Addressing the Urban Sanitation Challenge

Ground realities and emerging opportunities

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Symposium on Urban Sanitation Challenges in the Developing World

BIRAC, Bangalore Nov 6 2014
Challenge of Open Defecation

Globally, 100 million people in urban areas resort to open defecation
Of these 48% are in India

India story – faltering on sanitation!

Share of urban population for India is **11%** as compared to India’s share **47%** of urban population resorting to open defecation

% share of urban population - versus - % of urban population resorting to OD

**Challenge of waste water**

- **JMP-WHO** data for 2010 suggests **limited access to sewerage connections across most regions** except ECA.

- In India – only 5 cities have universal sewerage systems whereas **nearly 1200 cities have fully onsite systems**.

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**Access to sewerage services in LAMIC**

**Different types of sanitation systems in urban India**

*Source: IBNET(2011), WHO (2010)*

*Source: CEPT University, PAS Project*
Global goals and targets beyond 2015

From July 2013 Report of the UN Secretary General

A life of dignity for all: accelerating progress towards the Millennium Development Goals and advancing the UN development agenda beyond 2015

“No person should go hungry, lack shelter or clean water and sanitation, face social and economic exclusion or … These are human rights, and form the foundations for a decent life.” (p.3)

From JMP’s Post-2015 group for WASH

✓ Universal access to adequate sanitation at home (2040)
✓ Complete elimination of open defecation (2030)
✓ Sustainability and progressively eliminating inequities

From UN- Open Working Group on SDGs July 2014 zero draft

✓ Proposed Goal 6: Ensure availability and sustainable use of water and sanitation for all
✓ By 2030 universal access to safe and affordable water and adequate sanitation and hygiene for all
✓ Improve water quality by reducing pollution, doubling wastewater treatment and increasing recycling and reuse by x% globally
Why is urban sanitation important?

- Much greater negative externality of poor sanitation in urban areas
- Significant public health impacts of open defecation – stunting, outbreaks of diseases: **higher in urban due to density**
Increasing priority of government

“Pehle shauchalaya, phir devalaya...” “First toilets, then temples...”

Narendra Modi, Prime Minister of India
At a function organized in New Delhi for the youth, October, 2013

The Union Cabinet approval to an ambitious 5-year Swatchh Bharat Mission covering all 4041 statutory towns starting Oct 2, 2014 with a focus on elimination of open defecation and ....

Swatchh Bharat Programme for Urban Areas: PIB, Government of India Cabinet, September 24 2014
There are large gaps in urban sanitation service chain

<table>
<thead>
<tr>
<th>Access to type of sanitation for HH in urban India (in '000 HH)</th>
<th>Containment and Conveyance</th>
<th>Treatment of waste water in urban India²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open defecation: 67,025</td>
<td>Pit toilets: 54,778</td>
<td>Untreated waste: 79%</td>
</tr>
<tr>
<td>Community toilets: 6%</td>
<td>Sewerage connections: 44%</td>
<td>Treated waste: 21%</td>
</tr>
<tr>
<td>Individual toilets: 82%</td>
<td>Septic tanks: 45%</td>
<td></td>
</tr>
</tbody>
</table>

37 million practice open defecation in urban India

28 million people with individual toilets use unsanitary/ unimproved toilets

30,004 MLD untreated wastewater is discharged in water bodies or on land

Note: (1) Others category includes census categories of “pour flush toilets-other systems, night soil disposed intro open drain and latrines serviced by humans and animals”, (2) based on “Status of Sewage Treatment in India” report by Central Pollution Control Board of India (CPCB), 2005

Source: Analysis of access, and containment and conveyance is based on information from Census of India 2011
## Service components in urban sanitation

<table>
<thead>
<tr>
<th>Goals of improved sanitation</th>
<th>Service components in the value chain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>User interface</td>
</tr>
<tr>
<td>Access</td>
<td>Waste Management</td>
</tr>
<tr>
<td>Equity and access</td>
<td></td>
</tr>
<tr>
<td>Public health</td>
<td></td>
</tr>
<tr>
<td>Environment</td>
<td></td>
</tr>
</tbody>
</table>

Major Challenges in Urban Sanitation

- **Access and equity**
  - Eliminate open defecation
  - Ensure universal access to adequate sanitation

- **Waste water management**
  - Treatment of waste water /feecal sludge – collection, conveyance and treatment
  - Reuse of treated waste water and sludge

- **Financing and governance**
  - Institutional capacity at local level, regulation
  - Financing options and mechanisms
Eliminating open defecation
Progress on MDG – missing the target?

