Mainstreaming Citywide Sanitation
Opportunities & Challenges in Excreta Management

"Status of faecal sludge containment and transportation situation of small town in Karnataka"

Devanahalli, Karnataka, India

Date: 04-04-2016
Venue: Gulmohar Hall, India Habitat Centre, New Delhi

Presented By: CDD and BORDA

1. About Devanahalli

2. Sanitation situation at Devanahalli

3. FSM interventions at Devanahalli

4. Way forward

About Devanahalli

Geographic location	Population Demography	Administrative
• Located in Bangalore rural district • 39 Kms to the North east of Bangalore • Spread across an area-16 Sq.km • Has historic significance.	• Population of 28,039 (census 2011) • Population growth rate over 21%. • Growth rate more than national average of 17.3%	• Has 23 wards • 6400 households • 1517 commercial settlements • Administered by The town municipal council.

No provision for UGD

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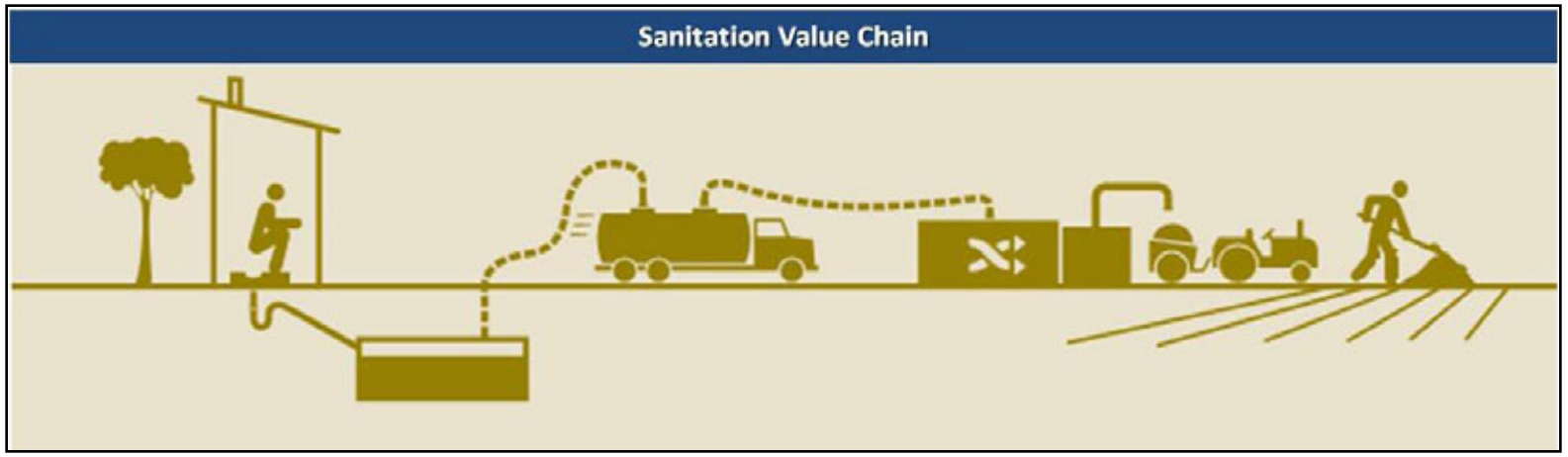
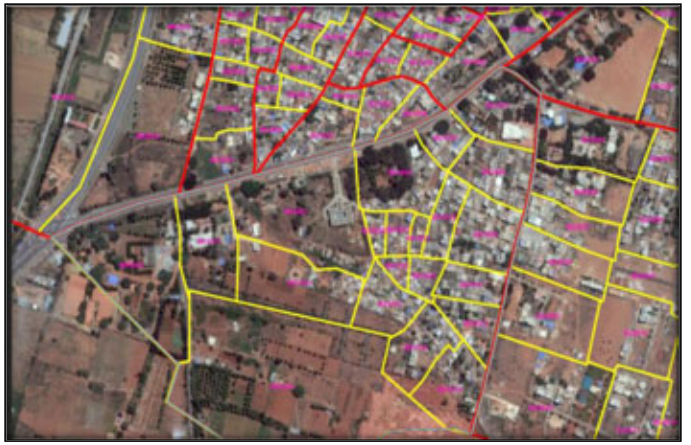
Sanitation Situation



