water quality, odour and noise.

## FSSM Actions at State Level

### Panelists:

1. Mr. Sunil Kumar (Ganga Basin, CSE)
2. Mr. Sarith Sasidharan (Orissa, EY)
3. Mr. Santhosh Ragavan (Tamil Nadu, IIHS)
4. Ms. Upasana Yadav (Maharashtra, CEPT)
5. Dr. Malini Reddy (Andhra Pradesh, ASCI)

**Moderator:** Krishnan Hariharan

The journey towards FSSM in their respective states was discussed by the panelists.

CEPT started their journey towards sanitation with the Government of Maharashtra even before the advent of the Swachh Bharath Mission. CEPT worked with the government on the city sanitation plan for 4 cities. Septage management was looked into and a detailed analysis of municipal finances was carried out. The Government of Maharashtra felt that SBM should not stop at declaring cities Open Defecation Free but should look at the entire sanitation chain. The framework for ODF+ and ODF ++ was developed. An incremental approach was adopted. While funding is available for cities under AMRUT, the remaining cities do not have sufficient funds. The Government of Maharashtra adopted an incentive scheme whereby cities that were declared ODF would be provided financial assistance. CEPT also provided technical support for FSTPs through capacity building workshops.

In case of Warrangal, a detailed analysis was carried out on the sanitation situation. ASCI conducted training programmes for municipal functionaries and city leadership. The city identified land and resources for the treatment plant and for operationalizing regulations. Warrangal may be the first city for implementing Faecal Sludge regulations. ICT technology was adopted for monitoring and implementing the regulations. Discussions with the communities

has helped in obtaining their buy in. PCBs have also been supportive and have made an effort to understand the technologies.

In 2014, operative guidelines were put forth for septage management in Tamil Nadu. A town in Tamil Nadu had one of the first FSTPs to obtain consent to establishment. Tamil Nadu looks into utilizing existing infrastructure such as co-treatment of faecal sludge with existing STPs. There is a mechanism for regulating truck operators. They have to be registered and have to follow a specific procedure. There are certain approaches to handle post treatment as well, such as entering into an agreement with the end users like agricultural communities. Overall, the state of Tamil Nadu has accepted FSSM and is working towards it.

200 MLD of septage is generated in the Ganga basin every day. Septage contained in unscientifically designed septic tanks which leads into the groundwater, or dumping the desludged matter into solid waste dumping ground, open drains or agricultural fields, eventually lead into River Ganga. In some cases, while STPs are constructed, there is a lack of funding available for sufficient connections, rendering it ineffective. Currently, CSE is working in 12 towns in Uttar Pradesh, Bihar and West Bengal. They educated the different stakeholders on the need for FSSM through capacity building programmes like handheld training, national and international exposure visits. Cities are beginning to understand the importance of FSSM. In addition to policies, a set of different actions need to be evaluated. Skilled manpower is required to handle the technical issues. Support from private players is needed for financing. In some towns with a population of 10 to 15 crores at the banks of Ganga, septage directly flows into the river. There is a huge opportunity for the construction of FSTPs. As an environmental regulator, PCBs have an immense role to play in this area. FSSM has to be looked at as an individual sector and there is a need to come up with clear cut approaches to tackle this issue. The first step that Orissa took was to define policies for different aspects of FSSM. In terms of tangible investments, a framework for investment in FSSM and septage management in the towns was developed. The state government provided funding for these investments. In small towns, where there are no private operators, the government provided trucks and invited private operators to operate these trucks. Orissa started working with 9 ULBs. Orissa possesses district mineral foundation funds, which they are using for FSSM implementation. Some amount of land is allocated in the state for sanitation. The state is also looking at options like co-treatment and co-location. Orissa is looking into scaling up to all the ULBs in the state. They are assessing options for quick implementation.

A few questions were then posed to the panelists. They were first asked what they think would be the scale and technologies required for FSSM implementation, how they would go about convincing the government in employing these measures, and how many towns will have FSSM or FSTP solutions in the next 3 years.

Dr. Malini Reddy gave a brief overview of Andhra Pradesh in this respect. Andhra Pradesh has an appetite for innovations. Many options related to FSTPs and sludge treatment are being explored. In 28 of the AMRUT towns, a series of consultations were made with engineers and state governments. Now STPs are used for co-treatment. Biomethanation plants are also being established. Funding is not a major concern for the state government. Other options like CSR are also being explored. The state as a whole is looking at new technological solutions. ASCI, with the support of the University of Chicago, is assisting the government in monitoring river water pollution through the use of sensors and real time data analysis.

