Accelerating Urban Sanitation in India

Policy Evolution, Progress, Implementation Challenges and Research Questions

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1. Urban Transformation: India
Urban Transformation

India is the second largest urban system next to China

India is urbanizing fast
India’s urban population to increase

- From 350 mn today to 600 mn by 2031
- From 50 cities with population of 1 mn and above today to 87 by 2031

On average, 25 per cent of the population in Indian cities lives in slums.

Urban planning, urban infrastructure development and public service delivery of universal standards must address this challenge.
Cities and Economy
Cities and Economy

- **Engines of Growth** – over 60% contribution to the economy

- **Hubs** for enterprise, innovation, people and politics

- **Increasing dependence** of national / provincial economic growth on the productivity of cities
Indian Cities and the Economy
Contribution to GDP

<table>
<thead>
<tr>
<th>Year</th>
<th>Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980-81</td>
<td>47%</td>
</tr>
<tr>
<td>1990-91</td>
<td>55%</td>
</tr>
<tr>
<td>2000-01</td>
<td>60%</td>
</tr>
<tr>
<td>2021</td>
<td>73%</td>
</tr>
</tbody>
</table>

Efficient urban areas are essential for achieving growth and poverty reduction targets.

Source: MoUD, GOI
Livable and competitive cities

Efficient and World Class Cities

- No water-borne Disease -- quality of life
- Sustained GSDP Equitable Growth

Public Health

- World class infrastructure and high quality Municipal Services esp for the poor (WASH)

Local Economic Growth

Effective governance

Reliable, Continuous, High quality, Affordable
# Benchmarks: Water Supply

<table>
<thead>
<tr>
<th>Proposed Indicator</th>
<th>Benchmark</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Coverage of Water Supply Connections</strong></td>
<td>100%</td>
</tr>
<tr>
<td>Per capita availability of water at consumer end</td>
<td>135 lpcd</td>
</tr>
<tr>
<td>Extent of metering of water connections</td>
<td>100%</td>
</tr>
<tr>
<td>Extent of non revenue water</td>
<td>15%</td>
</tr>
<tr>
<td><strong>Continuity of Water Supply</strong></td>
<td>24X7</td>
</tr>
<tr>
<td>Efficiency in redressal of customer complaints</td>
<td>80%</td>
</tr>
<tr>
<td>Adequacy of Treatment and Disinfection and Quality of Water Supplied</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Cost recovery in water supply services</strong></td>
<td>100%</td>
</tr>
<tr>
<td>Efficiency in collection of water supply related charges</td>
<td>90%</td>
</tr>
<tr>
<td>Number of persons receiving less than 70 lpcd</td>
<td>0%</td>
</tr>
</tbody>
</table>
## Benchmarks : Sewerage

<table>
<thead>
<tr>
<th>Proposed Indicator</th>
<th>Benchmark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coverage of Waste Water Network Services</td>
<td>100%</td>
</tr>
<tr>
<td>Collection Efficiency of Waste Water Network</td>
<td>100%</td>
</tr>
<tr>
<td>Adequacy of waste water treatment capacity</td>
<td>100%</td>
</tr>
<tr>
<td>Quality of waste water treatment</td>
<td>100%</td>
</tr>
<tr>
<td>Extent of reuse and recycling of treated waste water</td>
<td>20%</td>
</tr>
<tr>
<td>Extent of cost recovery in waste water management</td>
<td>100%</td>
</tr>
<tr>
<td>Efficiency in redressal of customer complaints</td>
<td>80%</td>
</tr>
<tr>
<td>Efficiency in collection of sewerage charges</td>
<td>90%</td>
</tr>
<tr>
<td>Extent of Sewer House Connection</td>
<td>100%</td>
</tr>
<tr>
<td>Coverage of Toilets</td>
<td>100%</td>
</tr>
</tbody>
</table>
## Benchmarks : Solid Waste Management

