CITY SANITATION PLAN
for AMBAJOGAI Municipality

PAS Project, CEPT University, INDIA
Report on town diagnostics for sanitation services and nature of capacity building support needed

Section IV: Ambajogai

30th May 2014

CEPT University
Contents

1 City profile

2 Current status of sanitation

3 Recommendation solutions

4 ULB institutional assessment and areas for capacity building

5 Financial capacity assessment
Ambajogai is a Class B town of ~74,000 people located in the Beed district of Maharashtra.

**Location**
- Class ‘B’ city located ~130 Km south-west of the city of Nanded in Maharashtra.
- Spread over 10.18 sq. km., with a population density of ~7,200 inhabitants / sq. km.
- Cultural capital of the Marathwada region, famous for its temples and educational institutes.

**Demographics**
- Population of Ambajogai Municipal Council (Census data)
  - 1981: 42,362
  - 1991: 57,159
  - 2001: 69,277
  - 2011: 73,975
  - Population growth has been slow (~2% between 1981 and 2011)
  - 26% of the total population lives in slum areas

- Has ~14,000 households with an average household size of ~5.5 persons

Source: Census information (link), City Sanitation Plan of Ambajogai, PAS Project – CEPT University.
The town is divided into four clusters for wastewater generation based on the natural drainage pattern.

Ambajogai’s wastewater clusters

Terrain and Topology

- The river *Jaywanti* flows in the south to north direction, dividing the town into two major parts – the eastern part and Western part.
- The natural slope and topography converges towards the river diverting wastewater to the river.
- Based on natural topography and drainage system, as well human construction, the city can be divided into four clusters:
  - **Cluster 1:** Semi-rural and sparsely populated, slopes to the north.
  - **Cluster 2:** Covers ~95% of the city population, slopes towards the river.
  - **Cluster 3:** Semi-rural and sparsely populated, slopes away from river.
  - **Cluster 4:** Minimally inhabited, slopes towards nearby lake.

Source: City Sanitation Plan of Ambajogai, PAS Project – CEPT University
For administrative purposes, Ambajogai is divided into 7 Prabhags

Administrative Map of Ambajogai

Only ~50% of this area is inhabited, comprising mainly of residential and institutional buildings
Population: 12,160

Densely populated area dominated by commercial establishments
Population: 11,051

Mix of old and new residential areas, as well as some commercial establishments
Population: 10,540

Only ~50% of this area is inhabited, mainly by slums and low income households
Population: 15,074

Newly developing area comprising primarily of residential colonies
Population: 10,302

Densely populated area dominated by commercial establishments
Population: 10,302

Newly developing area comprising primarily of residential colonies
Population: 10,302

Densely populated area dominated by commercial establishments
Population: 9,687

Source: City Sanitation Plan of Ambajogai, PAS Project – CEPT University
26% of the total population lives in 12 large slum areas

Map of Ambajogai city with slum pockets

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name of the slum</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wadarwada</td>
<td>1172</td>
</tr>
<tr>
<td>2</td>
<td>Dhorpura</td>
<td>348</td>
</tr>
<tr>
<td>3</td>
<td>Sadar Bazar</td>
<td>596</td>
</tr>
<tr>
<td>4</td>
<td>Panchseelnagar</td>
<td>2706</td>
</tr>
<tr>
<td>5</td>
<td>Parlives</td>
<td>3618</td>
</tr>
<tr>
<td>6</td>
<td>Ghandhinagar</td>
<td>1451</td>
</tr>
<tr>
<td>7</td>
<td>Raviwarpeth</td>
<td>1791</td>
</tr>
<tr>
<td>8</td>
<td>Siddharthanagar</td>
<td>1681</td>
</tr>
<tr>
<td>9</td>
<td>Millind nagar</td>
<td>2741</td>
</tr>
<tr>
<td>10</td>
<td>Kabirnagar</td>
<td>2177</td>
</tr>
<tr>
<td></td>
<td>Raigadnagar</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Dhobighat</td>
<td>502</td>
</tr>
<tr>
<td>12</td>
<td>Pensionpura</td>
<td>1475</td>
</tr>
</tbody>
</table>

Source: City Sanitation Plan of Ambajogai, PAS Project – CEPT University
Contents

1 City profile

2 Current status of sanitation

3 Recommendation solutions

4 ULB institutional assessment and areas for capacity building

5 Financial capacity assessment
Ambajogai faces a severe shortage of water, and only ~65% of households have a water supply connection

Source of water supply

<table>
<thead>
<tr>
<th>Source</th>
<th>Source of water supply (in MLD)</th>
<th>Coverage of water supply connections (in % of total households)</th>
<th>Per capita availability of water in Ambajogai (in LPCD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kalwati Dam</td>
<td>12.74</td>
<td>67</td>
<td>84.0</td>
</tr>
<tr>
<td>Manjra Dam</td>
<td>88%</td>
<td>67</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>67</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>68</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>65</td>
<td></td>
</tr>
</tbody>
</table>

- Manjra Damn near Dhanegaon is the main source of water for Ambajogai
- Water is treated at two treatment plants located at the dam sites, with a combined capacity of 25 MLD
- Water is stored at 4 ground storage reservoirs and 8 elevated storage reservoirs
- The percentage of households provided water supply connections has marginally fallen from ~68% in 2010-11 to ~65% in 2011-12
- The per capita availability of water is inadequate as per the Code of Basic Requirements of Water Supply set at 100-150 LPCD by the Bureau of Indian Standards (BIS) and the service level benchmarks set by the Govt. of India at 135 LPCD
- Current water supply (12.74 MLD) exceeds estimated demand (10.96), however per capita availability remains low due to loss of water through illegal connections and leakages

Source: City Sanitation Plan of Ambajogai, PAS Project – CEPT University,
Code of basic requirements of water supply by Bureau of Indian Standards (link), Census 2011
There are significant gaps across the sanitation value chain in Ambajogai (1/2)

Access

Collection

Conveyance

Treatment

Disposal/Reuse

Pour flush toilets

Septic tanks & Pits

Open/covered drains in old town

No conveyance in new town

Soak pits in some parts of new town

Irregular cleaning by emptier truck

No treatment facility

Into river or natural drain

Waste water

Septage

Pour flush toilets

Septic tanks

Open/closed drains

No treatment

Jaywanti River

No treatment of septage or grey and black water from domestic use

Source: City Sanitation Plan of Ambajogai, PAS Project – CEPT University
There are significant gaps across the sanitation value chain in Ambajogai (2/2)

Access to type of sanitation (Number of HH)
- Open defecation: 14,517 (30%)
- Community toilets: 9,663 (4%)
- Individual toilets: 67%

Method of collection of waste (Number of HH)
- Others: 9,663 (13%)
- Pit latrines: 1,290 (7%)
- Septic tanks: 14,517 (80%)

Methods of conveyance of waste (Number of HH)
- No drains: 14,517 (8%)
- Open drains: 1,290 (71%)
- Closed drains: ~4,300 HH practice OD in Ambajogai

Treatment of wastewater (in MLD)
- Untreated wastewater: 4.97 (100%)

Disposal of waste (in MLD)
- River Jaywanti: 4.97 (100%)

- ~4.97 MLD of wastewater is untreated
- No treatment facility for fecal sludge
- ~4.97 MLD of wastewater is dumped into river Jaywanti
- Fecal waste is dumped into the open