Sunil Kumar also provided his viewpoint on this subject. After monitoring and several tests, it was determined that co-processing waste with cement industries is a safe option and does not vary the emissions. New industries can adopt co-processing. Many FSTPs are coming up in India, and many are already operational. The technologies to treat waste already exists. They just have to be modified to suit faecal waste. In the next 3 years, a lot of progress can be made.

One solution cannot fit all. The panelists were asked about the role of champion states in advising other states about technological options.

Sarith Sasidharan indicated that different options can be looked at depending on the climatic and geographical conditions. Options that are plausible for the country and relevant for the state need to be identified. We would need to contextualize what works for our situation and start on our journey towards total sanitation.

In the same sentence that the chief minister of Andhra Pradesh declared the states urban areas ODF, he declared his intention for the state to achieve total sanitation. Currently, Andhra Pradesh is looking at scaling up and would have several lessons to share with the other states. Support from different stakeholders would be required. Currently, the 28 STPs that will also be treating sludge are on Public Private Partnership. The state aims to treat sludge in all 110 towns by 2018.

The government of Maharashtra is open to FSSM solutions to promote sustainability and public health. Private entities are beginning to realize that business opportunities will blossom with the introduction of innovative technology. The government is involving various stakeholders like CSR for funding, and the PCB for on ground implementation. With only, one-third of the faecal sludge being treated in the country, we still have a long way to go.

Santhosh Ragavan suggested looking at FSSM as an individual sector. In order to scale up, all the stakeholders would need to have active participation. If we approach FSSM through a sectoral method and with clarity, everything else will start falling into place.

In the Ganga basin, states are beginning to understand the importance of septage management for improved public health. There is a certain momentum at the ULB level. FSSM is continuous process.

Questions were then open to the audience. One of the participants asked about the procedures for implementing treatment plants and how government formalities can be simplified.

Prof. Chary gave a brief response to this query. The national government advised the state governments to move forward in introducing safe strategies for FSSM. Local bodies do not have sufficient funds. As a starting step, the available resources can be converted into FSTPs in the AMRUT towns. Formalities can be shortened only when we have policies, finances and appropriate procurement procedures in place. We would need to utilize Public Private Partnership to achieve our goals.

Another question, a participant asked was if the government has initiated any projects on its own in terms of funding.

28 STP projects in Andhra Pradesh are state funded. In Orissa, all septage treatment plants use government funds. The government of Orissa also invested in procuring cesspool vehicles. District mineral foundation funds are also used for this purpose. In Orissa, one of the FSTPs has already been commissioned to be constructed under AMRUT. In one of the towns in Maharashtra, the entire FSTP is to be built on governmental funds. The government uses money from its 14th finance commission. Maharashtra is moving from demand based to scheduled emptying, which is also a government service.

## **Panel Discussion: Regulatory Mechanisms for FSTPs**

### **Panelists:**

1. Mr. Suneel Dave, CPCB
2. Dr. D.K. Behera Orissa PCB
3. Mr. Raghavender Reddy, Telangana PCB

**Moderator:** Prof. Bala Subramanyam, ASCI

Prof. Bala Subramanyam requested Mr. Suneel Dave to speak about the different permits that are required to be given to establish an FSTP.

Mr. Suneel Dave said the permits for establishing an FSTP fall under the provision of the Water Act. In treating faecal waste, another kind of waste is generated that may be in the liquid or solid

form. The treated liquid may be reused or disposed and the treated solid can be used for composting.

Dr. Behera agreed that the permits fall under the Water Act. There are two tiers to the act—consent to establish and consent to operate. The consent to operate will be provided once there is a proper understanding of the pollution control measures taken up at the project site. There is a need to understand the level of surface water and ground water contamination at the site. The risk of contamination is also realized by evaluating the siting process of the plant. We deal with another major question of categorizing the plant (especially an FSTP) into orange, red, green or white categories given by the CPCB based on the pollution potential of the facility. At the state PCB level such as for Orissa, the facilities are also categorized according to the investment for the plant. At the state level, Dr. Behera suggested that all the regional officers of the PCB should meet to discuss the various parameters and standards for compliancy and develop a standard module for all the PCBs in the country to follow.

Prof. Bala Subramanyam then asked the panelists what critical aspects are to be focused upon when evaluating an FSTP at a state level.

In addition to points earlier stated by Dr. Behera, Mr. Raghavender Reddy also mentioned the aspect of public acceptance of the facility. With NIMBY on the rise, placing such facilities under the red category will not help us. Therefore, there is a need to showcase this as a necessary evil. There is a requirement to loosen up the PCB rules to establish a facility like this. Even for establishing a mini STP in the state, there are a lot of background cases in the court that need to be fought. Even for an area with no visible human habitation, people are apprehensive that placement of treatment plants will de-value the lands around it. However, due to space constraints, the municipality has to go ahead with the same option. Therefore, standards become very important to understand the pollution potential of the plant. The technology used in the FSTP isn't completely new. If the concerned FSTP plant complies with the discharge standards of the Water Act, the Environment Protection Act, the municipal solid waste rules and other municipality rules, there would not be any issue. Other soft issues like odour and sound should also be dealt with. A proper plan submitted on these lines will get the license from the State PCBs.

