PAS - Beyond data collection

Assessments and Improvement plans

Performance improvement plans for towns

Equity assessments and slum settlement surveys

Municipal finance assessments
Financing options for UWSS
State sector finance reports

Water audits

Information system improvements
PAS - Performance Assessment System... Largest Database on 900+ cities

- 2009-416 Cities
  - 68 Million population
    - 167 Cities of Gujarat
    - 249 Cities of Maharashtra
  - .....continued for 8 years

- 2015-463 Cities
  - 72.8 Million population
    - 168 Cities of Gujarat
    - 259 Cities of Maharashtra
    - 43 Cities of Chhattisgarh

- 2016-908 Cities
  - 96.5 Million population
    - 168 Cities of Gujarat
    - 364 Cities of Maharashtra
    - 168 Cities of Chhattisgarh
    - 69 Cities of Telangana
    - 96 Cities of Assam
    - 43 Cities of Jharkhand

PAS web portal: Repository of service level indicators of more than 1800 cities covering 18 states over a period of 3 years. Information available at www.pas.org.in
Over 19% of urban population lacks access to household latrine

About 67% of urban HHs were based on Onsite Sanitation Systems (OSS)

Diarrheal diseases cause an estimation of 365,000-500,000 deaths per year among children under the age of 5

81% of Urban India’s human excreta/sewage generated is untreated

Lack of proper sanitation causes an estimated loss of USD 53.8 billion in India
Achievements under Swachh Bharat Mission (Urban)

- **54,64,727** Constructions Achieved
- **4,64,250** Constructions Achieved
- **3,518** No. of Cities
  
### Individual Toilets
- **100% Door to Door Waste Collection**
- **67,085** Wards Achieved

### Community & Public Toilets
- **Waste to Energy**
- **88.4** Current Production (Mega Watt)

### Open Defecation free
- **Waste to Compost**
- **15,06,501** Current Production (Metric Ton)

Focus has been largely on toilet construction.
Focusing only on toilets leads to a situation where 80% of waste remains untreated

- A Shit-Flow Diagram (SFD) for India suggests that nearly 80 percent of faecal waste in India remains untreated and discharged in the domestic environment, agriculture fields or in water bodies.
- Water borne diseases in India are a major cause of infant and child mortality. Untreated waste is one of the main reasons for this.
- There is now a growing recognition of the fact that centralised sewerage systems are expensive both to build and to operate and maintain. The sewage treatment plants in India, as per the report of the Central Pollution Control Board are not efficient and do not treat waste as per the norms.

Source: CDD
Automatic SFD & WW Flow diagram Generation tool (Excel based)

Automatic SFD generation tool will generate **SFD diagrams** and **WW Flow diagram** for around 400 cities using **PAS data** of 4 Indian states (Maharashtra, Gujarat, Chhattisgarh and Telangana states)
Sustainable Development Goal (SDG) and safely managed sanitation

Target SDG 6.2 states that by 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation.

Sanitation ladder of JMP (WHO-UNICEF)

<table>
<thead>
<tr>
<th>SERVICE LEVEL</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAFELY MANAGED</td>
<td>Use of improved facilities that are not shared with other households and where excreta are safely disposed of in situ or transported and treated offsite</td>
</tr>
<tr>
<td>BASIC</td>
<td>Use of improved facilities that are not shared with other households</td>
</tr>
<tr>
<td>LIMITED</td>
<td>Use of improved facilities shared between two or more households</td>
</tr>
<tr>
<td>UNIMPROVED</td>
<td>Use of pit latrines without a slab or platform, hanging latrines or bucket latrines</td>
</tr>
<tr>
<td>OPEN DEFACTION</td>
<td>Disposal of human faeces in fields, forests, bushes, open bodies of water, beaches or other open spaces, or with solid waste</td>
</tr>
</tbody>
</table>

Note: improved facilities include flush/pour flush to piped sewer systems, septic tanks or pit latrines; ventilated improved pit latrines, composting toilets or pit latrines with slabs.
Safely managed sanitation systems – “conventional” solution?

**Sewerage systems**

- **Toilets** ➔ **Underground Sewer Network** ➔ **Treatment** ➔ **Reuse**

**Fecal Sludge and Septage management**

- **Toilets** ➔ **Septic Tanks** ➔ **Vacuum Emptier Truck** ➔ **Treatment** ➔ **Reuse**
FSSM as a solution to address the challenge

What is the challenge?