Gap in meeting the MDG target

Basic access increased from 50% to 60%

OD still high at 13%

Source: Projections by PAS Project based on data from WHO-UNICEF Joint Monitoring Program, 2013 Update
Progress on new ‘SDG’ – by 2030 / 2040?

Estimated proportion of the population using improved sanitation and population resorting to OD

- **Policy changes needed for universal improved sanitation by 2040**
  - The rate of increase for ‘improved sanitation at home’ will need to increase significantly – double/triple
  - Need to convert community toilets by promoting sharing by 5 households/families

Based on past trends **open defecation from urban India is likely to be eradicated by 2028.**

Source: Projections by PAS Project based on data from WHO-UNICEF Joint Monitoring Program, 2013 Update
Latent demand?

Two main reasons for not having “own toilets” in our cities”

1. Lack of space to build an own toilet
2. Lack of affordability to meet the toilet costs

Source: Based on household surveys in Gujarat and Maharashtra done under he PAS Project at CEPT University in 2010.
Latent demand for “Own toilets”

Based on the 2011 Census of India, there is high latent demand for ‘own toilets’ in urban India at 14.7 million households.

(This could be much higher given the definition used in Census)

Two-thirds of this demand is in “non-slum” areas.
Demand led scheme for improved sanitation

Support to Wai & Sinnar for developing Demand Based Own Toilet Scheme

- Each household to be provided with a subsidy of INR 5000 per household for individual toilets or toilets shared by up to four households
- In our surveys, households expressed a willingness to contribute between INR 3000 – 4000 upfront for a toilet
- Given this willingness to pay, households will be able to afford a toilet if 3 – 4 of them share a toilet

<table>
<thead>
<tr>
<th>Scheme details</th>
<th>Number of households sharing toilet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Households (Subsidy - INR 5000/HH)</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Cost per toilet (in INR)</td>
<td>$30,000</td>
</tr>
<tr>
<td>Subsidy per toilet provided by the ULB</td>
<td>$5000</td>
</tr>
<tr>
<td>Effective cost per HH</td>
<td>$25,000</td>
</tr>
</tbody>
</table>

Unlocking the latent demand through a partial incentive subsidy scheme...

1. Dissemination of scheme and receiving applications
   - Introduce and disseminate the scheme
   - Ward level meetings headed by the councilors
   - Through newspapers
   - Advertisement at public places
   - Announcement

   - Set up inquiry desks (ID) at panchayat level / city level
   - 5 inquiry desks at 5 grama panchayats or 1 desk at ULB office
   - Provide detailed information about the scheme to the citizens

   - Give out application forms
   - Interested households to collect application forms from ULB office
   - ULB staff to maintain records in the given format

   - Submission of filled and signed application forms
   - Households to submit applications along with required documents. ULB to collect same and maintain records

2. Shortlisting of beneficiary
   - Assess and shortlist applications
     - ULB to collate/compute data in the given format and develop a city level data based on applications received
     - ULB to assess applications through deskwork to categorise shortlist on the basis of their authenticity/feasibility
   - On ground inspection of shortlisted applications
     - ULB to inspect on ground possibility of construction of a toilet with septic tank as per given specifications/ standards
   - Finalize list of approved applications
     - ULB to finalize list of approved applications based on deskwork and actual inspection
   - Publish list of approved applications
     - ULB to display list of approved applications at ULB office and publish in the newspapers that it is displayed at the ULB office

3. On-ground Implementation
   - The scheme can be results-based with the involvement of an external verification agency
   - ULB to collate and compute data in the given format and develop a city level data based on applications received
   - ULB to assess applications through deskwork to categorise/shortlist on the basis of their authenticity/feasibility
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Addressing affordability constraint