User Interface → Containment → Transport → Treatment and Disposal

Household survey

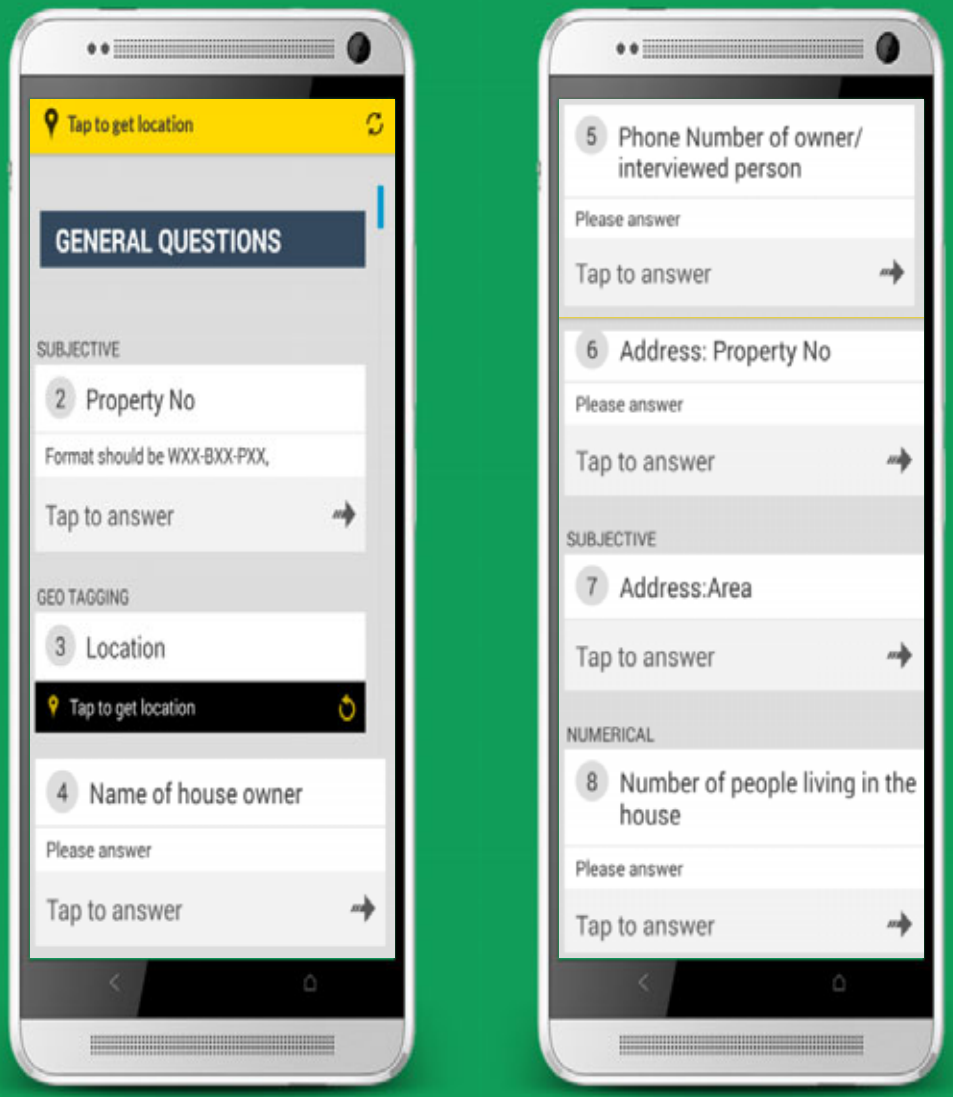


Household survey

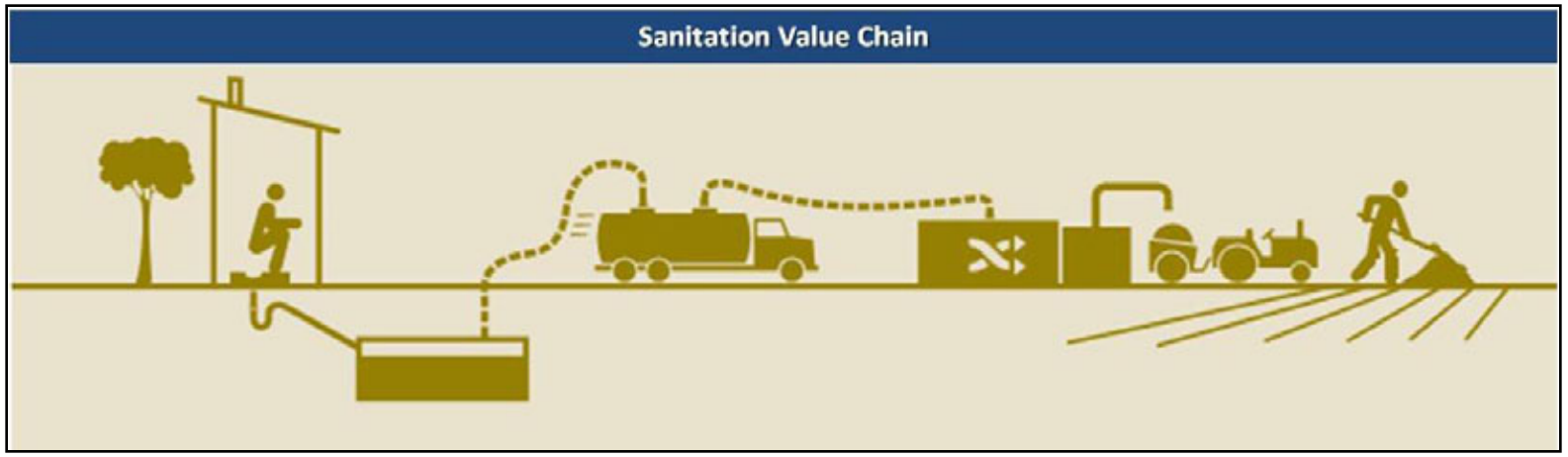
30 Students were divided into group of 6 , with one in-house CDD staff