Only 33% of the latrines are connected to a piped sewer network

Only 20% of the waste generated in the urban areas is currently treated

India is expected to experience the second highest rate of urbanization by 2030 indicating further sanitation challenges

What is the solution?

• One of the proven approaches to tackle the sanitation challenge pertaining to liquid waste management is faecal sludge and septage management

• FSSM takes a service-chain based approach, which comprises safe containment, conveyance, treatment, disposal/reuse of faecal waste

FSSM value chain

Containment  Emptying  Transport  Treatment  Reuse/dispose
There is growing recognition for FSSM at National and State level

- Over the past two years FSSM has received increasing attention and a national FSSM policy has been adopted.
- Government of India has undertaken several policy and programme initiatives, AMRUT FSSM sub-mission.
- Many states have undertaken FSSM projects in their cities.

~400+ FSTPs at planning or implementation phase
16 States have been certified as 100% ODF

These states have a total population of nearly a billion

- **Maharashtra**: FSSM Planned in 100 Towns
- **Odisha**: FSSM Planned in 114 Towns
- **Telangana**: FSSM Planned in 74 Towns
- **Tamil Nadu**: FSSM Planned in 49 Towns
- **Andhra Pradesh**: FSSM Planned in 110 Towns
- **Uttar Pradesh**: FSSM Planned in 31 Towns
### Various emerging approaches for FSSM in India

#### Collection and conveyance

<table>
<thead>
<tr>
<th>Timing of cleaning</th>
<th>Primary Capex financier</th>
<th>Operating agency</th>
<th>Opex Funding</th>
<th>Contract structure (if private op)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scheduled cleaning</td>
<td>Private player</td>
<td>Local taxes</td>
<td>Licensing</td>
<td>Local/State govt.</td>
</tr>
<tr>
<td>Demand driven</td>
<td>Local govt.</td>
<td>User charges</td>
<td>Service contract at city/zone</td>
<td>PPP with PLAM</td>
</tr>
<tr>
<td></td>
<td>State govt.</td>
<td>Grant -phil / non profits</td>
<td>Reverse tipping fees</td>
<td></td>
</tr>
</tbody>
</table>

#### Treatment

<table>
<thead>
<tr>
<th>Technology for treatment</th>
<th>Primary Capex financier</th>
<th>Operating agency</th>
<th>Opex Funding</th>
<th>Contract structure (if private op)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSTP</td>
<td>Private player</td>
<td>Private player</td>
<td>Local taxes (via govt)</td>
<td>PPP</td>
</tr>
<tr>
<td>STP Co-treatment</td>
<td>Local govt.</td>
<td>Local govt.</td>
<td>Reuse revenue</td>
<td>PSP</td>
</tr>
<tr>
<td>SWM Co-treatment</td>
<td>State/ National govt.</td>
<td>Phil/ non-profits</td>
<td>Reverse tipping fees</td>
<td></td>
</tr>
</tbody>
</table>

#### Monitoring framework
Sustainability Charter Launched by the Hon’ble Chief Minister emphasizes on FSSM

#7 Moving towards ODF+/++ by ensuring collection and adequate treatment of human fecal waste

Hon’ble Chief Minister’s Speech on occasion of declaring Urban Maharashtra ODF on 1st October 2017

GoM Pioneered the concept of ODF+/++
Maharashtra began with FSSM in two cities – Sinnar & Wai

- Small & Medium towns in Maharashtra
- Population
  - Wai ~43,000
  - Sinnar ~72,000
- Declared ODF in 2016 - 2017
- Moving towards ODF++

1st cities in India to implement citywide scheduled emptying of septic tanks

1. Scheduled emptying of septic tanks
   - Schedule for 33% septic tanks to be emptied every year.
   - Awareness generation activities
   - City level Regulations and training of masons for proper design of septic tanks
   - Wai & Sinnar already operational

2. Involving Private sector for emptying operations
   - Bids invited on Maharashtra govt e-tender website and private company selected through transparent process
   - Escrow account to be maintained with 3 months’ payment
   - Performance based payments

3. Levying a Sanitation tax to support operations
   - Residents paying a small sanitation tax as a part of property tax instead of per-emptying charges

4. Faecal Sludge and Septage treatment facility (FSTP)
   - Private company constructing FSTPs.
   - Sinnar’s FSTP constructed through DBOT tender, financed through Sinnar own funds. It has been commissioned on March 3rd, 2019
   - Wai’s FSTP funded by BMGF and is operational
Wai, Sinnar, Maharashtra
Scheduled desludging of septic tanks

1st city to start scheduled emptying of septic tanks

On May 30, 2018, Wai Municipal Council in Maharashtra became the first city in India to start a Scheduled Desludging service. Similar service will start in the city of Sinnar soon.