Note: (1) Collection only for HH with individual toilets, (2) Includes low quality sewerage network and primitive methods such as latrines serviced by animals

Source: Census of India 2011, PAS data 2011, City Sanitation Plan of Ambajogai, PAS Project – CEPT University
Access: Open defecation rates are extremely high, particularly in slums where ~80% of households practice open defecation

Access to types of sanitation facility in Ambajogai
(As a % of total HH)

<table>
<thead>
<tr>
<th></th>
<th>Overall</th>
<th>Slum HH</th>
<th>Non Slum HH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open defecation</td>
<td>14,517</td>
<td>1,084</td>
<td>13,433</td>
</tr>
<tr>
<td>Community toilets</td>
<td>4%</td>
<td>79%</td>
<td>4%</td>
</tr>
<tr>
<td>Personal toilets</td>
<td>67%</td>
<td>0%</td>
<td>70%</td>
</tr>
</tbody>
</table>

Current status of access to toilets in Ambajogai

<table>
<thead>
<tr>
<th>Prabhag</th>
<th>Toilet dependence</th>
</tr>
</thead>
</table>
| Prabhag 1| • 60% of HH have access to personal toilets  
• 35% of HH practice open defecation  |
| Prabhag 2| • Almost all HH have access to personal toilets  
• Rare instances of open defecation  |
| Prabhag 3| • 70% of HH have access to personal toilets  
• 20% of HH practice open defecation  |
| Prabhag 4| • 90% of HH have access to personal toilets  
• 10% of HH practice open defecation  |
| Prabhag 5| • 80% of HH have access to personal toilets  
• 8% of HH practice open defecation  |
| Prabhag 6| • Only 30% of HH have access to personal toilets  
• 60% of HH practice open defecation  |
| Prabhag 7| • 90% of HH have access to personal toilets  
• 10% of HH practice open defecation  |

- 4,303 households practice open defecation in Ambajogai
- 9,663 households have access to individual toilets
- Only 551 households are dependent on community toilets, and slum HHs mainly resort to open defecation due to lack of functional community toilets

Source: Census of India 2011, City Sanitation Plan of Ambajogai, PAS Project – CEPT University
**Access:** There are 39 community toilet blocks in Ambajogai and 2 public toilets

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**Location of community toilet blocks in Ambajogai**

- Community toilets
- Slum areas

**Location of Public toilet blocks in Ambajogai**

- Public toilets
- Slum areas

Source: City Sanitation Plan of Ambajogai, PAS Project – CEPT University
## Access: Community and public toilet blocks are in very poor condition and need refurbishment

<table>
<thead>
<tr>
<th>Community toilets</th>
<th>Public toilets</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Community toilet" /></td>
<td><img src="image2" alt="Public toilet" /></td>
</tr>
</tbody>
</table>

- There are 39 **community toilet blocks** in Ambajogai which are located in slum and non-slum areas
- A study in 2012 found that **community toilets are in very poor condition** with only 141/249 functional seats
- Most toilet blocks are in **dilapidated condition**
- **Lack of availability of regular water supply** limits use
- **Unavailability of electricity** makes them unsafe for use at night
- All Community toilet facilities are free to use and mainly managed by the ULB

- There are 2 **public toilets** blocks in Ambajogai
- One public toilet is located at the bus stand and the other at the Dasopant Samadhi area
- The public toilet at the **bus stand** is operated by a **private contractor** and runs on a **pay-per-use model**
- **Lack of maintenance of toilet blocks, broken infrastructure, and unavailability of water** limit their use
- There is a need for a **public toilet near Yogeshwari temple**

Source: City Sanitation Plan of Ambajogai, PAS Project – CEPT University
Septage collection: 80% of individual toilets depend on septic tanks, which are often over-sized and difficult to access.

Method of collection of waste for households with personal toilets
(As a % of total HH)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Others²</td>
<td>9,663</td>
<td>13%</td>
</tr>
<tr>
<td>Pit latrines</td>
<td></td>
<td>7%</td>
</tr>
<tr>
<td>Septic tanks</td>
<td></td>
<td>80%</td>
</tr>
</tbody>
</table>

- Most personal toilets are connected to septic tanks for collection.
- Septic tanks are usually designed to have 2-3 baffled chambers.
- Septic tanks are often sealed at the top, making access difficult.
- Septic tanks in old town areas are often of non-standard size due to space constraints.
- Practice of constructing septic tanks with outlets connecting to local open drains or channels is widely prevalent (see photo above).

Source: Census of India 2011, City Sanitation Plan of Ambajogai, PAS Project – CEPT University
Conveyance of septage: Only 1% household septic tanks are cleaned annually as compared to the service standards of 33%.

Existing septage conveyance mechanism in Ambajogai

- The Ambajogai ULB has one suction emptier truck of only 200 L capacity which is responsible for cleaning all septic tanks in the town.
- The truck is used to clean all community and public toilets once a week and households pay ~INR 3,000/septic tank to the ULB to get their septic tanks cleaned.
- There is no regulated schedule for cleaning, and households call the ULB when the septic tanks fill up.

Number of septic tanks cleaned annually by the Ambajogai ULB (As a % of total septic tanks)

<table>
<thead>
<tr>
<th></th>
<th>At present</th>
<th>CPHEEO standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleaning frequency</td>
<td>&gt;8-10 yrs.</td>
<td>3 yrs.</td>
</tr>
</tbody>
</table>

- Only 1% of tanks are cleaned annually, far below the service standards of 33% recommended by the CPHEEO manual and the MoUD advisory on septage management.
- Due to infrequent cleaning, septage begins to solidify in tanks.
- As the septic tank fills up, fecal matter along with effluent is released into the drains, leading to widespread pollution.

Note (1) The Central Public Health and Environmental Engineering Organization (CPHEEO) is the technical wing of the MoUD and deals with matters related to urban water supply and sanitation.

Source: City Sanitation Plan of Ambajogai, PAS Project – CEPT University.
**Wastewater collection and conveyance: ~70% of households rely on open drains for the conveyance of waste water**

<table>
<thead>
<tr>
<th>Method of collection and conveyance of wastewater (As a percentage of total HH)</th>
<th>Road side drains</th>
<th>Map of Ambajogai with conveyance mechanisms</th>
</tr>
</thead>
<tbody>
<tr>
<td>No drains</td>
<td>14,517</td>
<td>![Road side drains image]</td>
</tr>
<tr>
<td>Open drains</td>
<td>8%</td>
<td>![Map of Ambajogai]</td>
</tr>
<tr>
<td>Closed drains</td>
<td>71%</td>
<td></td>
</tr>
<tr>
<td>Closed drains</td>
<td>20%</td>
<td></td>
</tr>
</tbody>
</table>

- ~1,200 households in Ambajogai have no drainage system for the conveyance of wastewater
- There is no appropriate mechanism for conveyance of grey and black water and all wastewater is disposed into drain channels flowing along the streets
- In old town area, a large amount of solid waste is dumped into drains, blocking the nallahs
- The drainage system in new areas is limited in coverage and wastewater is discharged into soak pits or into the open

Source: City Sanitation Plan of Ambajogai, PAS Project – CEPT University
Wastewater treatment and disposal: All wastewater is dumped without treatment into river Jaywanti

Quantity of Wastewater generation in Ambajogai by clusters

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Prabhag</th>
<th>Wastewater generated (MLD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Part of 6</td>
<td>0.4</td>
</tr>
<tr>
<td>2</td>
<td>1,2,4,5,7 and part of 3 and 6</td>
<td>4.2</td>
</tr>
<tr>
<td>3</td>
<td>Part of 3</td>
<td>0.1</td>
</tr>
<tr>
<td>4</td>
<td>Part of 7</td>
<td>0.2</td>
</tr>
</tbody>
</table>

There is no treatment facility for septage or wastewater

Wastewater treatment

- ~4.97 MLD of wastewater is generated in Ambajogai and goes untreated due to lack of any centralized or decentralized treatment facility
- Due to lack of soak-pits and treatment facilities all the wastewater drains into the river or into natural drains

Source: City Sanitation Plan of Ambajogai, PAS Project – CEPT University
Septage treatment and disposal: Septage is disposed off at the solid waste dump site without treatment.