<table>
<thead>
<tr>
<th>Proposed Indicator</th>
<th>Benchmark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household level coverage of Solid Waste Management services</td>
<td>100%</td>
</tr>
<tr>
<td>Efficiency of collection of municipal solid waste</td>
<td>100%</td>
</tr>
<tr>
<td>Extent of segregation of municipal solid waste</td>
<td>100%</td>
</tr>
<tr>
<td>Extent of municipal solid waste recovered/recycled</td>
<td>80%</td>
</tr>
<tr>
<td>Extent of scientific disposal of municipal solid waste</td>
<td>100%</td>
</tr>
<tr>
<td>Extent of cost recovery in solid waste management services</td>
<td>100%</td>
</tr>
<tr>
<td>Efficiency in redressal of customer complaints</td>
<td>80%</td>
</tr>
<tr>
<td>Efficiency in collection of user charges</td>
<td>90%</td>
</tr>
<tr>
<td>Extent of processing and treatment of MSW</td>
<td>100%</td>
</tr>
</tbody>
</table>
Sanitation

- Lagging development indicator causing serious public health, environmental and social consequences

- Neglected for various reasons

- Viewed as a private provision

- Sanitation means dealing with solid waste; less attention to fecal waste management

- Sewerage is considered as the only solution; especially in big cities

- Limited uptake due to high capex; dysfunctional due to lack of maintenance and lack of capacity
2. Urban Sanitation: Status
Scale of challenges: India

**MDG Goal/Target/Indicator** | **India’s Baseline - 1990** | **India’s Target for 2015** | **India’s achievement in 2012**
--- | --- | --- | ---
Safe drinking water (T) | 70 | 85 | 93
Improved Sanitation (T) | 18 | 59 | 36
Improved Sanitation (U) | 50 | 75 | 60
Improved Sanitation (R) | 7 | 71 | 25

Source: MOPSI 2013
Lack of credible data and evidence on health impact of sanitation
Urban Sanitation provision in India: Choices people make
TWO PIT POUR FLUSH COMPOST TOILET
75% of fresh water resource which is being used for drinking purpose is contaminated.
Sewage contributes 60% of total pollution load.
93% of total domestic wastewater is generated in Class-I cities.
Ref.: CPCB Report, 2009
OD not restricted to slums alone, higher slum and non slum OD in lesser urbanized states

Census 2011
Policy Response : Evolution
History of Sanitation Policy and Programme Development, close link with sector developments internationally

1947 '80 '86 '90 '93 '95 '99 2000 '01 '03 '04 '05 '07 '08 '10 '12 '14 '15

- International Water & Sanitation Decade
- Millennium Summit & MDG focus on WATSAN
- International Year of Sanitation. Part of Water for Life Decade
- Increased national-level interest in (urban) sanitation

Recent Policy evolution: Urban Sanitation

- **Pune Declaration 2004**: Past some central and a number of EAP sanitation projects. Innovations in Tamil Nadu and Maharashtra. MoUD Workshop lead to a declaration on Open Defecation Cities, which was followed with a Task Force to study and recommend a draft Policy.

- **JnNURM 2005 - 15**: First National Flagship Urban Scheme. Reform based project funding grants with state shares. WatSan ~ 70% funding and sanitation, only underground sewerage and WWTPs, no toilets, no innovations.


- **Swatch Bharat Mission (Urban) 2014**: SBM (Urban) is one of a set of urban schemes. Not reform linked. First UD scheme targeting HHs as beneficiaries. IHL GoI subsidy of Rs 4000/-; Community toilets 40% as Viability Gap; Public toilets – no central grant funding (private/CSR support), Swachh Bharat Kosh (Private contributions).
Significant Change in Strategy

Entitlement based, city size and sector based programs

JNNUR M (2005-2015)
23 Reforms, Large city focus, large grant funding

Current Urban Strategy

100 SMART Cities
Competitions

500 NUDM Cities
Reforms

4041 SBM Cities
Basic Sanitation is delinked from reforms; Individual responsibility stressed on, FSM funded in larger cities (60% of urban population)
Recognition for OSS vis a vis
Sewerage system

From Toilet Provision to City-wide Sanitation
Swachh Bharat Mission (Clean India Mission)

Sanitation is more important than Independence
+ 30 billion USD programme
“...We are launching Swachh Bharat Mission, a massive mass movement that seeks to create a Clean India. Cleanliness was very close to Mahatma Gandhi's heart. A clean India is the best tribute we can pay to Bapu when we celebrate his 150th birth anniversary in 2019...”

