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

Journey towards safely managed sanitation in non-sewered sanitation areas of Bangladesh
Structure of Presentation

Contents...

- Sanitation situation in Bangladesh
- Approaches
- Sanitation value chain
- Planning
- Technology
- Performance
- Finance
- Operations
- Additional analysis and outcomes
  - Influencing Outcome
  - Political Economy Analysis (PEA)
  - Environmental Benefits from Life Cycle Analysis
  - Sanitation Safety Plan
  - Health Security Scheme
Snapshots from JMP

- Bangladesh achieved less than 1% OD in 2017
- Insignificant slippage has been observed since last 5 years

OD mostly reported in the lowest quantile households at 1.7% due to disasters destroying sanitation facilities and other practical reasons

Thrust for safely-managed sanitation is essential

10% increase of sanitation coverage from 2015

- 39% safely-managed sanitation
- 78% if we include shared facilities

- 9% sewer coverage
- 3% faecal sludge treated
Approach to follow

1. **City sanitation planning**
   - Situation assessment and mapping
   - Gap assessment and identification of concern
   - FSM options and implementation strategy

2. **Technology**
   - Context specific options
   - Affordable
   - Optimal O&M

3. **Market Mapping**
   - Identify market actors
   - Product output

4. **Business Approach**
   - Municipality led
   - Private sector led

5. **Awareness and capacity building**
   - Capacity building of sanitation workers
   - Orientation to basic WASH
   - Development of SOP for treatment plant

**Working towards a paradigm shift in the global south…**
Addressing Sanitation Value Chain

Collection
Transportation
Treatment
Disposal/Reuse

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Planning

Sakhipur Municipality

- Poultry litter
- Solid waste

Co-composting with faecal sludge and solid waste

Use in agriculture

Saidpur Municipality

- Faecal sludge

Co-composting with faecal sludge

Safe discharge into treatment facility

Scale up the Sakhipur FSTP model

Use in agriculture, landscaping
Technology (standard)

Collection
- Solid waste
- Faecal sludge
- Saw dust

Transportation
- Van
- Vacutug

Pre-Treatment
- Segregation
- Organic portion
- Dry sludge
- Air dry
- Raw sludge on drying bed (Planted and Unplanted)
- Black water

Treatment
- Mixing raw materials
- Put in compost bed
- Maturation
- Screening
- Turning by hydraulic turner
- Constructed wetland

Post-Treatment
- Fine compost
- Post maturation
- Packaging
- Larger pebbles, compost
- Reuse as amendment

Disposal/Reuse
- Soil conditioner
- Use at agriculture land
- Safe discharge to environment
Performance of FSTPs

Sakhipur

- Faecal sludge loading capacity = 5 m³/day
- Compost production capacity = 24 MT/year

Scan the QR code to take Virtual tour to Sakhipur

142,749
33,472
37,532
9,336

Saidpur

- Faecal sludge loading capacity = 26 m³/day
- Compost production capacity = 379 MT/year

Additional features
- Provision of rainwater harvesting - 68 m³ reservoir for plant operation and maintenance
- Provision for solar energy harvesting - generates 10 KW electricity per day

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## Financial Aspect: Sakhipur

<table>
<thead>
<tr>
<th>Average monthly financials</th>
<th>2017</th>
<th>% of revenue</th>
<th>2018</th>
<th>% of revenue</th>
<th>2019</th>
<th>% of revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid waste collection fees</td>
<td>12,278</td>
<td>21%</td>
<td>19,735</td>
<td>28%</td>
<td>17,185</td>
<td>21%</td>
</tr>
<tr>
<td>Faecal sludge collection fees</td>
<td>25,366</td>
<td>43%</td>
<td>34,500</td>
<td>50%</td>
<td>36,181</td>
<td>45%</td>
</tr>
<tr>
<td>Compost sale</td>
<td>14,968</td>
<td>26%</td>
<td>15,425</td>
<td>22%</td>
<td>27,014</td>
<td>34%</td>
</tr>
<tr>
<td><strong>Total revenue (incl. misc.)</strong></td>
<td><strong>58,693</strong></td>
<td><strong>21%</strong></td>
<td><strong>69,660</strong></td>
<td><strong>28%</strong></td>
<td><strong>80,380</strong></td>
<td><strong>21%</strong></td>
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<tr>
<td><strong>Total expenditure</strong></td>
<td><strong>159,081</strong></td>
<td></td>
<td><strong>155,390</strong></td>
<td></td>
<td><strong>116,748</strong></td>
<td></td>
</tr>
<tr>
<td>Revenue as % of expenditure</td>
<td>37%</td>
<td></td>
<td>45%</td>
<td></td>
<td>69%</td>
<td></td>
</tr>
</tbody>
</table>