Location of the dump site

Crude disposal of septage

Dump site located next the existing solid waste treatment facility

Solid waste treatment facility

Source: City Sanitation Plan of Ambajogai, PAS Project – CEPT University
Existing Wastewater water flows in Ambajogai

Source: City Sanitation Plan of Ambajogai, PAS Project – CEPT University
City profile

Current status of sanitation

Recommendation solutions

ULB institutional assessment and areas for capacity building

Financial capacity assessment
CEPT has supported Ambajogai with developing comprehensive City Sanitation Plan for universal sanitation services (1/2)

Option 1: Mixed sewerage and settled sewerage, IFSM and decentralized treatment

- **Cluster 2**: Pour flush toilets, Community / public toilets
  - Pour flush toilets → Conventional sewers → Conventional sewers → Conventional sewers → Conventional sewers → Waste water treatment facility → Safe disposal or reuse of treated waste water

- **Cluster 1, 3, 4**: Pour flush toilets
  - Pour flush toilets → Improved septic tanks → Settled sewers → Suction emptier truck → Waste water treatment facility → Safe disposal or reuse of treated septage → Safe disposal or reuse of treated septage

- **Adequate primary treatment through improved septic tanks and conveyance of wastewater through sewer network**
- **100% coverage of conveyance system**
- **100% Treatment of septage and grey water**
- **Safe disposal or reuse of wastewater**

Source: City Sanitation Plan of Ambajogai, PAS Project – CEPT University
CEPT has supported Ambajogai with developing comprehensive City Sanitation Plan for universal sanitation services (2/2)

<table>
<thead>
<tr>
<th>Access</th>
<th>Collection</th>
<th>Conveyance</th>
<th>Treatment</th>
<th>Disposal/Reuse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provision of individual toilets in slum areas (INR 11 Million)</td>
<td>Rehabilitation of drains in Cluster 2A (INR 92.4 Million)</td>
<td>Cluster 2A - Conventional wastewater treatment facility (INR 53.4 Million)</td>
<td>Reuse for agriculture and irrigation purposes</td>
<td></td>
</tr>
<tr>
<td>Refurbishment of 39 community toilet blocks (INR 5.7 Million)</td>
<td>Cluster 2A - conventional sewer (INR 567.8 Million)</td>
<td>Cluster 1,3,4A - Decentralized wastewater treatment facility (INR 30 Million)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refurbishment of community toilet block in Sardarbazar slum (INR 0.3 Million)</td>
<td>Cluster 1,3,4A - Settled sewers (INR 43 Million)</td>
<td>Cluster 1,3,4A - Fecal sludge treatment facility (INR 1 Million)</td>
<td>Reuse as compost in agriculture</td>
<td></td>
</tr>
<tr>
<td>Refurbishment of existing public toilets and urinals (0.92 Million)</td>
<td>Cluster 1,3,4A - Suction emptier truck (INR 0.8 Million)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Investment required**
- INR 17.9 Million
- INR 704 Million
- INR 84.4 Million

- This proposal provides each household in Ambajogai **access to individual and community toilets**
- The city has already proposed a **conventional sewer network for Cluster 1**
- In the remaining cluster, the city is exploring the construction of a **settled sewer network with DEWATs along with regular septic tank cleaning**
- The total investment required for this proposal is ~**INR 806.3 Million**

Note: (A) Cluster 2 refers to Ambajogai’s central town area, while Clusters 1, 3, 4 are newly developed clusters where ~14% of Ambajogai’s households live (B) The plan for a conventional sewerage system attached to a conventional treatment plant had already been undertaken by the city under UIDSSMT

Source: City Sanitation Plan of Ambajogai, PAS Project – CEPT University
The ULB has decided to construct a conventional sewerage system in the central part of the city.

**Location of conventional sewerage network**

**Details of the project**

- Cluster 2 will be served by **two conventional trunk main sewers** for the east and west sides.

- The trunks will connect to a sump from where wastewater will be pumped to **conventional sewage treatment plant** near the river.

- The construction is due to begin in **2014** and will cost the ULB ~INR 600 – 700 Million.

- The **sewer network** and pumping stations will cost ~ INR 550 – 630 Million, and the **treatment plant** will cost ~ INR 50 - 70 Million.

- However, the sewerage network will **not cover** the 3 remaining three clusters.

Source: City Sanitation Plan of Ambajogai, PAS Project – CEPT University; Detailed Project Report for underground drainage system prepared by Solid Core Consultants Pvt. Ltd.
For the remaining 3 clusters, the city plans to develop decentralized sanitation solutions for the safe conveyance and treatment of waste.

1. **Integrated fecal sludge management (*short run*)**
   - Regular (in a 3-year cycle) collection and disposal of fecal waste from septic tanks, along with necessary refurbishment of septic tanks, construction of a treatment facility for septage and reuse of treated septage.

2. **Settled sewer + DEWATS (*long run*)**
   - Conveyance of wastewater through settled sewers to a decentralized wastewater treatment facility for the newly developing clusters and reuse of treated wastewater.
In the short run, the city plans to develop an end-to-end integrated fecal sludge management solution in these three clusters

**Current value chain**
- **Access:** Pour flush toilets
- **Collection:** Septic tanks
- **Conveyance:** Suction emptier trucks
- **Treatment:** No treatment facility
- **Disposal / Reuse:** Septage disposed off on dumping site

- Septic tanks lack manhole covers
- Septic tanks are not of standard size
- No HHs level database on septic tanks

**Proposed value chain**
- **Access:** Pour flush toilets
- **Collection:** Septic tanks
- **Conveyance:** Suction emptier trucks
- **Treatment:** Sludge drying beds
- **Disposal / Reuse:** Revenue from compost

- Providing access manhole covers to allow regular cleaning
- Data base /MIS on properties with septic tanks
- Preparing a schedule for regular cleaning of septic tanks, to ensure tanks are cleaned every 3 years, or 33% of septic tanks are cleaned annually
- Installing fecal sludge drying beds, for the treatment of fecal sludge
- Use or sale of treated sale of septage at a fixed rate to nearby farms or agro-businesses

Source: Presentation on septage management plan of Ambajogai, CEPT University
As in the other cities, septic tanks will first need to be provided with access manhole covers to enable ready access for cleaning.

Details of proposal

- Based on an assessment done during the preparation of the city sanitation plans, it was noticed that many septic tanks in Ambajogai had sealed covers.