Entire survey was conducted in 5 days with each student covering 100-150 Surveys

App based survey



Sanitation Situation



User Interface → Containment → Transport → Treatment and Disposal

User Interface

User interface | Containment | Transport | Treatment and Disposal

5,780 (90%)
With Toilets

- Flush toilets **16.4%**
- Pour flush toilets **83.6%**

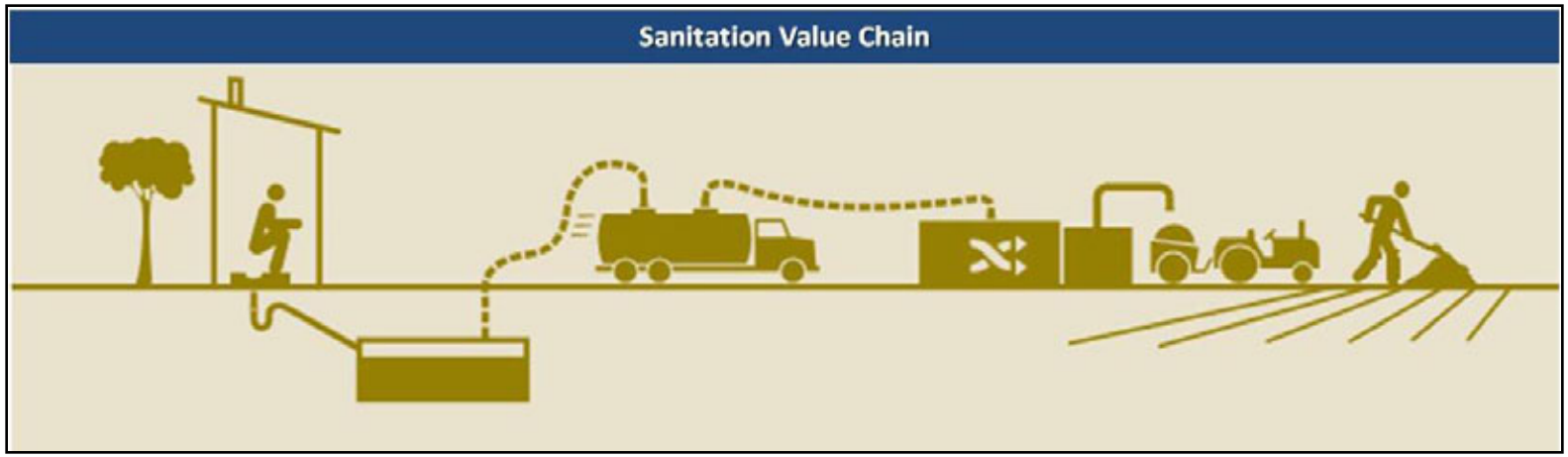
620 (10%)
Without Toilet

- Open defecation-**61.8**%
- Public toilets-**16**%
- Shared toilets-**22**%

Reasons for no toilets

- Cost-**49%**
- Space-**39%**
- Other-**12%**

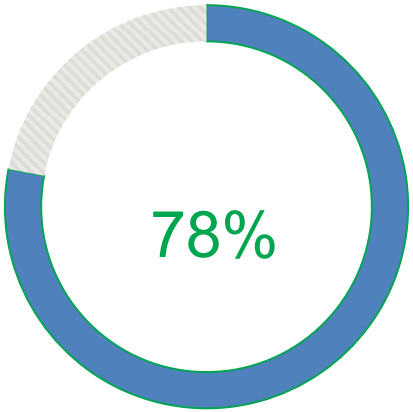
Sanitation Situation



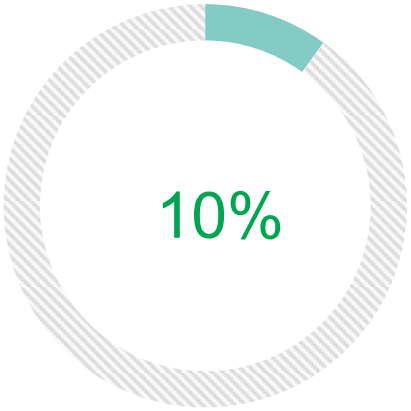
User Interface → Containment → Transport → Treatment and Disposal

Household survey

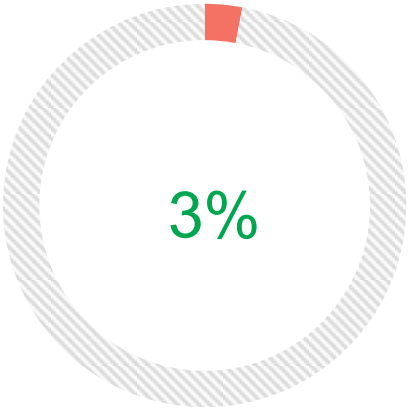
User interface | **Collection** | Transport | Treatment and Disposal