“If we collectively make it a people’s movement then I don’t see any reason why we will not be counted among the clean cities and nations of the world”

“... the work of cleaning India cannot be done by one person, or by Government functionaries alone – it has to be done by 125 crore people....”

“I urge every one of you to devote at least hundred hours every year, that is two hours every week towards cleanliness”
• **SBM (Urban) – Objective Statement**
  
  « Elimination of open defecation  
  « Eradication of Manual Scavenging  
  « Modern and Scientific Municipal Solid Waste Management  
  « To effect behavioral change regarding healthy sanitation practices  
  « Generate awareness about sanitation and its linkage with public health  
  « Capacity Augmentation for ULB’s  
  « To create an enabling environment for private sector participation in Capex (capital expenditure) and Opex (operation and maintenance)
Individual Toilets

Community Toilets

Public Toilets

Solid Waste Management

IEC & Public Awareness

Capacity Building
Key provisions

- Incentive to build individual toilets – Rs 4000 (65 USD)
- Viability gap for Community and public toilets
- Swachh Bharat Khosh (Fund)
- Swachh Bharat Tax (national) – 0.5 %
- National Campaign – Mass movement across political spectrum / civil society
- Capacity building at municipal / state level
- Deployment of corporate social responsibility – Mandatory
SWACHH VIDHYALA (CLEAN SCHOOLS)
Program is aligned with national missions
75% of all schools in India are Government and Govt. aided schools

1.1 million Schools
110 + million Children
1000 children die everyday in India because of diarrheal diseases

Poor Quality Water and Sanitation and Hygiene
ASER 2014 SHOWS..

76% schools have drinking water  
24% don’t

65% schools have useable toilets  
35% don’t

56% schools have useable girls’ toilets  
44% don’t
55% of schools do not have hand washing facility near toilet/urinal

Source: DISE 2013-14
WASH IN SCHOOLS

1. **Drinking Water**
2. **Toilets**
3. **Handwash Station**

**Operation and Maintenance**

**Capacity Building**

**Swachh Vidyalaya Package**
Progress
SBM-Urban

**Individual Toilets**
- Constructions Achieved: 24,05,066
- Completion: 36%
- Mission Target: 66,42,221

**Community Toilets**
- Constructions Achieved: 76,744
- Completion: 30%
- Mission Target: 2,51,829

**Public Toilets**
- Constructions Achieved: 22,293
- Completion: 9%
- Mission Target: 2,55,760

**100% Door to Door Waste Collection**
- Wards Achieved: 82,609
- Completion: 48%
- Total Wards: 39,571

**Open Defecation Free (ODF)**
- No. of cities: 405

**100% Door to Door Waste Collection (D2D)**
- Total Wards: 39,571

**Waste to Energy (W2E)**
- Current Waste to Energy Production (Mega Watts): 88.4

**Waste to Compost (W2C)**
- Waste to Compost Production for the year 2016 (Metric Tons): 17,018.8

Source: SBM –G and SBM – U website, accessed on October 7, 2016
Key achievements (1-5)

• Political advocacy – 4
• Peoples campaign – 3
• Leveraged public sector finance at the state and local level (top up incentives) – 4
• PPPs in sanitation gained traction (large san market) - 3
• Significant increase in CSR funding - 4
• City wide approach (OD Free) - 3
• Convergence with other main interventions like Smart city and Heritage city /Amrut – 3
• Monitoring and learning – institutionalized – 3
Key achievements (1-5)