- This prevented regular cleaning, as the seal had to be broken each time to access the septic tanks.

- ULB proposes the provision of RCC access manhole covers (60 cm X 45 cm) to allow easy access during the emptying process.

- The cost of installing one such cover is INR 500-800.

- Assuming ~30% of septic tanks will need to be repaired, this implies a cost of ~INR 0.5 million.

Source: Presentation on septage management plan of Ambajogai, CEPT University
To maintain a 3 year emptying cycle, 898 personal septic tanks will need to be cleaned annually in these three clusters.

### Current septage management practice

- **~1% of tanks cleaned per year** (once in >8-10 years)

### Recommended septage management practice

- **~33% of tanks cleaned per year** (once in 3 years)

### Current barriers

1. Lack of detailed information on household level sanitation situation
2. Many septic tanks are sealed and difficult to access
3. Cleaning is done on-call by the household, who do not see the need for regular cleaning
4. Ambajogai has only 1 truck of 200 L capacity, owned and operated by the ULB
5. Houses pay ~INR 3000 to the ULB to get tanks cleaned but only once in more than 8-10 years

### Proposed solutions

1. MIS/database on household level sanitation
2. Septic tanks will be refurbished with access covers
3. Septic tanks will be cleaned on a pre-determined schedule. Regulations and penalties will be set in place to ensure periodic cleaning. Awareness generation activities will educate households about the need for regular cleaning.
4. Ambajogai will get an additional 5 kL truck to meet service standards, that will clean 3 tanks per day, 300 days per year, which can be operated by a private. The existing truck will serve in areas which are inaccessible in the 3 clusters
5. All property owners (residential and non-residential) will pay a ‘special sanitary tax’ to be levied by the ULB as per the municipal legislation

Source: Presentation on septage management plan of Ambajogai, CEPT University,

(i) Maharashtra Municipal Councils, Nagar Panchayats and Industrial Townships Act, 1965, Chapter IX: Municipal taxation, Section 108
For the treatment of collected septage, 4 sludge drying beds will be needed

Technical details of sludge drying bed

- The MoUD advisory recommends the use of unplanted Sludge drying beds (SDB) for the treatment of collected septage.
- The sludge will be allowed to dry for 15 days to form sludge cakes, which can be disposed safely in the open.

Description of proposal

- For these three clusters, it is estimated that the daily load on the septage treatment facility will be 10.5 cum/day.
- This SDBs can either be constructed either at the wastewater treatment facility, or at the solid waste dump site or along with the DEWATs plant.
- The city requires 4 sludge drying beds, covering a cumulative area of 684 sq. m.
- The total investment required is INR ~0.8 - 1 Million.

Note: (1) Excluding the cost of land, which will be provided by the ULB.
Source: Presentation on septage management plan of Ambajogai, CEPT University.
To ensure adoption of the integrated fecal sludge management plan, the ULB has to make regulatory changes

- The key issue in ensuring regular and safe septage management is lack of implementation of government regulations and advisories
- This will need the formulation of ULB bye-laws and rules to ensure implementation of each aspect of the IFSM plan
- The rules should address:
  1. **Septic tank design**: to ensure septic tanks of standard size are installed in new constructions
  2. **Periodicity of de-sludging**: to ensure septic tanks are cleaned every 3 years as per the MoUD’s advisory
  3. **De-sludging procedures**: to ensure safe handling of fecal sludge
  4. **Sanitation tax**: to persuade households to clean septic tanks regularly
  5. **Penalties**: to deter irregular cleaning and use of substandard septic tanks
- There is also a need for regular monitoring and inspection of septic tanks and de-sludging procedures to facilitate the implementation of bye-laws

Source: Presentation on septage management plan of Ambajogai, CEPT University
These activities also need to be supported by campaigns for awareness generation

- To ensure adoption of government regulations and ULB bye-laws, there is a need to generate awareness about regular septic tanks emptying

- To educate people about IFSM we can involve:
  1. Print and electronic media
  2. Civil Society organizations such as NGOs and RWAs
  3. Academic institutions such as schools and colleges
  4. Opinion influencers such as doctors and religious leaders

Illustrative posters to generate awareness

- Preservation of the Environment is our joint responsibility.
- Septic tank base should always be sealed, so that it does not pollute ground.
- Whenever the septic tank gets cleaned, please check that no cracks in the side walls or base of septic tanks.
- Have proper vent pipes for your septic tanks.
- Septic tanks should be located away from groundwater sources.
- Provide proper access manhole to ease the process of emptying.

- As you clean your toilets daily, so that it does not affect your health, similarly clean your septic tanks every 3 years so that it does not affect the environment.
- Ambajogai Nagar Parishad will provide you services for cleaning of Septic tank free of cost once every 3 years.
- The ULB officials will inform you in advance before they clean your septic tanks.
- ULB will leave 1 inch of solids inside septic tank, as it will act as seeding material for new incoming waste.
The integrated fecal sludge management plan will entail capital investment of INR ~2.5 million and annual operating costs of INR ~1.2 million.

### Capital expenditure

<table>
<thead>
<tr>
<th>Activity</th>
<th>INR (Million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constructing 4 sludge drying beds</td>
<td>0.8</td>
</tr>
<tr>
<td>Purchasing 1 Honey sucker</td>
<td>0.8</td>
</tr>
<tr>
<td>Refurbishing 30% of septic tanks¹</td>
<td>0.5</td>
</tr>
<tr>
<td>Technical assessment</td>
<td>0.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2.5</strong></td>
</tr>
</tbody>
</table>

### Operating expenditure per year

<table>
<thead>
<tr>
<th>Activity</th>
<th>INR (Million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation of suction emptier truck</td>
<td>0.9</td>
</tr>
<tr>
<td>Operation of treatment facility</td>
<td>0.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1.2</strong></td>
</tr>
</tbody>
</table>

Note: (¹) As per discussions with the ULB, this cost can also be borne by private households.

Source: Presentation on septage management plan of Ambajogai, CEPT University.
Levying a special sanitary tax along with the sale of septage can make the septage management model profitable.

### Estimated annual revenue from septage management in Ambajogai

*(INR in Million)*

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sanitation tax</td>
<td>1.3</td>
</tr>
<tr>
<td>Sale of septage</td>
<td>0.6</td>
</tr>
<tr>
<td>Total cost</td>
<td>1.9</td>
</tr>
</tbody>
</table>

#### Details of revenue model

- The city can levy a **special sanitary tax of INR 500 per household per year** i.e. roughly equivalent to half the current one-time charge of Rs. 3000.
- The ULB can also recover **costs through** the sale of compost after treatment.
- Assuming ~30% of the compost is sold at INR 0.50/kg, the **pay back period for the ULB will be ~3-4 years**.

**Assumptions:**
1. Annual sanitation tax collected by the ULB is assumed to be ~INR 500 per household per year for 2694 households
2. 30% collected septage sold at INR 0.50/kg

**Source:** Presentation on septage management plan of Ambajogai, CEPT University
The city is also exploring the construction of settled sewers to serve these three clusters in the long run.

Settled sewer technology

- **Small bore sewers** with a minimum diameter of 100 mm are proposed to be constructed over a period of 5 years.
- **Minimum excavation depth** is proposed to be 0.6 meters.

