Learning from the Demonstration of FSM Value Chain
Satkhira, Bangladesh

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Practical Action Bangladesh
High population density (4600 people/km²)
38% people directly use inland water for daily WASH
99% people use OSS
Municipality never offers FSM
No designated place sludge disposal
Around 80 emptiers
No idea on safety gears
FSM Context
Throwback Satkhira-2013

No Mention of FSM in Budget
No FSM in ADP
34% illegal sewerage connections
23% HH took emptying service in every 1-3 years
21% HH took emptying service in every 5-7 years
No Public awareness on FSM
Final destination of sludge was mostly inland water bodies
Resource Recovery

Our Approach

- Recovering waste water for agriculture
- Reducing pathogenic part of sludge and use as soil conditioner
Methodology

How FSM is Planned in Satkhira

- **Toilet with OSS System**
- **Demand Creation of Pit-Emptying Services**
- **Sludge stored in Containments**
- **Mass awareness against illegal sewerage connections**
- **Containments with illegal connection with drains**
- **Innovating low-cost technologies for sludge emptying, transportation & disposal**
- **Scooped traditionally by sweepers & disposed**
- **Contaminating the wetlands/fresh water**
- **Creating STP & demand generation of end product**
- **Capacity Building of Conservancy Section and Sweepers**
## Interventions

### pre conditions for acceleration of FSM demo

<table>
<thead>
<tr>
<th>Orientation on FSM and Exposure Visit</th>
<th>Satkhira Municipality &amp; Department of Agriculture Extension</th>
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</thead>
<tbody>
<tr>
<td>Capacity Building Activities</td>
<td>Municipal Dwellers as Emptying Clients</td>
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<td>Food Consumers</td>
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<tr>
<td>Advocacy with Local Level Stakeholders</td>
<td>Conservancy Section &amp; Pit Emptiers</td>
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<td></td>
<td>Waste Collectors</td>
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<td></td>
<td>Treatment Plant Operators</td>
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<td></td>
<td>Urban Farmers (Small &amp; Large)</td>
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<td></td>
<td>Peri-Urban Farmers</td>
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<td></td>
<td>LISA based gardeners &amp; Big Gardeners</td>
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<tr>
<td>Awareness Raising Activities</td>
<td>Vegetable Vendors &amp; Retailers</td>
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<tr>
<td></td>
<td>Compost Dealers, Producers &amp; Sellers</td>
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<tr>
<td>Field Level Demonstration</td>
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</tbody>
</table>
Technologies

Innovative, low cost & sustainable technologies
In 2016-
Treated 150,000 liters of sludge
Produced 12 MT sludge cake with $1,240 as market price
Release 130,000 liters of treated waste water
01 sweepers association has formed including 07
The association did $ 5,435 business
Sweeper’s efficiency enhanced around 2 times
Regular occupational hazard reduced
Medicine cost reduced from $8 to $1.2 per month
## Findings

### Nutrient in Dried Sludge

<table>
<thead>
<tr>
<th>Compost Type</th>
<th>N</th>
<th>P</th>
<th>K</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faecal Compost</td>
<td>1.40%</td>
<td>1.14%</td>
<td>0.36%</td>
<td>1.20%</td>
</tr>
<tr>
<td>Minimum Requirement by SRDI</td>
<td>05.-4.0%</td>
<td>0.5-3.0%</td>
<td>0.5-3.0%</td>
<td>0.1-0.5%</td>
</tr>
<tr>
<td>Cow-dung Compost</td>
<td>1.20%</td>
<td>1.00%</td>
<td>1.60%</td>
<td>0.13%</td>
</tr>
<tr>
<td>Kitchen Compost</td>
<td>0.92%</td>
<td>0.51%</td>
<td>1.25%</td>
<td>0.08%</td>
</tr>
</tbody>
</table>
## Findings

### Field Demo

<table>
<thead>
<tr>
<th>Radish 60-70 days Circle (16 units)</th>
<th>Only Soil</th>
<th>Soil+SC+PCF</th>
<th>Soil+OCF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Land</td>
<td>1 Sq. Meter</td>
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<td>1 Sq. Meter</td>
</tr>
<tr>
<td>Fresh Yield</td>
<td>2.2 Kg</td>
<td>4.8 Kg</td>
<td>4.7 Kg</td>
</tr>
<tr>
<td>Investment</td>
<td>12 BDT</td>
<td>27 BDT</td>
<td>31 BDT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Red Amaranths 30-40 days Circle (16 units)</th>
<th>Only Soil</th>
<th>Soil+SC+PCF</th>
<th>Soil+OCF</th>
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</tr>
<tr>
<td>Fresh Yield</td>
<td>450 gm</td>
<td>800 gm</td>
<td>825gm</td>
</tr>
<tr>
<td>Investment</td>
<td>10 BDT</td>
<td>22 BDT</td>
<td>24 BDT</td>
</tr>
</tbody>
</table>

SC- Sludge Compost; PCF- Prescribed Amount of Chemical Fertilizer; OCF- Overdone of chemical fertilizer/the traditional amount use by the farmers.
Overall Findings

Periodic Change in the FSM Demonstration

- **F**: Financially Profitable for the Sweepers
- **I**: Institutionalization of Emptying Service
- **E**: Environment Friendly Disposal/Dumping
- **T**: Use of Sustainable Technology for Emptying & Transportation
- **S**: Social Acceptancy of Emptying Job & Sludge Compost Use
Findings
Nexus with Urban Agriculture & Food Security

- Satkhira Municipality have 1980 ha. of Agricultural Land
- Yearly demand of Chemical fertilizer is 1,700 MT & Compost is 2,650 MT
- There is a potential demand of 4300 MT compost inside the Municipality area
- Farmers use 3 times more fertilizer than prescribe, increase production cost.
- It leaves pathogenic residue in crops, later transmitted to human body.
- Soil lose essential micro nutrients (B, Fe, Ca, Mg, S) due to lack of compost use
- Prescribed amount of chemical fertilizer with compost can bring expected production, is less production cost and don’t leave harmful residue.
- Treated waste water (with allowed amount of BOD & COD) can use in agriculture
The Value Chain Offers

- Reduced use of chemical fertilizer
- Recondition of the soil with micro-nutrients
- Enhanced urban agriculture/food production
- Less untreated waste in open areas/water bodies/public places
- Less to No FS in Fresh Water Ecology
- Generating Green and dignified Jobs for sanitation workers, small urban farmers, organic compost producers and marketers
Challenges

Learning from Demonstration

- Institutional and Regulatory Framework on FSM in Bangladesh is yet to be approved by the GoB

- No national level Septic Tank Inspection Modality

- Illegal Sewerage Connections and unsafe sludge dumping with inadequate enforcement mechanisms

- FSM is not mainstreamed in Municipality Master Plan, Annual Budget and Annual Development Plan

- Undignified livelihood for pit-emptiers

- Lack of awareness on safe food production at producer and consumer level
Lessons Learned for Scale Up

- Inter-departmental coordination among different govt. line agencies
- Integration with large scale govt. project
- Promote the sanitation service system as dignified and socially acceptable
- Mass awareness raising on demand generation for regular pit-emptying & against illegal connection
- Legal enforcement to control illegal connection and proper septic tank construction
- Promoting safe food and urban based agriculture among producer groups, large retailers and consumers
Thanks for your concern......