- Partial subsidy through a demand based scheme at city level can address affordability concerns to some extent
- Household surveys suggest that most households that lack own toilets will require access to credit to build a toilet. There is some willingness to take a loan to build a toilet
- How do we get potential lenders to lend in a city that develops a local city level program?
Options for waste water management
Sanitation systems in Urban India

- Only 5 cities are reported to have 100% sewerage system
- Nearly 1200 cities have fully onsite sanitation systems

**76%** of cities in India are fully dependent on **on-site sanitation systems**

**24%** are dependent on **mixed sanitation systems**

Source: Based on the SLB data submitted to GOI by 16 states covering 1564 cities
Onsite sanitation – emerging questions

38.2% URBAN HHs HAVE SEPTIC TANKS

Are septic tanks linked to soak pits
Are they built as per Codes / Specifications?
How often are they cleaned?
Where does the effluent flow?
What happens to the SLUDGE?
Support to Citywide Strategies

CSP- Support to small and mid-sized cities

These cities were selected by the Maharashtra Jeevan Pradhikaran and the Water Supply and Sanitation Department of Maharashtra for the development of City Sanitation Plans (CSPs) with the support of CEPT University.

Support to cities in state of Maharashtra, India

City Sanitation plan options for the cities

Citywide Settled Sewerage System

1. Regular refurbishment of old community toilets
2. Construction of wastewater treatment facilities
3. Access optimization and integration

Citywide Onsite Sanitation System

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

Mix of Settled Sewerage and Onsite Sanitation system

Citywide sanitation improvement plans with non-conventional systems that would have the same outcomes

Key Activities in Preparation of City Sanitation Plans

Based on local priorities the following solutions have been short-listed for each city

Implementation of citywide solutions based on local priorities
Existing situation in cities

Existing Pit and Septic tank with drain field

Open / covered drains

No conveyance system in new developments

No treatment of fecal sludge

Into river or natural drain

Dumping along with solid waste

Lack of 100% coverage of conveyance system

Lack of treatment facility

Lack of scientific disposal of septage

Old city area - Inadequate primary treatment but good conveyance through open drains

New developments - Improved primary treatment through septic tanks but no drains or have soak pits

User interface

Collection

Conveyance

Treatment

Reuse / Disposal

Missing links in Sanitation value chain

EXISTING SANITATION VALUE CHAIN

Pour flush latrines

Septic tanks / Pits

Open / Closed drains

No treatment

Natural Drain / Into river
Existing Sanitation situation in small cities
**Septage collection**: Inappropriate design and location of household septic tanks often makes access difficult for regular cleaning and emptying.

*Individual toilets*
- Septic tanks are below the toilets and don't have access.
- Inaccessible septic tanks with sealed tops.
- Septic tanks often empty into drains.

*Community toilets*
- In many toilets, septic tanks located behind the complex.
- 2 Chambered septic tanks located behind community toilets.
- Newer toilets have 2-3 chambered septic tanks with access covers.

Source: City Sanitation Plan, PAS Project – CEPT University
### Wastewater collection and conveyance: Current issues

<table>
<thead>
<tr>
<th>Effluent and grey-water being discharged into drains</th>
<th>Widespread clogging of drains</th>
</tr>
</thead>
</table>

Source: City Sanitation Plan, PAS Project – CEPT University
### Current status of disposal of wastewater and septage in cities

<table>
<thead>
<tr>
<th>Wastewater dumps into the river</th>
<th>Septage is disposed off in the open</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Wastewater" /> <img src="image2.png" alt="Wastewater" /> <img src="image3.png" alt="Wastewater" /></td>
<td><img src="image4.png" alt="Septage" /> <img src="image5.png" alt="Septage" /> <img src="image6.png" alt="Septage" /></td>
</tr>
</tbody>
</table>

Source: City Sanitation Plan, PAS Project – CEPT University
End-to-end integrated fecal sludge management (IFSM)