Proposed Location of settled sewers

- The city is exploring the **construction of settled sewers in Cluster 1, 3 and 4** which will not be covered under the conventional sewerage network proposed by the ULB.
- These three clusters account for ~14% of the total households and ~14% of the total wastewater generated (0.7 MLD / 4.97 MLD) in Ambajogai.

Source: Presentation on Wastewater management plan for Ambajogai, CEPT University
The settled sewer system will be attached to DEWATS facility at 4 locations for the treatment of wastewater.

Proposed location of DEWATS

<table>
<thead>
<tr>
<th>DEWATS No.</th>
<th>Area</th>
<th>Population (2045)</th>
<th>Wastewater generated (Cu. M.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 A</td>
<td>Backside of Yogeshwari temple</td>
<td>2,350</td>
<td>255</td>
</tr>
<tr>
<td>1 B</td>
<td>Backside of Yogeshwari temple</td>
<td>2,150</td>
<td>183</td>
</tr>
<tr>
<td>2</td>
<td>Barula Talab</td>
<td>3,000</td>
<td>255</td>
</tr>
<tr>
<td>3 A</td>
<td>Kranti Nagar</td>
<td>4,700</td>
<td>400</td>
</tr>
<tr>
<td>3 B</td>
<td>Kranti Nagar</td>
<td>3,500</td>
<td>300</td>
</tr>
<tr>
<td>4 A</td>
<td>Mauli Nagar</td>
<td>6,000</td>
<td>510</td>
</tr>
<tr>
<td>4 B</td>
<td>Mauli Nagar</td>
<td>6,000</td>
<td>510</td>
</tr>
</tbody>
</table>

- Our initial assessment provides for 7 DEWATS plants located at 4 locations.
- All the DEWATS facilities will provide at least up to secondary treatment, after which the wastewater will be safe for disposal in the river or for reuse.

Source: Presentation on Wastewater management plan for Ambajogai, CEPT University, DEWATs prefeasibility report for Ambajogai by CDD.
The overall proposal will require an investment of INR ~87 Million on capital expenditure and an annual O&M cost of INR ~2.6 Million.

**Investments required on capital assets for settled sewers + DEWATS**

*(INR in Million)*

<table>
<thead>
<tr>
<th>Settled sewers</th>
<th>DEWATS 1</th>
<th>DEWATS 2</th>
<th>DEWATS 3</th>
<th>DEWATS 4</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>43.0</td>
<td>8.3</td>
<td>8.7</td>
<td>12.7</td>
<td>14.5</td>
<td>87.2</td>
</tr>
</tbody>
</table>

**Annual O&M costs of settled sewers + DEWATS**

*(INR in Million)*

<table>
<thead>
<tr>
<th>Settled sewers</th>
<th>DEWATS 1</th>
<th>DEWATS 2</th>
<th>DEWATS 3</th>
<th>DEWATS 4</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.2</td>
<td>2.6</td>
</tr>
</tbody>
</table>

Note: 1) Cost of each DEWATS facility is the average of the costs proposed by the Center for DEWATS Dissemination (CDD) (2) O&M cost for 100 to 200 m³ of DEWATS is INR 100000/- every 2 years, for 200 to 350 m³ of DEWATS the cost is INR 130000/- every 2 years & for 350 to 500 m³ of DEWATS the cost is INR 150000/-

Source: DEWATS Prefeasibility report by CDD for Ambajogai, City Sanitation Plan of Ambajogai, PAS Project – CEPT University
Contents

① City profile
② Current status of sanitation
③ Recommendation solutions
④ ULB institutional assessment and areas for capacity building
⑤ Financial capacity assessment
Ambajogai is governed by the elected municipal council which is aided in its day-to-day operations by the executive wing.

**Legislative wing**
- **Consists of elected officials** called nagarsevaks, led by the Council President who is directly elected by the people.
- **Nagarsevaks are organized into committees**, such as the standing committee and water and sanitation committee— with the authority to plan and approve proposals.
- **Legislative and financial approvals** are discussed and passed in the general body meeting (GBM).

**Executive wing**
- **The executive wing** is the bureaucratic arm, led by Chief Officer (CO).
- The CO is supported by officers heading various departments of the executive wing.
- Ambajogai has 7 Prabhags divided into 28 wards for administrative purposes.
- The executive wing is responsible for implementing policies and schemes.

---

**Ambajogai Municipal council**
*(led by the president, Ms. Rachna Suresh Modi)*

**28 Wards**
*(led by nagarsevaks)*

---

**Executive wing**
*(led by the chief officer, Mr. Jamwar)*

- General Admin.
- Accounts and Tax
- Town Planning
- Water supply
- Sanitation
- Others

---

Source: City Sanitation Plan of Ambajogai, PAS Project – CEPT University, Interviews with Ambajogai city officials
The sanitation department is headed by the sanitary inspector, who supervises a staff of ~80

Structure of the sanitation department

- Chief officer
  - (Mr. Jamwar)

- Sanitary inspector
  - (Mr. Umardand, 1 sanctioned, 0 vacancy)

- Sanitary supervisors
  - (3 sanctioned, no vacancies)

- Sanitary workers
  - (80 sanctioned, 84 working, no vacancies)

- Engineer
  - (Mr. Lahane)

- Consultant
  - (Mr. Patil)

Key issues

- **Shortage of staff**: Like other cities, Ambajogai faces a staff crunch due to inflexible government resolutions on the number of sanctioned staff.

- **Lack of dedicated personnel**: Even though all sanitary worker positions are filled, in practice not all workers focus on sanitation work.

- **Vacancies and Absences**: Only one of the sanitary inspector positions is filled, and officials report that daily absences are common. As in other cities, the state retains authority over hiring, and important senior positions remain vacant.

- **Lack of formal monitoring**: There is no formal monitoring or reporting structure for staff.

- **Lack of training**: There is no formal training, and learning is on-the-job hampering productivity.

Source: Interviews with Ambajogai city officials
Ambajogai has entered into four management contracts with private players, only two of which are currently active.

<table>
<thead>
<tr>
<th>Sector</th>
<th>Name of the contract</th>
<th>ULB responsibilities</th>
<th>Contractor responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active contracts</td>
<td>Management contract for cleaning small drains and transportation and disposal of collected waste</td>
<td>Monthly payment to the contractor at fixed charges per tractor per trip</td>
<td>Cleaning drains and transportation and disposal of waste</td>
</tr>
<tr>
<td></td>
<td>Awarded to a local non-profit</td>
<td></td>
<td>Provision of labor, tractors, trailers and cleaning materials</td>
</tr>
<tr>
<td></td>
<td>Management contract for pre-monsoon cleaning of large drains</td>
<td>One-time payment to the contractor at fixed charges per tractor/truck per unit time</td>
<td>Cleaning of main drains before monsoons</td>
</tr>
<tr>
<td></td>
<td>Awarded to a local contractor</td>
<td></td>
<td>Provision of labor, JCB, tractors, trailers and cleaning materials</td>
</tr>
<tr>
<td>Inactive contracts</td>
<td>O&amp;M of vermi-compost treatment plant</td>
<td>Fixed monthly payment to contractor for O&amp;M</td>
<td>Provision on labor for operating the mechanical separator</td>
</tr>
<tr>
<td></td>
<td>Awarded initially to an Ahmednagar based contractor, now up for re-bidding</td>
<td></td>
<td>Sale of compost, 100% of the proceeds of which paid to the ULB</td>
</tr>
<tr>
<td></td>
<td>Contract for door-to-door waste collection</td>
<td>Fixed monthly payment</td>
<td>Provision on labor, trucks (ghantagadi) and cleaning materials</td>
</tr>
<tr>
<td></td>
<td>Awarded to two local self-help groups, now discontinued</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Artwork from the Noun project, City contract documents, Interviews with Ambajogai city officials
City officials acknowledge the utility of private sector engagements, but have faced certain challenges.