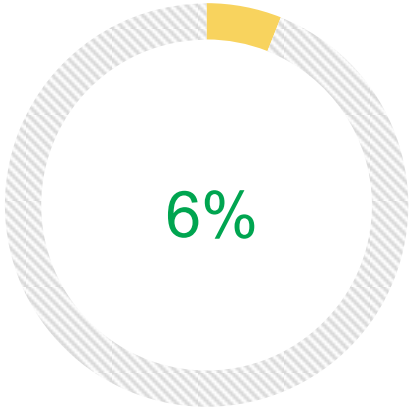
Single Pit



Septic Tank



Twin Pit



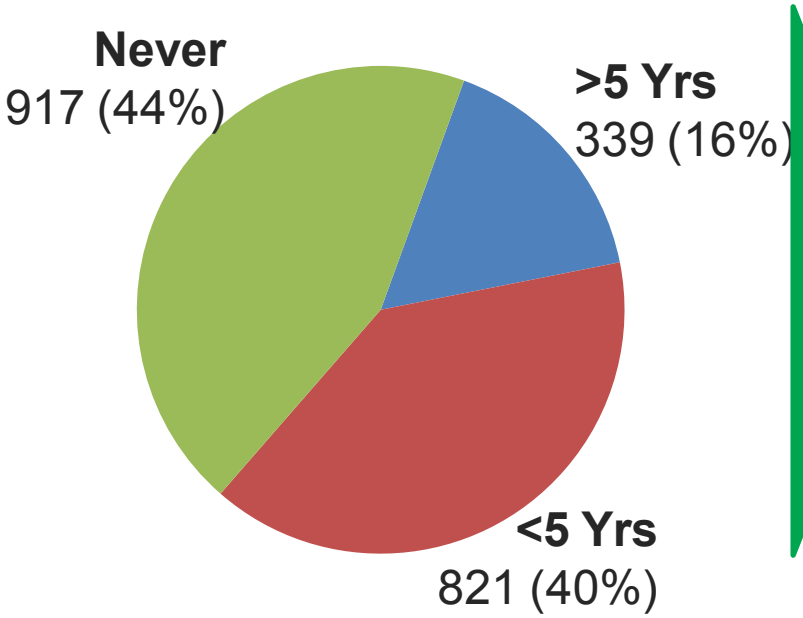
Open drain

Septic tank/Pit with lining — **35% households**

Septic tank/Pit without lining — **65% households**

Desludging practices

User interface | **Collection** | Transport | Treatment and Disposal



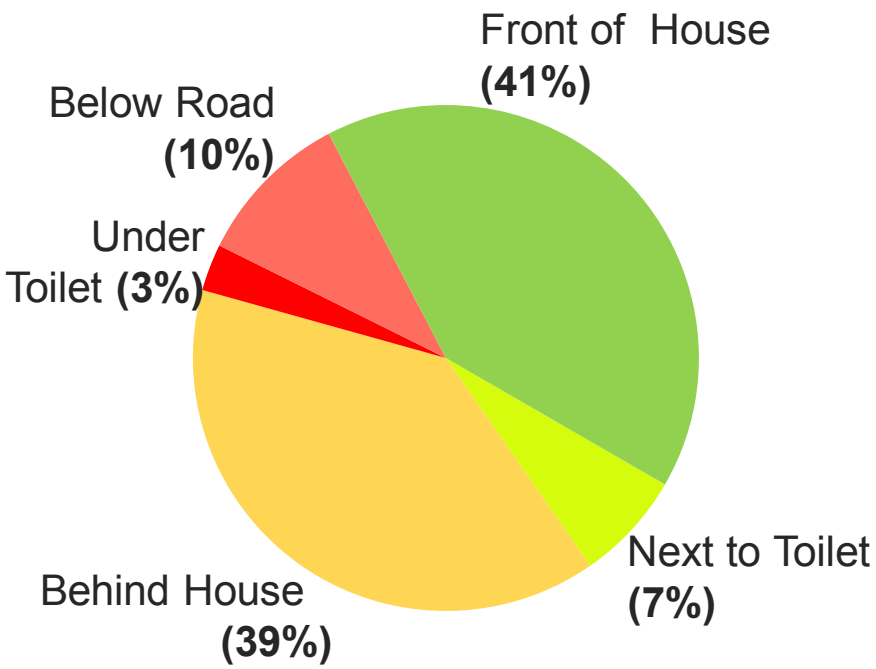
- Use of tablets/chemicals
- Majority of collection systems located such that they are not accessible
- Soil condition
- Majority of the collection systems do not have baselining
- Overflow pipe connected to drain

Irregular Desludging Interval

- Majority of collection systems are aged 5-10 years
- 3% households have their grey water connected to collection system

Access to containment systems

User interface | **Containment** | Transport | Treatment and Disposal



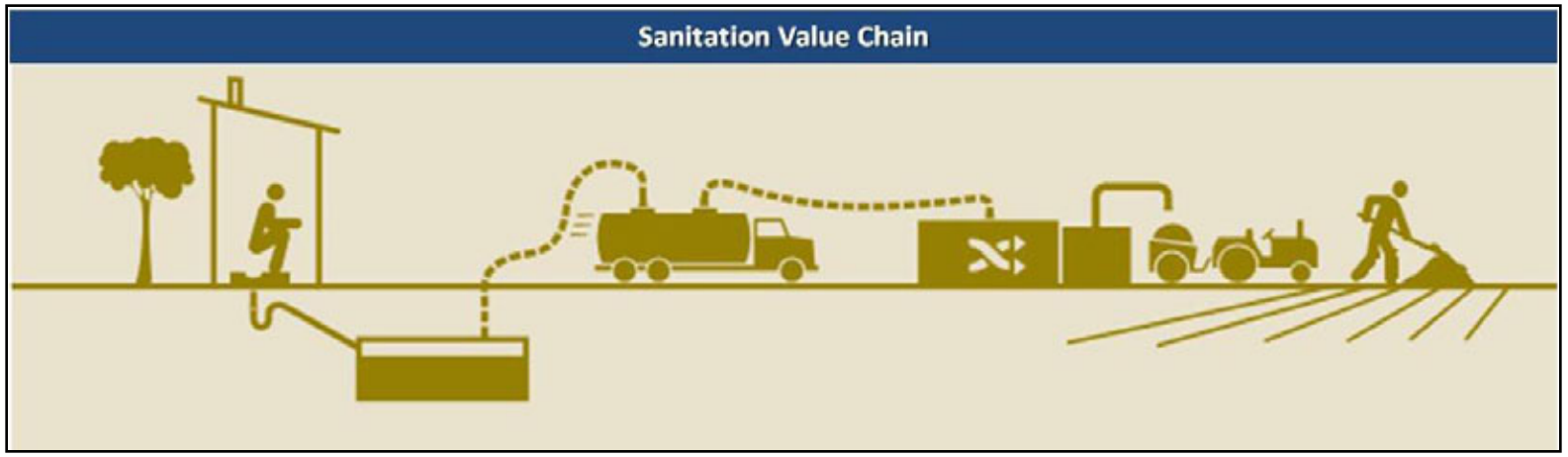
Location of collection systems

Key issues

User interface | **Containment** | Transport | Treatment and Disposal

- Lack of awareness on **design / construction** standards and importance of **timely desludging**
- Acts empower the ULBs to formulate local by-laws for design/construction aspects, however **no practical reference** available for the same
- Due to irregular desludging and lack of construction standards most of the sewage discharged into the **storm drain** or seeps under ground
- Manual scavenging observed in certain wards (3% households resort to manual scavenging, due to **economic factors** or **inaccessibility**)
- Majority of the collection systems are **unlined**
- Poor monitoring and accountability by local ULB

Sanitation Situation



User Interface → Containment → Transport → Treatment and Disposal

Transportation

User interface | Containment | **Transport** | Treatment and Disposal

- TMC operates one desludging vehicle with 4000L Capacity
- People prefer private players to government services
- Records indicate on an average 3 to 4 loads of faecal sludge desludged weekly
- Prominence of other private players as well, 5 such operators present
- Private operators charge 1500-2000 Rs / desludging
- Written application based requisition by households for availing TMC services

Preference analysis

User interface | Containment | **Transport** | Treatment and Disposal

- At present in Devanahalli 61% of households prefers private operators and only 35% households prefer government services.
- Reason for this perception being;
  - ✓ Written application has to be submitted, where in private players be called via telephone
  - ✓ Not arriving on time and delayed desludging
  - ✓ No cleanliness or any safety precautions handled while desludging
  - ✓ Lesser service cost compared to private players