Mr. Suneel Dave added that PCBs are more concerned about the discharge of waste than the technology used in the plant.

Prof. Bala Subramanyam asked if we can place this facility under the green category and not the red category, without compromising on the compliance requirements.

Mr. Suneel Dave responded that in accordance with the Water Act, this plant will not be any different from STPs from the environmental point of view. Therefore, these plants would also need to be governed per the Water Act.

Discussions were then carried out between the participants and the panelists, as presented below.

**Participant:** The amount of faecal sludge generated is very less in comparison to the population. Can we take that into account when categorizing sewage?

**Dr. Behera:** If evaluating a STP, then septage is also taken into consideration when treating sewage. However, we have particular standards for waste water and we cannot relax them.

**Participant:** When you place a facility in the red category, does it not only provide a certain perception but also increase the process to gain the license from the PCB?

**Dr. Behera:** No. Earlier, 120 days was the time required to provide license to the facility, but now with the ease of business rolled in, the consent is being given in 30 days. Now all the PCBs provide consent online.

**Participant:** Is there an additional requirement of carrying out an EIA?

**Dr. Behera:** Unless you come under the official notification of EIA, there is no requirement to develop any such reports.

**Participant:** Do discharge standards include the solid materials that are given as outputs of the plant?

**Dr. Behera:** Solid discharges are used for composting/ as manure. This falls under the ambit of solid waste management rules. Our main concern is waste water management. Though we talk about zero discharge, in reality that is not possible. Although the plant proposal may say that all the water discharged will be utilized within the plant premises, it is not always the case.

**Participant:** How are you going to address the pathogenic presence, if any, in dried sludge?

**Dr. Behera:** The solid waste management rules also address the issue of pathogens. Otherwise, the dried sludge from the sludge drying bed can be used as manure directly.

**Audience:** Does the PCB also regulate the procedure of emptying of septage from the septic tanks? **Dr. Behera:** PCB deals with directly handling the waste.

**Prof. Chary:** Any material broadly characterized as hazardous waste is governed by the road transport authority. This comes under the ambit of the motor vehicle act and not under the purview of the PCB.

**Prof Chary:** If a concerned facility does not fall under the categories of Red, Yellow and Green, the onus falls on the State PCB to position it appropriately.

**Mr. Dave:** These categories are laid out for the PCBs to provide consent for management.

**Prof. Chary:** But the influence of these categories is not just limited to license but also the costs of monitoring increase drastically. The red category requires a lot of monitoring systems to be put in place which a small municipality may not be able to afford.

**Dr. Behera:** The plant is scored based on our parameters when the consent for establishment was placed in front of us. The categorization of the plant is done based on this exercise.

**Participant:** Can a group be formed right now under the leadership of Mr. Dave to come up with more pragmatic solutions for short term treatment such as trenching until a treatment plant is actually placed in the town/city? We can also utilize the incremental approach that Malaysia used.

**Mr. Dave:** I shall definitely take this suggestion and place it in front of my authorities and hope that this will actually pan out as we are hoping.

**Prof. Bala:** I request you to take these requests and suggestions into account, especially the documentation of the PCB mandates for establishing an FSTP as that would clarify a lot of misconception and difference in opinions amongst the officers of State PCBs. This will bring a common understanding within all the stakeholders.

**Mr. Dave:** I shall take this to my authorities and we would like to work together in the future and come up with clear cut guidelines.

**Dr. Behera:** I also request the CPCB along with the participants and Prof. Chary to categorize this FSTP into one of the categories.

### Close Out and Next Steps

Prof. V Srinivas Chary concluded the workshop with some suggestions for follow up actions. The alliance can assist CPCB in developing guidelines related to FSTPs and materializing some ideas that came across during the workshop like developing small working groups. The alliance can organize study tours, including a series of visits inside and outside India. Customized training programmes can also be organized on various technological options. State wide or regional discussions that bring the ULBs and PCBs together can be held.

The co-treatment option may be something to which we need to give additional attention. If data on STPs in the country are available, this information can be plotted and these maps can be shared with the municipalities. If the STPs have adequate capacity and are functional, they can act as potential co-treatment facilities. Inventory on the STPs need to be collected from the PCBs, so that some of these STPs can be converted into co-treatment facilities instead of investing in stand alone projects.

With active collaboration from all sectors, the sanitation network can be expanded to all the cities in the country.