### All officials believed that the private sector provides a higher quality of service than ULB workers

*Nobody wants to work in the sanitation department anymore – they all want office jobs. Our staff keeps requesting transfers and we found it extremely difficult to incentivize them. Hence we decided to privatize and are quite happy. We can place penalties on the private contractor and make sure that the work is done.)*

- Sanitary Inspector, Ambajogai

*Private sector engagement became necessary because of a severe staff crunch. The number of permanent staff we can hire is fixed by the state government. On top of that, our sanitary staff is constantly pulled into other work, and then there are a few each day who are absent.)*

- Engineer, Ambajogai

*I am not completely satisfied with our current private sector players, but they are performing better than the permanent ULB staff, who lack the incentives to work.)*

- President, Ambajogai

### However, the ULB’s inability to make monthly payments has thrown up difficulties in finding willing private partners

*The first vendor we hired for the operation of the vermin-compost plant quit because we were unable to make the monthly payments.)*

- Engineer, Ambajogai

*We had to discontinue the contract made to SHGs for door-to-door cleaning because of poor performance and payment issues.)*

- Sanitary Inspector, Ambajogai

*We had to release a tender three times for the vermicomposting plant. We need three minimum bids to move forward. We got no bids the first time, two bids the second time, and have finally received three bids this time.)*

- Sanitary Inspector, Ambajogai

Source: Interviews with Ambajogai city officials
The engagements are structured as simple annual management contracts which are renewed annually.

<table>
<thead>
<tr>
<th>Features</th>
<th>Cleaning of small drains and waste collection</th>
<th>Pre-monsoon drain cleaning</th>
<th>O&amp;M of vermi-composting plant</th>
<th>Door-to-door waste collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract length</td>
<td>Annual</td>
<td>Annual</td>
<td>Annual</td>
<td>Annual</td>
</tr>
<tr>
<td>Automatic Renewal</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>Tender type</td>
<td>Open bid</td>
<td>Open bid</td>
<td>Open bid</td>
<td>Open bid</td>
</tr>
<tr>
<td>Payment duration</td>
<td>Monthly</td>
<td>Monthly</td>
<td>Monthly</td>
<td>Monthly</td>
</tr>
<tr>
<td>Item rate or Lump sum/fixed fee</td>
<td>Item rate</td>
<td>Item rate</td>
<td>Fixed fee</td>
<td>Fixed fee</td>
</tr>
<tr>
<td>Rate per unit</td>
<td>~ INR 650-750 per tractor trolley per trip</td>
<td>~750 per hour per JCB machine; ~INR 1,750 per day per tractor</td>
<td>~INR 93,000 per month</td>
<td>~INR 42,000 per month</td>
</tr>
<tr>
<td>Penalty clause for non-performance</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Number of bids received last year</td>
<td>3-4</td>
<td>3</td>
<td>3</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

Note: (1) Item rate contracts are those billed based on a bill of quantities or inputs, while a lump sum contract is a fixed fee paid irrespective of level of inputs.

Source: Interviews with Ambajogai city officials, City contract documents

Key issues

- The council prefers annual contracts that are put up for re-bidding each year to increase competition
  - Likely to increase transaction costs
  - Lapses in service are likely during contract re-negotiation
- Active contracts are item-rate, and payment is linked to inputs (man-days), instead of outputs or outcomes
  - There are no performance incentives tied directly to outputs or service levels
  - Item-rate contracts tied to number of man-days are also more difficult to monitor effectively
- Payment is not tied to monitoring
  - There is no mention of monitoring or reporting requirements in the contractor
  - The penalty clause is open-ended and not tied to specific monitored parameters
The current contracts lack important risk allocation clauses affecting both the ULB as well as the private contractor.

### Priority contract clauses for effective engagements

<table>
<thead>
<tr>
<th>Features</th>
<th>Cleaning of small drains and waste collection</th>
<th>Pre-monsoon drain cleaning</th>
<th>O&amp;M of vermicomposting plant</th>
<th>Door-to-door waste collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>User complaint redress</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Dispute resolution mechanism</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Mitigating payment risk</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Mitigating Termination risk</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
</tbody>
</table>

### Key gaps

- There is no mechanism to **handle complaints from users**.
- There is **no established dispute resolution mechanism** between the municipality and the private player.
- There is no clause to **manage delays in payments** (e.g. interest paid to the private sector).
- **Contracts lack termination clauses**. There is no notice period for either the private player or the municipality.

Source: Interviews with Ambajogai city officials, City contract documents
The process for implementing private engagements involves multiple stakeholders.

Note: Functions highlighted over the dotted line are done by both the stakeholders. *If tender value is over INR 1 Million, tenders need to be e-tenders

Source: Interviews with Ambajogai city officials
For existing contracts, the ULB manages the needs assessment as well as the technical and financial feasibility studies internally.

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Technical assessment</th>
<th>Financial assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Assess the existing level of infrastructure</td>
<td>• Set a financial benchmark for negotiations with the private contractor (often by estimating ULB’s expenditure on the same task)</td>
<td></td>
</tr>
<tr>
<td>• Determine the services required from the private contractor</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Person responsible</th>
<th>Technical assessment</th>
<th>Financial assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Engineer</td>
<td>• Engineer</td>
<td></td>
</tr>
<tr>
<td>• Sanitary inspector</td>
<td>• Sanitary inspector</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Key gaps</th>
<th>Technical assessment</th>
<th>Financial assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>• <strong>Staff shortage:</strong> The ULB has only one engineer and sanitary inspector, who are responsible for all technical and financial evaluations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• <strong>Limited technical knowledge of proposed solutions:</strong> The settled sewer and DEWATS plans are relatively new to the ULB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

“We would like to get help with preparing a detailed project report (DPR) to capture the technical and financial details for the settled sewer and DEWATS plan. On our end we can help assess sources for funding.”

- Ambajogai engineer

“We also need to assess how to structure the public private partnership for the sewerage and DEWATS plan. What are the profit expectations from the private player? What sanitation tax will we collect? What revenue can be expected from the sale of wastewater? These are all questions we have.”

- Ambajogai engineer

Source: Interviews with Ambajogai city officials
The procurement process is a simple open bid conducted annually where the contract is awarded to the lowest bidder

**Procurement process**

1. **Draft contract and place a request for proposals**
   - Chief office (CO) approves tender drafted by the Sanitary Inspector (SI)
   - Bids are then solicited local newspaper

2. **Receive bids from private players**
   - Private players submit their bids including:
     - Business license and registration
     - Pan card
     - Pricing quote
     - Tax records
     - Previous work experience

3. **Evaluate bids and sanction work order**
   - Received bids are evaluated by the General body and negotiated by the SI and CO
   - Contractors meeting the minimum specified criteria and offering the lowest bid are issued a work order

**Key Gaps**

- **Focus on lowest cost:** Service quality or level is not an award criteria. Current requirements include the most basic legal requirements, which are met by most bidders. As a result, contracts are awarded to the lowest bidder resulting in poor levels of service
- **Difficulty in finding bidders:** The vermi-compost contract was sent for three rounds of bidding before the minimum three contracts were received – indicating that the ULB was not meeting player expectations

"Other than cost, all the other criteria are satisfied by all the players. Hence generally we just select the lowest bidder. If the cost is too high then the ULB successfully negotiates to bring it down.”