**Current value chain**
- Pour flush toilets
- Septic tanks
  - Septic tanks lack manhole covers
  - Septic tanks are not of standard size
  - No database on septic tanks for properties
- Suction emptier truck
  - Only 2-4% of septic tanks cleaned annually
- No treatment facility
- Disposed off on dumping site

**Proposed value chain**
- Pour flush toilets
- Septic tanks
  - Providing access manhole covers to allow regular cleaning
  - Enforcing regulations on septic tanks design
  - Database of properties with septic tanks
- Suction emptier trucks
  - Preparing a schedule for period cleaning of septic tanks, to ensure that all septic tank are cleaned at least once in 3 years
  - Enforcing regulations and penalties for periodicity of septic tank cleaning and safe handling of sludge
  - Payment using local taxes using escrow mechanisms
- Sludge drying beds
  - Installing fecal sludge drying beds for the treatment of fecal sludge
- Revenue from compost
  - Safe dumping of treated fecal matter and/or the sale of septage at a fixed rate to nearby farms or agro-businesses
From complaint redressal to a regular IFSM service

<table>
<thead>
<tr>
<th>Current septage management practice</th>
<th>Recommended septage management practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>~2-4% of tanks cleaned per year (once in &gt;8-10 years)</td>
<td>~33% of tanks cleaned per year (once in 3-5 years)</td>
</tr>
</tbody>
</table>

**Current barriers**

1. Cleaning is done on-call by the household, who do not see the need for regular cleaning

   The cleaning services of the ULB are currently treated as a complaint redressal system for overflowing septic tanks rather than a regular cleaning and maintenance service

2. Each town has only 1 truck, owned and operated by the ULB

3. Households pay ~INR 400-1000 to get tanks cleaned, but only once in >8-10 years when the tanks overflow

**Proposed solution**

1. 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

2. Each town will get an additional 1-3 trucks to meet service standards, which will be operated by a private player

3. Local taxes levied by the ULB as per municipal act \(^1\) will be used to recover the operating expenses for regular cleaning

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Note (1) Maharashtra Municipal Councils, Nagar Panchayats and Industrial Townships Act, 1965, Chapter IX: Municipal taxation, Section 108
Good risk mitigation and allocation can attract good contractors and help reduce contract price

**Risk mitigation:** There are several types of risks that must be managed across the lifecycle of any public private partnership

<table>
<thead>
<tr>
<th>Phase</th>
<th>Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project planning and</td>
<td>Commissioning risk, Demand risk, Performance risk, Cost escalation,</td>
</tr>
<tr>
<td>development</td>
<td>Design risk, Payment delay and default</td>
</tr>
<tr>
<td>Construction phase</td>
<td>(SDB construction and septic tank rehabilitation)</td>
</tr>
<tr>
<td>Operation</td>
<td>(Cleaning of septic tanks and operation of SDBs)</td>
</tr>
</tbody>
</table>

Several risks involved during lifecycle of the project, where PPP is involved. These need to be addressed

**Risk mitigation:** Private players highlighted a number of concerns with public private partnerships that need to be addressed

<table>
<thead>
<tr>
<th>Risk</th>
<th>Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Termination</td>
<td>The contract should have a clause defining a 3 month notification period in case of termination. It should also have a dispute resolution mechanism.</td>
</tr>
<tr>
<td>Delayed payments</td>
<td>Ideally, bills should be cleared in 30 days. And for late payments, interest should be paid at the rate of 8% per annum.</td>
</tr>
<tr>
<td>Transparent procurement</td>
<td>We would rather not deal with the ULB directly, there are always issues with internal politics. If there is a mediator in between then we would be interested.</td>
</tr>
<tr>
<td>Cost escalation</td>
<td>For a fixed-fee contract for regulated schedule, we cannot offer 24 hour emergency service. We will only work 8 hours a day, otherwise it is likely that we will over-use our truck.</td>
</tr>
<tr>
<td>Performance risks</td>
<td>Another key issue is the escalation of fuel costs. The contract should clearly account for that.</td>
</tr>
<tr>
<td>Performance risks</td>
<td>If we work on a regulated schedule, it will be difficult to get household signatures. That will become complicated, and I don’t want my payment to suffer.</td>
</tr>
<tr>
<td>Performance risks</td>
<td>I have tried to do a regulated schedule on my route, but that has been difficult. People always say, “come back later”, and it falls apart.</td>
</tr>
</tbody>
</table>