Household preference for desludging services

O&M Cost

User interface | Containment | **Transport** | Treatment and Disposal

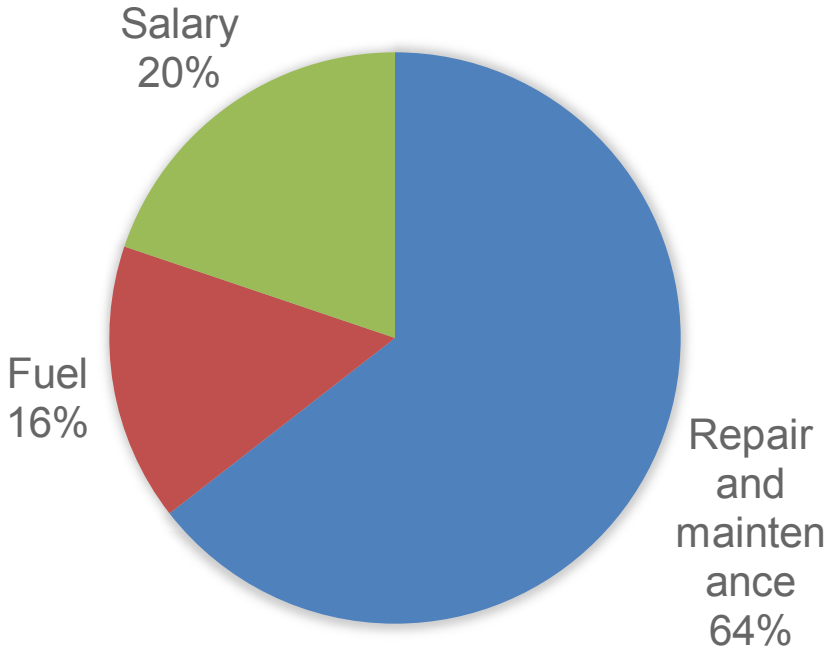
Cost of TMC Truck: Rs.16,00,000

Average annual O&M cost:

- Operation cost – Rs. 1,50,000
- Maintenance cost – Rs. 60,000 – 75,000
- Total cost – Rs. 2,25,000

Average annual income:

- Average desludging per year 150 – 180
- Cost for desludging – Rs. 1000
- Total income – Rs. 1,50,000 – 1,80,000

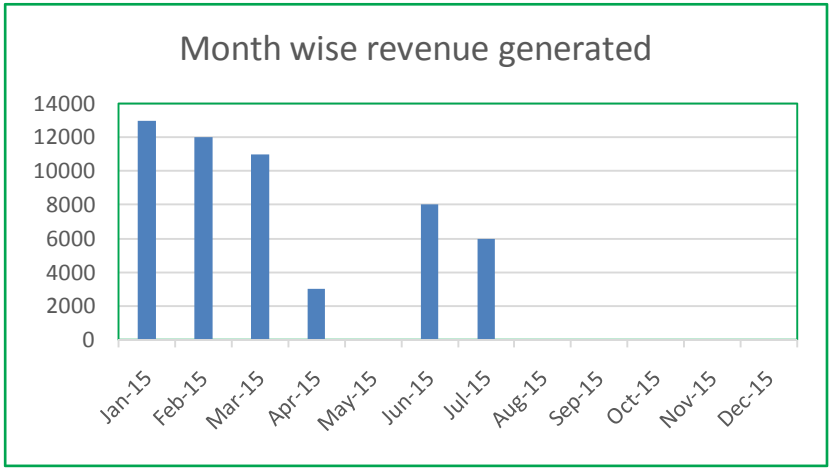


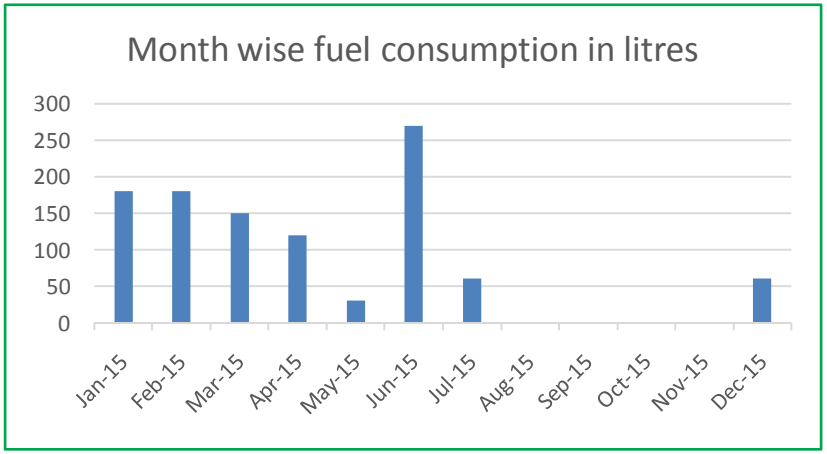
Cost apportion for the year 2015

Source: TMC Devanahalli

O&M cost analysis

User interface | Containment | **Transport** | Treatment and Disposal





Monthly average cost and revenue

Average Maintenance cost	Rs. 5,920
Average fuel consumption	130 lts
Average revenue genrated	Rs. 6,625

Overview of Revenue(2015)

Revenue	Rs 53,000
Operating Costs	Rs 1,50,000
Maintenance	Rs 2,75,000
Gap	Rs 3,71,000