• Innovative approaches explored - 2
• Importance of BCI recognized – 3
• Capacity building of stakeholders – 2
• Social entrepreneurship - 2
• Children as agents of change – 2
• Acceptance of OSS vis a vis Sewerage
Leveraging public finance for sanitation

A.P – Rs 11,000
Telangana – Rs 8000
Maharastra – Rs 14000
Bihar – Rs 8000
Emergence of social enterprise models
Pune Sanitation Drive

- Community toilets in low income areas
- More than 15,000 seats
- Capex by PMC
- O & M – community – Rs 15-20 /family /month
Community managed toilets - SHGs

- CMT is Community Managed Toilets.

<table>
<thead>
<tr>
<th>Particulars (in Rs.)</th>
<th>Community – managed toilets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average monthly income per toilet</td>
<td>Supported by WAVE (Rs.)</td>
</tr>
<tr>
<td>Average monthly expenditure per toilet (breakdown below)</td>
<td>7300</td>
</tr>
<tr>
<td>Electricity</td>
<td>2700</td>
</tr>
<tr>
<td>Cleaning materials</td>
<td>1300</td>
</tr>
<tr>
<td>Repair and replacement</td>
<td>900</td>
</tr>
<tr>
<td>Salary for the toilet caretakers</td>
<td>2400</td>
</tr>
<tr>
<td>Community toilets with a bank account (%)</td>
<td>98%</td>
</tr>
<tr>
<td>Community toilets with accounts kept on site (%)</td>
<td>95%</td>
</tr>
</tbody>
</table>
Child friendly toilets
Community toilet inauguration and handing over to CBOs
Community Toilet linked with DEWATS
Challenges and opportunities

1. Target driven – mission mode approach with limited focus on sustainability
2. Potential Slippage – technical, water security, bad masonry
3. Conversion of insanitary toilets
4. Maintenance of created assets
5. Going beyond toilets – focusing on sanitation/health outcomes
6. FS/Septage disposal – Institutionalized open defecation
7. Capacity gaps at every level
8. Institutional accountability at the municipal level
9. Public finance reforms for sustenance
10. Sustaining BCI
11. Sustaining political capital for sanitation
12. Lack of robust real time monitoring
Slippage
ODF towns – Risk of slippage

• While some urban areas in the past have achieved OD free status through provision of toilets, the sustainability of service delivery is not maintained over the period. Due to this the sanitation coverage of habitations has become uncertain and changes with time and habitations move back and forth of full coverage. **Slippage is the term often used to reflect unsustainable service delivery of sanitation.**

• Technical and non technical reasons
Slippage

- Poor quality of construction - low margins for contractors, corruption, theft of materials, etc.
- Poor monitoring on construction quality of toilets, post-construction usage of toilets
- Cost of evacuation of pits – eventually leading to OD
- Water security related issues
- High water table
- Weak BCI at the local level

Source: Field studies conducted for Sustaining ODF in Five States by ASCI, 2016
Lack of child friendly designs
Weak Operation and Maintenance
Sanitation is beyond toilets
Experience shows that provision of toilets and toilet technology alone cannot address sanitation problems.
WASH IN SCHOOLS

- Drinking Water
- Toilets
- Handwash Station

- Operation and Maintenance

- Capacity Building

Swachh Vidyalaya Package
Child-Friendly Design

• Do the facilities address special gender related needs?
  – Privacy for changing
  – Menstrual hygiene management
  – Water for hygiene
Positive impact of hand washing

Handwashing with Soap
% reduction in diarrhoea morbidity in children under 5 - outcomes of various meta-analyses

<table>
<thead>
<tr>
<th>Study</th>
<th>Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curtis and Cairncross (2003)</td>
<td>44</td>
</tr>
<tr>
<td>Fewtrell (2005)</td>
<td>44</td>
</tr>
<tr>
<td>Cochrane (2008)</td>
<td>43</td>
</tr>
<tr>
<td>I3E (2009)</td>
<td>37</td>
</tr>
<tr>
<td>CHERG (2010)</td>
<td>48</td>
</tr>
</tbody>
</table>
Institutionalizing open defecation