Developed a plan for scheduled septic tank emptying for tanks to be emptied once every 3 years. 2 trucks to desludge ~2000 septic tanks annually in Wai and 3-4 trucks to desludge 4000 septic tanks annually.

It is possible for most cities in India to adopt this practice.

What has been achieved by scheduled desludging in Wai ...

• 350+ septic tanks covered by scheduled desludging done in 5 months
• Since last 2-3 months…

  7-8 septic tanks desludged per day as compared to 7-8 per month in 2017 with demand desludging

  2.2 million liter septage delivered to treatment facility

  90%+ acceptance rate from HHs for scheduled service

• Sanitation workers now wear safety gear regularly
• Households pay sanitation tax instead of high user charges for desludging
Scaling up potential in 316 cities in Maharashtra

77 cities with underground sewerage systems and existing/proposed STP

316 cities with septic tanks and no treatment facility

~50 MILLION URBAN POPULATION
393 CITIES
Financing FSSM services in the state of Maharashtra

• Landscape study of potential business models in FSSM and capacity building workshops

  • FSSM business models for emptying and treatment across Four States under finalization
  • Detailed landscape study of private service providers in Maharashtra ongoing
  • Stakeholder workshops conducted to discuss potential business models with private sector

• Innovative financing options

  • Performance linked annuity model (PLAM) for scheduled emptying included in State policy brief, disseminated at various forums like CPHEEO discussions, Stockholm WWW, FSM5, etc
  • Development Impact Bond for FSSM - Two rounds of roundtable discussions conducted with various stakeholders in partnership with DASRA, engagement with NUS for DIB study
    • Next step - discussions with potential impact investors and outcome funders
Our recommendations to Fifteenth Finance Commission

Faecal Sludge Management (FSM) is a critical component, which will help consolidate and sustain the progress achieved towards attaining an ODF India and help achieve the Sanitation SDGs

OUR RECOMMENDATIONS

1. Earmarking up to 20% of the funds for FSSM to ensure ULBs have enough finances to assure ODF status is sustained and progress is made towards safely managed sanitation

2. Emphasize the importance of reserving funds for IEC/ BCC activities pertaining to sanitation

3. Emphasise the importance of municipal data collection along with service level benchmarks and San Benchmarks on FSSM

4. Link performance grants and emphasise monitoring of service level benchmarks as suggested in the National FSSM policy
Rural Urban Linkages

Large GPs (19%) generate nearly 50% of liquid waste

- No. of GPS – 247,00
- Population – 92 Crore
- Liquid waste generated – 39,337 MLD

<table>
<thead>
<tr>
<th></th>
<th>Large GPs &gt;5,000</th>
<th>Medium GPs</th>
<th>Small GPs &lt;1,500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution of GPs</td>
<td>19%</td>
<td>53%</td>
<td>28%</td>
</tr>
<tr>
<td>Population Share</td>
<td>55%</td>
<td>38%</td>
<td>7%</td>
</tr>
<tr>
<td>Share of Liquid waste generation</td>
<td>47%</td>
<td>45%</td>
<td>8%</td>
</tr>
</tbody>
</table>

Co-treatment with FSTPs

Option-2: Co-treatment with proposed FSTPs

78 Census Towns (CTs) and 2141 LDVs can co-treat their feacial sludge in nearby cities with existing and proposed FSTP.

<table>
<thead>
<tr>
<th>Type</th>
<th>Total No.</th>
<th>Total population covered (in lakhs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Census Towns within 20km buffer of cities with proposed FSTPs</td>
<td>78</td>
<td>11</td>
</tr>
<tr>
<td>Number of LDVs within 20km buffer of Potential cities with FSTPs (based on ongoing plans)</td>
<td>2141</td>
<td>73</td>
</tr>
<tr>
<td>Total LDV+ Census towns coming within 20 km buffer of cities with FSTP</td>
<td>2219</td>
<td>84</td>
</tr>
</tbody>
</table>

Source: Census town data: Census, 2011.
Thank you

cwas@cept.ac.in
pas.org.in

About us
The Center for Water and Sanitation (C-WAS) at CEPT University carries out various activities – action research, training, advocacy to enable state and local governments to improve delivery of services.

We are a member of the NFSSM Alliance, India

This is the expected future for 500+ Indian cities in the next 3 years