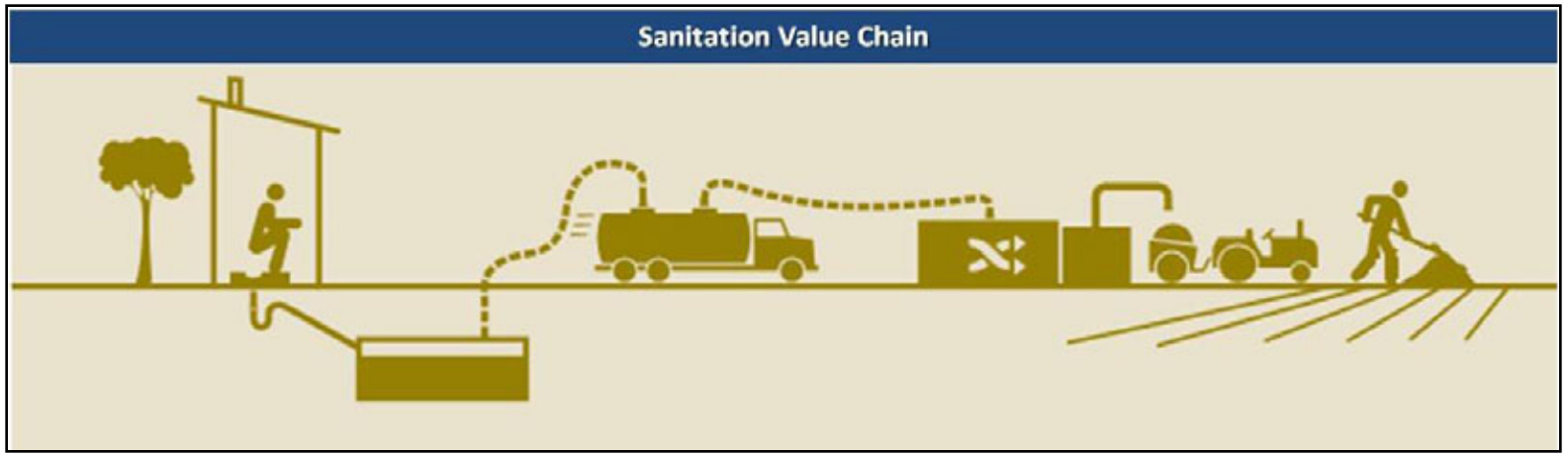
Source: TMC Devanahalli

Key issues

User interface | Containment | **Transport** | Treatment and Disposal

- Poor truck maintenance and lack of skilled operators
- Major repairs halts the truck for very long period
- Non availability of dedicated driver
- Truck is not used to its optimum – poor desludging demand / service
- Lack of financial accountability – income vs expenditure
- Lack of safety guidelines and safety gears for operators.
- Lack of proper operational plan and resource allocation for the same
- Difficult procedure to avail services of TMC truck

Sanitation Situation



User Interface → Containment → Transport → Treatment and Disposal

Treatment and disposal

User interface | Containment | Transport | **Treatment and Disposal**

- No treatment facility available
- Disposal of faecal sludge at designated or remote areas
- Most disposal into nearby farm lands (disposed in open pits in farmland)
- Faecal sludge directly used as a **soil conditioner** in agricultural fields without adequate treatment (mostly cash crops)
- **Lack** of regulations and **guidelines for safe reuse**
- Farmers un-aware about the health risks involved with the present practice

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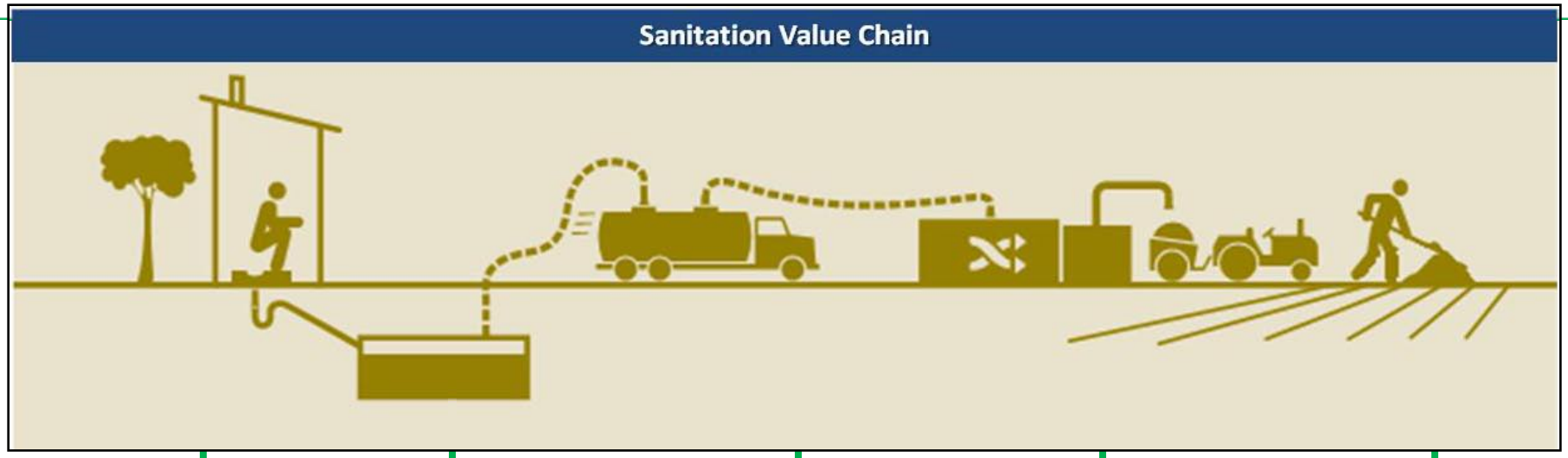
Our interventions



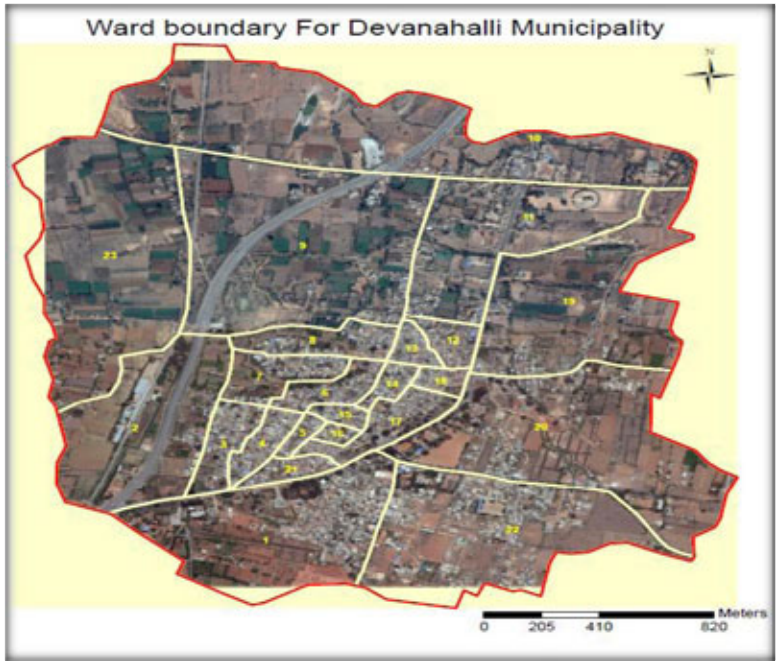
• IEC campaigns • Awareness programs, • Construction of toilets	• IEC campaigns • Design / construction standards, • workshops	• Operational optimisation • Business model • Operator training	• Effective treatment • Operation optimisation • Streamlining O&M	• Reuse • Co-composting • Farmers benefit