Addressing environmental sanitation issues through effective FSM

ODF+
Sanitation Systems

Non-Sewered Sanitation System

Sewered Sanitation System

Fecal Sludge

Wastewater

Fecal Sludge Management

De-Centralized Wastewater Treatment System (DEWATS)

Centralized Wastewater Treatment

Decentralized Sanitation
Fecal Sludge Management

FSM

User Interface → Excreta Storage → Emptying and Transport → Treatment → Use or Disposal
What is SEPTAGE – also called Faecal Sludge

It is raw, partially digested semi-solid slurry that has been contained over a period of time, the source of which is human excreta or black water.
Typical disposal location
GREATER WARANGAL MUNICIPAL CORPORATION

Preamble to the Council

RocNo.F1/5425/2015


***

The Greater Warangal Municipal Corporation (GWMC) is mandated with the function of “public health, sanitation, conservancy and solid waste management” in accordance with the Constitutional Amendment Act, 1994. The Municipal Corporation Act has provided comprehensive powers to the Council and Commissioner for effective collection, transportation, treatment and disposal of sewage (the definition of which includes septage) within municipal jurisdiction.
# Septage Management and Decentralized Waste Water Management

## Septage Management – Key components of regulatory framework

<table>
<thead>
<tr>
<th>Design and Construction of Septic Tanks</th>
<th>Conversion of Insanitary Latrines into Sanitary Latrines</th>
<th>Pumping and Desludging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Septage Transportation</td>
<td>Septage Treatment, Disposal and Reuse</td>
<td>Information, Education and Communication (IEC)</td>
</tr>
<tr>
<td>Training Programs</td>
<td>Record keeping and MIS</td>
<td>Help Line for Septage Management</td>
</tr>
</tbody>
</table>
Faeal Sludge Treatment Plant
Challenges and opportunities

1. Target driven – mission mode approach with limited focus on sustainability
2. Potential Slippage – technical, water security, bad masonry
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11. Sustaining political capital for sanitation
12. Lack of robust real time monitoring
Effective BCI
Accelerating Urban Sanitation

What next?
Urban Sanitation in India

Policy

BCI and Capacity

Science and Innovation
Innovations in Sanitation Provision
Late mover advantage
Technology is rapidly evolving
Reinventing traditional approaches

Biotechnology Industry Research Assistance Council (BIRAC), A Government of India Enterprise

Announcing a Grand Challenge India Funding Opportunity “Reinvent the Toilet Challenge - India”
Focus areas – Technology led solutions

• Technology of toilets
  – Lowering the cost ; improving the performance in different regions
  – Lowering water usage
• School toilets – 1.4 million – functionality issues
• Septage management – Treatment and disposal
• Waste water recycling – decentralized models
• Skilling in technology
• Social entreprenuership
Disruptive innovations

**si3 challenge**

| sanitation - innovate | incubate | initiate |

**DO YOU HAVE A DISRUPTIVE IDEA TO ACCELERATE SANITATION IMPROVEMENT IN WARANGAL?**

Propose ideas for toilet design, ICT intervention, elimination of open defecation, technology for septage management, solid waste management, monitoring and behavior change to bring radical improvement in urban sanitation.

Top competitors will receive a cash prize, mentorship support, funding support to test the idea, and a platform for global recognition.

**find out more and register at**

[si3challenge.com](http://si3challenge.com)

<table>
<thead>
<tr>
<th>event</th>
<th>date</th>
</tr>
</thead>
<tbody>
<tr>
<td>idea submission</td>
<td>23rd October</td>
</tr>
<tr>
<td>shortlist release</td>
<td>6th November</td>
</tr>
<tr>
<td>proposal submission</td>
<td>18th December</td>
</tr>
<tr>
<td>final presentation</td>
<td>14th January</td>
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