Concerns about addressing the risks were raised by private sector during interactions
Financing options for sanitation
Leveraging funds for making cities ODF

- **Demand led schemes**
  - Active participation of state and urban local governments with locally led schemes with applications from households
  - Partial subsidies to unlock latent demand

- **Leverage limited public funds by exploring innovative new sources of funds**
  - Facilitate access to affordable credit for all households
  - Policy changes to increase credit flows – Explicit focus on sanitation in Priority Sector Lending (PSL)
  - Explore new sources of funds
Evidence on household finance for sanitation

Most MFI and HFI records show 99%+ repayment record

A number of MFIs have provided toilet loans

- Guardian has supported over 27000 households with toilet loans
- Water.org support to 20 MFI partners
- ESAF, SKSRDP, Grameen Koota have also provided sanitation loans

Besides MFIs, there are other institutions

- Cooperative sector
  - Coop banks, and Coop credit societies
- Scheduled commercial Banks
  - housing improvement loans SBI, HDFC Bank, etc.
- HFIs –
  - housing improvement loans e.g. GRUH, others
But, additional funds are needed

- High potential demand in the country for household level sanitation finance (credit) – Loan fund of ~Rs 20,000 crore - to achieve full coverage of own toilets

- In the past availability from public funds (GoI’s ILCS, state government programme – e.g. Nirmal Gujarat, MSNA etc) was less and failed to leverage additional funds – Swatchh Bharat Program for urban areas envisages a partial subsidy of ~ Rs 5000 (allocation ~Rs 5000 crore) – so need to leverage additional funds

- MFI lending is limited and faces constraints: high costs, need to consider sanitation as part of ‘productive assets’, difficulty in meeting mobilisation costs, added costs of new product and monitoring
Funds are needed for three purposes

- **Partial Subsidies** to unlock demand and improve affordability
- **Debt funds for on-lending** by lenders – MFIs, HFIs, AHFIs, - at affordable and competitive rates
- **Support grants**
  - For lenders to meet mobilization /monitoring costs, which cannot be easily covered through capped margins
  - For Cities/ ULBs to meet costs of technical support in preparing demand led schemes, monitoring
  - For statewide /local campaigns, awareness generation
## What is required to make all cities OD free in 5 years

<table>
<thead>
<tr>
<th>Description</th>
<th>INR Crores</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Investments for toilets</strong></td>
<td>64,447</td>
<td>Assuming it takes INR 30 thousand to build a toilet</td>
</tr>
<tr>
<td>Partial incentive subsidy</td>
<td>12,371 (19%)</td>
<td>Assuming Rs 5000 per HH for all households not having a toilet</td>
</tr>
<tr>
<td>HH Savings</td>
<td>10,392 (16%)</td>
<td>Assuming Rs 5000 and Rs 3000 for APL and BPL HHs respectively</td>
</tr>
<tr>
<td>Loans</td>
<td>41,684 (65%)</td>
<td>Considering repayment period of 3 years – returnable capital</td>
</tr>
<tr>
<td><strong>Loan Fund</strong></td>
<td>22,755</td>
<td></td>
</tr>
<tr>
<td><strong>Grants</strong></td>
<td>14,678</td>
<td>Subsidy + support costs</td>
</tr>
<tr>
<td>Support costs</td>
<td>2,306</td>
<td>Administration, technical assistance to HHs and monitoring costs, awareness generation</td>
</tr>
<tr>
<td>Partial incentive subsidy</td>
<td>12,371</td>
<td></td>
</tr>
<tr>
<td><strong>Leverage</strong></td>
<td>4.39</td>
<td>Investments/Public costs</td>
</tr>
<tr>
<td></td>
<td>8.78</td>
<td>If half of the public costs are mobilized through CSR, etc.</td>
</tr>
</tbody>
</table>