Framing Policy guidelines

FSM

Policy recommendations

- Toilet construction in open defecation areas
- Toilets outlet connected to drains to have containment system
- Standardization of Septic tanks and Pits design
- Database of onsite system and regular desludging guidelines
- Formalization of private honey suckers
- Requirement of appropriate treatment facility or/and safe disposal
- Training to local masons on standard designs on onsite sanitation system

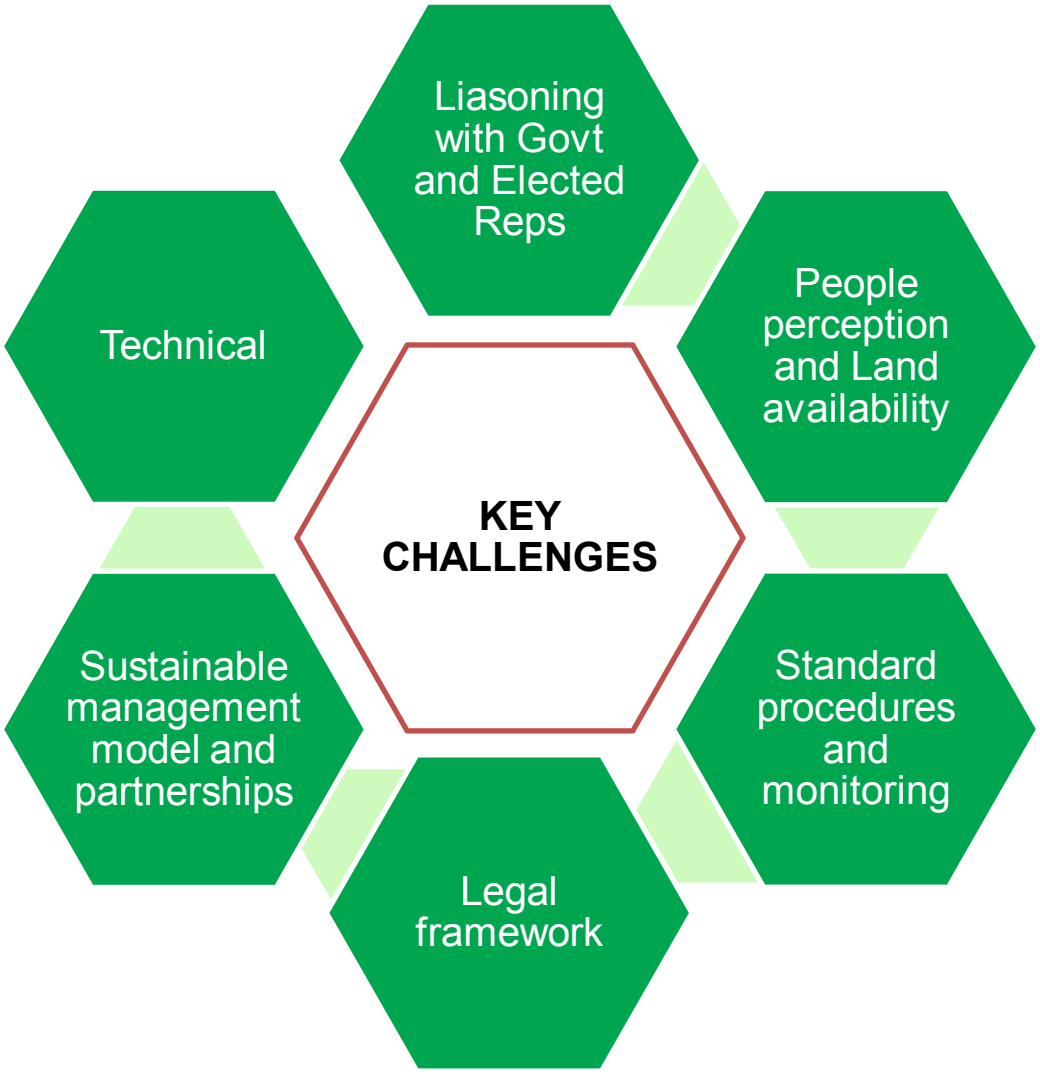


Status so Far…

- Faecal sludge Treatment facility commissioned
- Operational Days = **142**
  Truck Loads received = **90**
- Faecal Sludge Received = **1,83,900 Liters**
- Engagement with local farmers—interest in buying treated water and sludge
- Regular data collection and performance monitoring

- **90 %** of Devanahalli households surveyed
- FSM Policy guidelines drafted and under review
- Induction to TMC officials and Operator Trained
- Dedicated landline for desludging service
- **350+** visitors incl. **100+** international visitors, **200** senior officials

Key challenges



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Way forward

Monitoring and operations	Policy	Upscale
• Daily Dashboard - Operations • Data analysis • Streamlining truck operations • Improvisations in tech design & o&m • Government officials and stake holder induction • Development of Sustainable management model and implementation	• Workshops for ULB level officials on policy importance • End to end policy implementation • Legal/Institutional frame work to be adopted • Regulations for desludging and dumping at FSTP	• Policy adoption at the state level • FSM initiatives in other towns in Karnataka and other states • Development various management models • Build at least 20 FSTP's in Karnataka and other states - 2017