- Ambajogai engineer

Note: (i) Bids over INR 1 million require e-tendering
Source: Interviews with Ambajogai city officials
Monitoring of contracts is not systematic and focused more in inputs rather than outputs or service levels

**Cleaning of small drains and waste disposal**
- The department has created a *prabhag* wise daily schedule for the private contractor
- Supervisor accompanies the contractor on his schedule
- Supervisor collects the signatures of each household where drain cleaning was done and submits them to the sanitary inspector on daily basis

**Pre-monsoon drain cleaning**
- No systematic schedule for monitoring, supervisor checks the progress of the work on an ad-hoc basis over the duration of the work (~ 1 month)

---

**Key Gaps**

- **Monitoring forms do not measure key output metrics:** For drain cleaning, the only monitoring form lists user signature testifying that a truck arrived in their locality. It does not measure key output metrics such as level of satisfaction or quality with cleaning etc.
- **There are no systematic monitoring tools for other contracts:** the pre-monsoon drain cleaning and O&M of the vermi-compost plant are inspected on an ad-hoc basis, and the findings are not recorded
- **Limited resources to meet established monitoring standards:** The burden of supervision for all activities falls entirely on the 3 supervisors. As per ULB monitoring practices, user signatures are expected from each household in the service areas yet the forms we collected seem have only ~10 – 15 signatures, suggesting that supervisors were unable to meet monitoring standards

“We have an extensive monitoring system in which we take signatures from each household in the area where work is done.”

- Sanitary Inspector

“The ULB can manage monitoring itself. It is one of our routine activities.”

- Chief Officer

Source: Interviews with Ambajogai city officials
Current monitoring forms are rudimentary, and do not measure service levels or outcomes

Form for user signatures for monitoring drain cleaning

Daily schedule for drain cleaning

Source: Interviews with Ambajogai city officials, City documents
The ULB needs support in undertaking assessments, developing contracts and monitoring mechanisms

**Current status and key gaps**

- Undertaken by sanitary inspector and ULB staff
- Annual management contracts prepared by the ULB with a monthly payment based on billed inputs
- Lowest bid meeting minimum criteria is chosen
- Self reported forms and form filled by ULB supervisors is tallied daily
- Monitoring forms focus on inputs

**Capacity building needed**

- Prepare technical and financial assessments for proposed solutions
- Develop a systematic contracting framework with which:
  - Links payment to explicitly monitored service levels or outputs
  - Clearly addresses risks affecting both the private and the public sector
- Strengthen current framework for bid evaluation to include metrics for quality and level of service delivery
- Draft a systematic monitoring framework that
  - Clearly measures outputs or outcomes
  - Is clearly tied to payment incentives
  - Can be effectively implemented by ULB staff

**Need for capacity building**

Source: Interviews with Ambajogai city officials, City documents
Contents

① City profile
② Current status of sanitation
③ Recommendation solutions
④ ULB institutional assessment and areas for capacity building
⑤ Financial capacity assessment
There are three accounts in the ULB budget, namely Revenue, Capital and Extraordinary

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenue account</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revenue Receipts</td>
<td>55.2</td>
<td>66.8</td>
<td>69.1</td>
<td>69.5</td>
<td>84</td>
<td>104.1</td>
<td>130.5</td>
</tr>
<tr>
<td>Revenue Expenditure</td>
<td>42.1</td>
<td>51.3</td>
<td>51.5</td>
<td>55.4</td>
<td>67.4</td>
<td>111.7</td>
<td>159.8</td>
</tr>
<tr>
<td><strong>Capital account</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital Receipts</td>
<td>54.4</td>
<td>50.1</td>
<td>38</td>
<td>30.3</td>
<td>64.3</td>
<td>150.7</td>
<td>201</td>
</tr>
<tr>
<td>Capital Expenditure</td>
<td>56.6</td>
<td>52.2</td>
<td>63.7</td>
<td>35.7</td>
<td>95.2</td>
<td>148.8</td>
<td>214.1</td>
</tr>
<tr>
<td><strong>Extraordinary account</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extraordinary Receipts</td>
<td>2.4</td>
<td>5.4</td>
<td>2.9</td>
<td>4.6</td>
<td>15.6</td>
<td>6.3</td>
<td>6.7</td>
</tr>
<tr>
<td>Extraordinary Expenditure</td>
<td>2.6</td>
<td>5.7</td>
<td>5.1</td>
<td>4</td>
<td>6.2</td>
<td>9.5</td>
<td>12.7</td>
</tr>
<tr>
<td><strong>Summary</strong></td>
<td>112</td>
<td>122.2</td>
<td>109.9</td>
<td>104.3</td>
<td>163.9</td>
<td>261.1</td>
<td>338.2</td>
</tr>
<tr>
<td><strong>Total Receipts</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Expenditure</strong></td>
<td>101.4</td>
<td>109.2</td>
<td>120.4</td>
<td>95.1</td>
<td>168.8</td>
<td>270</td>
<td>386.6</td>
</tr>
<tr>
<td>Closing Balance</td>
<td>33.7</td>
<td>46.8</td>
<td>36.3</td>
<td>45.6</td>
<td>40.6</td>
<td>31.8</td>
<td>-3.7</td>
</tr>
<tr>
<td><strong>Revenue account surplus (INR in million)</strong></td>
<td>13.1</td>
<td>15.6</td>
<td>17.6</td>
<td>14.1</td>
<td>16.6</td>
<td>7.5</td>
<td>-29.3</td>
</tr>
<tr>
<td><strong>Operating ratio</strong></td>
<td>0.76</td>
<td>0.77</td>
<td>0.75</td>
<td>0.80</td>
<td>0.80</td>
<td>1.07</td>
<td>1.22</td>
</tr>
</tbody>
</table>

**Revenue Accounts**
- Revenue receipts and expenditures are those related to day-to-day operations of the ULB
- Traditionally Ambajogai has maintained a revenue deficit, indicating good financial health

**Capital Accounts**
- Capital receipts includes grants received from state or central governments for the creation of capital assets
- Capital grants received from the state and central governments are usually tied to specific capital creation projects

**Extraordinary Accounts**
- This account includes receipts and expenditure which are temporary in nature and vary from year to year
- Revenue from these receipts is not predicted or used for the planning of future projects

Note: (i) Ratio of revenue expenditures to revenue receipts, core measure of financial health for a ULB
Source: Financing plan for Ambajogai, CEPT University
Ambajogai ULB is dependent on grants to fund its operational expenditures, however own-tax revenues form a considerable proportion.