*Source: Estimates based on analysis by the PAS Project, CEPT University, using data from Census of India 2011 and base. Monetary figures are in current prices.*
Potential sources of funds

- **Government/ donors**
  - Government of India, state government, donors through **increased allocation to household sanitation**
  - **Local governments from their own funds** to meet partial subsidy costs

- **New sources**
  - **CSR** as per the provision in the new Companies Act
  - **Social impact investors** emerging as a potential new source..
  - **Crowd funding** for defined social causes
  - Increased flows from **commercial banks** through PSL policy changes
**CSR – a potential new source**

- The Companies Act, 2013 allows new models of social engagement by mandating that large companies spend 2% of their three-year average annual profit towards corporate social responsibility (CSR)
  - potential estimated annual flows from CSR of **Rs 17,000 Crores**
- Though sanitation is included in the list of activities, it is still challenging to direct **CSR funds to urban sanitation**
- Many companies already active in sanitation space but largely in rural areas – HUL, Ambuja Cement, ACC, Amul, GAIL, NTPC

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*Ambuja Cement Foundation*

Its community development work is based on its mission and underscores our belief in communities and in our role as catalysts to bring in change.
SIBs have been used globally to generate investment for a range of social issues.
Social impact investors

- Social impact investors emerging as a potential new source: High net worth individuals (HNI), Institutional social investors, Foundations

- For example, a recent 3-year Debt Funds for Cancer Cure by HDFC Mutual Fund mobilized about Rs 77 + Rs 180 crore. The dividend from this was provided to Indian Cancer Society. The first HDFC-CC Debt Fund provided Rs 11 crore to ICS in two years.
Crowdfunding is fast emerging as an important source

2012 - More than 450 Crowdfunding Platforms

- 2011 - Amount raised US$1.5 billion
- 2014 - Amount increased to US$ 5.1 billion
Crowdfunding Platforms- Approaches and Experiences

Spacehive
- First funding platform for Civic Projects
- Fee charged from Project conceptualizer only when targeted goal is achieved

Milaap
- Crowd provide interest-free loan to Milaap, no interest charged to lenders, Milaap charges 5% fee from Field Partners
- Funds construction & renovation of toilets for individual households in rural & semi-urban areas
- Till June 11, 2014; 1733 sanitation loans and have overall raised US$ 1,506,655 with 9,785 loans

Crowdfunding under the purview of SEBI
- Equity and debt based Crowdfunding under SEBI purview
- SEBI has invited suggestions from industry and markets regarding different possible structures for crowdfunding within existing legal framework
Fund mechanisms to capture new sources

Possible structures at different levels

- **National /state - Urban Sanitation Development Impact Fund (USDIF)**
  - to mobilize debt funds for on-lending at affordable costs
  - to meet the support costs of potential lenders
  - Sourced by CSR, government/donor funds, commercial banks through PSL

- **State / City sanitation fund (CSF)**
  - to meet support costs for city governments
  - to provide partial subsidy to households
  - Sourced by CSR, local benefactors, government/donor funds
Emerging national (and global) priority on sanitation and particularly on eliminating open defecation.

High latent demand for ‘own toilets’ in urban areas, to facilitate this need to look for innovative finance:
- Public funds are used to LEVERAGE additional resources.
- To ensure that the new schemes are DEMAND led and not supply driven.

It is necessary to evolve appropriate fund mechanisms to capture and channel the new sources to finance institutions, households and cities.

For waste water management, the need is to focus on onsite sanitation systems. Build capacities of local governments to develop and manage PPP contracts.
In the new urban sanitation campaign, key roles will need to be played by *urban local governments and ‘potential lenders’* – who will work with households to ensure construction and use of toilets, and undertake PPP contracts.

Ensure appropriate **Policy /programs**

- Include sanitation loans as a part of *Priority Sector Lending*
- Use of CSR for sanitation through an appropriate fund mechanism rather than only directly on projects
- State government to promote city level ODF Plans and PPPs for IFSM services
Thank you

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