FSTP plant, Devanahalli

Need for FSTP and FSM

- Devanahalli TMC interested to ensure feacal sludge management
- Outcome of sanitation safety Planning recommends FSM
- No sewer system planned in the near future → Limited water supply
- TMC operates one desludging vehicle with 4000L capacity
- Estimated 1 to 2 loads of faecal sludge / septage desludged daily
- Majority of collection systems not in line to the required standards

Treatment

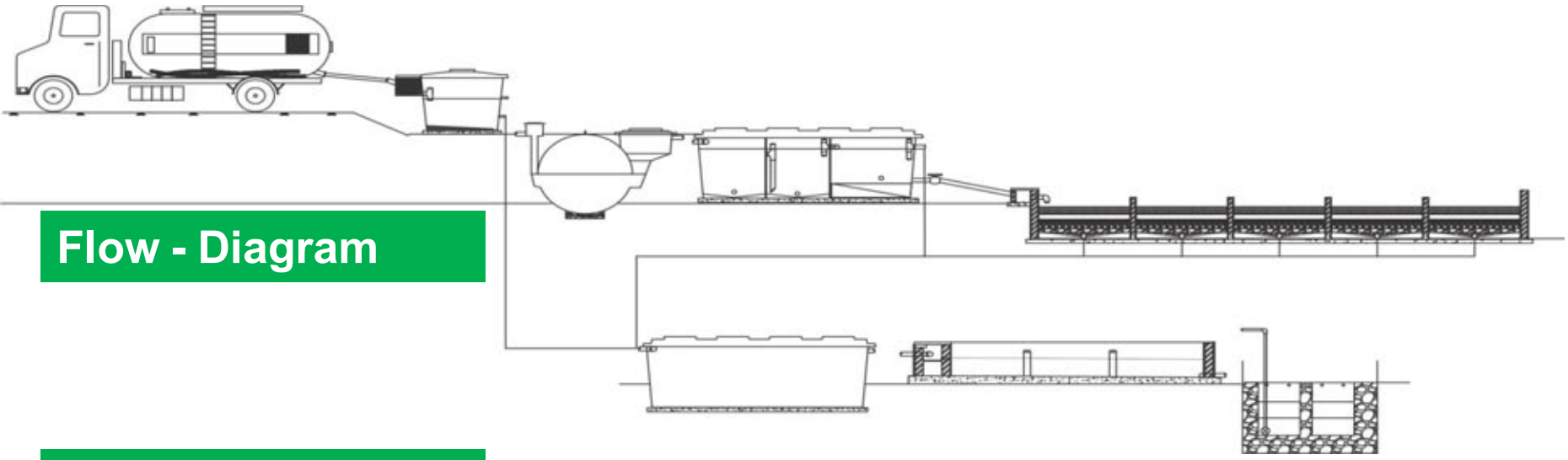
Concept and Technology adopted

Selection criteria

Key criteria for selection of treatment concept and modules

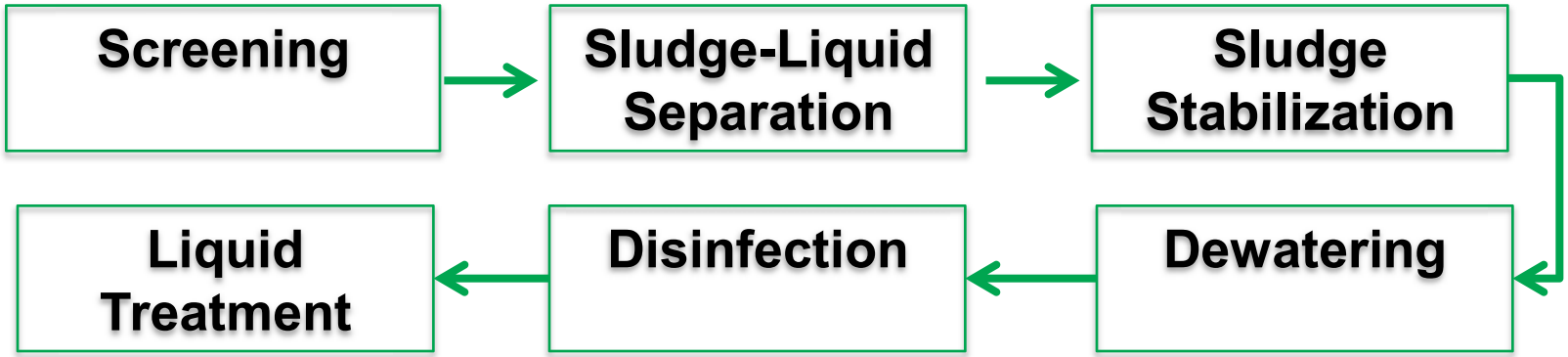
- To meet the required discharge standards for safe disposal
- Social acceptability and people preference
- Ease in operation (simplicity) and maintenance of the treatment unit
- Safe and hygienic operation for operators and mainatainace staff
- Affordable O&M cost for the TMC
- Minimization / No usage of electromechanical inputs for treatment as well as disposal
- Reasonable capital cost and construction area requirement
- Outcome of sanitation safety Planning recommends FSM

Treatment Modules



Flow - Diagram

Treatment Process



Plant Description

- **Capacity** Serves 30,000 people (de-sludging every 4-5 years)
- **Technology** Gravity-based Biological Treatment
- **Area** 650m^2
- **Priority** Simple, low cost O&M
- **Structure**: Mostly underground, completely covered, odorless
- **Capital Cost** Rs 45 + 35 Lacs (Rs 300 per capita)
- **Operating Cost `** Rs 24 Lacs per year (Rs 80 per capita per year)
- **Lifecycle cost** Rs 1,500 per capita—very low

Consortium for DEWATS Dissemination Society

BORDA SOUTH ASIA

Treatment modules

Thank you!!

CDD Society

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