Ambajogai ULB Revenue receipts
(As a % of average receipts between 2007-2011)

- Non-tax revenues like rent from properties, service charges, licence fees etc. make up a small portion of revenue receipts.
- Average municipal tax revenue accounted for ~40% of revenue receipts, and averaged to about ~INR 510 per capita in 2010-11.
- The two main sources of tax revenues are:
  - Property tax (INR ~ 449 per property per year in 2010-11, INR 11.4 million on an average over 2007-2011, 36% of total tax revenue)
  - Water tax (INR ~ 1500 per connection per year in 2010-11, INR ~20 million on an average over 2007-2011, ~60% of total tax revenue)
- High proportion of revenue from taxes is due to the high collection efficiency (82% of property tax and 88% of water tax in 2009-10).
- Revenue grants amount to INR ~ 35 million per year on an average from 2007-2011 constituting 44% of total revenue receipts.
- On average (2007-11) ~INR 3.4 million in grants was dedicated to solid waste, part of the 12th finance commission grants.

Note: (1) Total 2011 tax revenues divided by 2011 population, (2) Total consolidated tax revenue divided by number of properties, (3) Total water tax revenue divided by number of connections.

Source: City budget documents, CEPT University analysis.
Water supply and wastewater constitute more than ~1/3\textsuperscript{rd} of total revenue expenditure

Ambajogai ULB Revenue expenditure
(As a % of average receipts between 2007-2011, INR in million)

- “Others” includes expenditure on education, contributions as well as other miscellaneous expenses of the ULB
- Expenditure on general administration includes salaries of ULB employees, Pensions and gratuities
- Expenditure on water supply and wastewater is ~66% of total expenditure on public health and welfare
- Per capita expenses towards on WSS was INR ~574, against INR ~926 suggested by the HPEC in 2011

Source: City budget documents, CEPT University analysis
Ambajogai is expected to have an average surplus of INR ~10-15 million per year for investment going forward.

Forecast of Ambajogai ULB’s Revenue receipt and expenditure
(In million)

<table>
<thead>
<tr>
<th>Year</th>
<th>Actuals</th>
<th>Projected</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>1.6</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>15.5</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>17.6</td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>14.1</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>16.6</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>-7.6</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>-29.3</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>12.7</td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>13.5</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>14.2</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>14.9</td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>15.6</td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>16.4</td>
<td></td>
</tr>
<tr>
<td>2019</td>
<td>17.1</td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td>17.7</td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td>18.4</td>
<td></td>
</tr>
<tr>
<td>2022</td>
<td>18.9</td>
<td></td>
</tr>
</tbody>
</table>

Note: The projected revenue and expenditure is based on an estimated average growth rate.
Source: City budget documents, CEPT University analysis
Appendix
## Capital cost incurred in Integrated Fecal Sludge Management (IFSM) plan

### Refurbishment of septic tanks

<table>
<thead>
<tr>
<th>Cost of refurbishing 1 septic tank</th>
<th>650</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total number of septic tanks refurbished</strong></td>
<td><strong>808</strong></td>
</tr>
<tr>
<td><strong>Cost</strong></td>
<td><strong>525,370</strong></td>
</tr>
</tbody>
</table>

### Conveyance of fecal sludge

<table>
<thead>
<tr>
<th>Number of tanks to be cleaned per year</th>
<th>898</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of trips per day, for ~300 days</td>
<td>3</td>
</tr>
<tr>
<td>Number of honey sucker required</td>
<td>1</td>
</tr>
<tr>
<td><strong>Cost of truck</strong></td>
<td><strong>780,000</strong></td>
</tr>
</tbody>
</table>

### Treatment of collected septage

<table>
<thead>
<tr>
<th>Amount of septage treated per day (cu. m.)</th>
<th>10.5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total septage (15 days) (cu. m.)</strong></td>
<td><strong>157.9</strong></td>
</tr>
<tr>
<td>Area of one SDB (sq. m.)</td>
<td>120</td>
</tr>
<tr>
<td>Depth of septage (m)</td>
<td>0.3</td>
</tr>
<tr>
<td>Capacity per bed (cu. m.)</td>
<td>36</td>
</tr>
<tr>
<td><strong>Number of beds req.</strong></td>
<td><strong>4</strong></td>
</tr>
<tr>
<td><strong>Cost per bed</strong></td>
<td><strong>200,000</strong></td>
</tr>
<tr>
<td><strong>Cost</strong></td>
<td><strong>800,000</strong></td>
</tr>
</tbody>
</table>

### HH survey and septic tank assessment

<table>
<thead>
<tr>
<th>Cost of 1 HH survey</th>
<th>50</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong># of HH surveyed</strong></td>
<td><strong>2694</strong></td>
</tr>
<tr>
<td><strong>Cost</strong></td>
<td><strong>134,710</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cost of 1 HH survey</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong># of HH surveyed</strong></td>
<td><strong>2694</strong></td>
</tr>
<tr>
<td><strong>Cost</strong></td>
<td><strong>269,420</strong></td>
</tr>
</tbody>
</table>

### Total Cost

- **Total Cost** = **INR 525,370**
- **Total Cost** = **INR 810,000**
- **Total Cost** = **INR 800,000**

**Total Cost = INR ~2.5 Million**

Note: All costs in INR

Source: CEPT University analysis for Septage Management plan of Ambajogai
## Annual operational cost incurred in Integrated Fecal Sludge Management (IFSM) plan

### Conveyance of Fecal Sludge

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost (INR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of diesel (INR/L)</td>
<td>60</td>
</tr>
<tr>
<td>Fuel efficiency (KM/L)</td>
<td>10</td>
</tr>
<tr>
<td>Total distance travelled in a year (Km)</td>
<td>9,429</td>
</tr>
<tr>
<td>Total Cost</td>
<td>56,574</td>
</tr>
</tbody>
</table>

### Treatment of Collected Septage

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost (INR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of staff</td>
<td>3</td>
</tr>
<tr>
<td>Monthly salary</td>
<td>7,000</td>
</tr>
<tr>
<td>Total salary</td>
<td>432,000</td>
</tr>
<tr>
<td>Maintenance cost (5% of capital cost)</td>
<td>43,856</td>
</tr>
</tbody>
</table>

**Total Cost = INR 295,856**

### Annual Total Cost

**INR ~1.2 Million**

Note: All costs in INR; Source: CEPT University analysis for Septage Management plan of Ambajogai
# Water supply Census information

## Main Source of Drinking Water

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Source of drinking water</th>
<th>Ambajogai (No. of HH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tap water from treated source</td>
<td>13,153</td>
</tr>
<tr>
<td>2</td>
<td>Tap water from untreated Sources</td>
<td>238</td>
</tr>
<tr>
<td>3</td>
<td>Covered and uncovered well</td>
<td>104</td>
</tr>
<tr>
<td>4</td>
<td>Tubewell/Borehole</td>
<td>543</td>
</tr>
<tr>
<td>5</td>
<td>Handpump</td>
<td>177</td>
</tr>
<tr>
<td>6</td>
<td>Others</td>
<td>302</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>14517</strong></td>
</tr>
</tbody>
</table>

## Availability of tap water from treated source

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Tap water from treated source</th>
<th>Ambajogai (No. of HH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Within the premises</td>
<td>10,611</td>
</tr>
<tr>
<td>2</td>
<td>Near the premises</td>
<td>1,856</td>
</tr>
<tr>
<td>3</td>
<td>Away</td>
<td>686</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>13153</strong></td>
</tr>
</tbody>
</table>

Source: Census of India 2011
Thank You