Scan to access Small Town Sanitation Learning Series
Operations

SOP for FSTP operation

Green certification from DOE

Quality Monitoring

Scan to access
The 8th Five Year Plan recognises WaterAid's demonstration of plant for solid and faecal sludge management in Sakhipur as a replicable model in the urban context.

**Box 9.1: Sakhipur FSTP and Co-Composting Plant**

The Sakhipur FSTP and co-composting plant is located in Tangail district, 3 km from the town centre. The municipality owns the plant with technical support from WaterAid and NGO partner BASA. With operations beginning in 2016, the plant and associated service has demonstrated a feasible mechanism for operating FSM. The vacutug owned by the municipality is used to collect faecal sludge from households after interested households submit an application and pay emptying fees. The vacutug is then used to transport the collected sludge to the FSTP and co-composting plant.

The treatment consists of 10 unplanted drying beds, and the dried sludge is co-composted with organic waste in the co-composting plant located within the FSTP compound. The compost is packaged and sold in the market. Local farmers use this compost as a soil conditioner and their feedback is encouraging. The Department of Agricultural Extension at Sakhipur has been providing further technical guidance for reuse and distribution among local farmers.

Currently, the operation and maintenance of the plant is managed jointly by the Municipality and WaterAid. Income is generated from the tariffs for waste collection and from compost sales, recovering about 70% of the cost. Although the plant is yet to be financially self-sustainable, it has demonstrated a working modality of FSM services capturing the entire sanitation value chain, which can be scaled up further.
Environmental benefits from Life Cycle Analysis

0.05 GJ LHV energy savings/1 ton waste recycling

0.61 ton reduction/1 ton of organic waste recycling

0.28 ton carbon dioxide emission reduction/1 ton waste recycling

0.44 kL of water saving/1 ton waste recycling

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Political Economy Analysis (PEA)

- Power over the actions of the Municipality
- Influence over the actions of the Municipality
- Existence of a two-way working relationship between the stakeholder and the Municipality
Sanitation Safety Plan useful in climate change context

1. Prepare for SSP
2. Describe the sanitation system
3. Identification of hazardous events, assessment of existing control measure and exposure risks
4. Develop and implement plans
5. Monitor control measures and verify the performances
6. Develop supporting programs along with their review plan

Scan to access the publication
Shasthya Nirapotta Scheme (SNS)
Health Security Scheme

- Unique approach for sanitation workers

- **Premium**: BDT 199 only
- **Enlistment**: Including family members (gets a SNS Card)
- **Life insurance coverage**: BDT 30,000 for individuals

- **If a premium holder dies**, insurance claim to be received by nominee

- **Discounted health services** for everyone in the family from empaneled service providers

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Beneath the surface

- Ownership of the municipality (demand driven)
- Capacity of the municipality (management, technical and financial; be that managed by own or out-sourced)
- Look back to the technology- is it the right fit? (affordable and simpler O&M)
- Reflection on the journey ODF > FSTP > CWIS/ IUS (build on what didn’t go well and how to consolidate)
Follow on action of WaterAid Bangladesh

- Holistically planning led the municipality in a climate impacted context
- Demand to come from the municipality with the resource sharing
- Comprehensive PEA, SFD, WFD analysis to understand the context in depth
- Enhance developing capacity of the municipality to Led the whole process and functions (management, technical and financial; be that managed by own or out-sourced)
- Look back to the technology- context specific easy to do design which will be affordable including O&M
- Reflect what didn’t go well during our journey ODF > FSTP > CWIS/ IUS
- Build on consolidating all learning from the sector)
Thank you!

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