Session 5: Faecal Sludge Treatment Systems: Planning, technology, performance, economics and operations

April 25 - 27, 2023
FSM: What does experience on ground inform us?

- Faecal sludge treatment systems have mostly relied on non-mechanical and biological treatment processes in small scale Faecal Sludge Treatment Plants (FSTPs). As well as through Co-Treatment of faecal sludge at existing Sewage Treatment Plants.
- With more than half a decade of initiation of FSM work in India, the time is right to assess the following:
  - Performance efficacy of different treatment systems,
  - Challenge of securing sufficient and regular quantities of sludge reaching the FSTPs,
  - O&M of Plants

Perhaps matters other than technology, are more important in addressing the sustainability of operations of FSTPs and Co-treatment plants? For sustainable and inclusive outcomes, the plants must first be operational.
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<th>1.4 billion and 36%</th>
<th>Population with % residing in Urban space</th>
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<tbody>
<tr>
<td>32%</td>
<td>Urban HHs have access to PIPED SEWER</td>
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<tr>
<td>68%</td>
<td>HHs are dependent on Onsite Sanitation Systems like Septic tanks</td>
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Managing sludge generated from OSS is a Challenge & priority
Total FSTPs in India- 500+
Progressive States in FSM-
- Odisha
- Tamil Nadu
- Telangana
- Uttar Pradesh
- Rajasthan
- Jharkhand
- Assam
- Madhya Pradesh
- Chattisgarh
- Karnataka

*Odisha is the first state that covered all the ULBs with non sewered sanitation*
Treatment Approaches - FSTP- Example of UP

**Hybrid-1**
- Screening
- FS Collection/Stabilization
- Mechanized Solid Liquid Separation
- Liquid Collection Tank
- Liquid Treatment (Secondary+ Tertiary+ Advance treatment)
- Sludge drying beds

**Hybrid-2**
- Screening
- Bio-Digester
- Lamella clarifier-1
- Aeration-1 and Aeration 2
- Lamella clarifier-2
- Sludge drying beds

**Nature Based-1**
- Screening
- Planted Drying Beds
- Liquid Collection Tank
- Liquid Treatment (Secondary+ Tertiary+ Advance treatment)

**Nature Based-2**
- Screening
- Anaerobic Stabilization reactor
- Tiger bio filter
- Liquid storage tank
- Tiger bio filter 2
- Horizontal planted gravel filter
- Polishing pond
- Vermiomposting yard

**01**
- 02
- 03
- 04

Working towards a paradigm shift in the global south...
As per the AMRUT Tender Document, for a 32 KLD FSTP:

Contactor who constructs the FSTP, gets an O&M contract that allows him/her to charge Rs. 2500 per de-sludging of a septic tank for 5,000 tanks in a year. Hence both de-sludging and O&M work are covered in one contract for one operator.

Rs. 1.25 crore Annual O&M and de-sludging cost – to be received 100% from citizens.
Unbundling the De-Sludging and O&M cost of FSM operations in UP

Cost Comparision

Total O&M cost in INR/ Month

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<th>Description</th>
<th>Cost/ Frequency</th>
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<tr>
<td>O&amp;M- FSTP</td>
<td>Average- INR 24,00,000/ Year</td>
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<tr>
<td>De-sludging- for covering 5000 HH</td>
<td>Approx- INR 33,00,000/ Year</td>
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Way Forward:

FSM Operations for sustainable and inclusive FSM service outcomes

- One FSTP Operator also controlling all de-sludging operations or open competition for de-sludging work?
- Treatment System (FSTP) selection
  - Does our experience inform us of one or more preferred FSTP Treatment systems for each state of India?
  - How to scale up as a state level strategy?
- The real challenge of Faecal Sludge not reaching FSTPs
  - Should we incentivise faecal sludge reaching the FSTP by paying a Tipping Fee?
  - How much do penalties and high registration fee for desludgers help in improving sludge collection?
- Sustainability of FSTP plant operations
  - Should the O&M cost of plant operations be paid by the city municipal authority, as is the case of Sewage Treatment Plant operations? From state and central finance commission support for small towns that are running deficit in municipal finances. Or any other means: Hybrid Annuity Models, Sanitation Tax (as part of Property Tax), etc.?
  - Volumetric and Treatment Standards based Payment for Plant operations – not just for O&M.
  - How much of the O&M cost recovery is possible from revenue of selling treated bio solids and treated waste water?
Thank you!

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