

# FAECAL SLUDGE AND SEPTAGE MANAGEMENT

## Planning, Financing, Implementation

### WHAT IS FAECAL SLUDGE?

Faecal sludge is raw, partially digested, semi-solid slurry that has been contained over a period of time. The source of faecal sludge is human excreta or black water.

The following factors influence the characteristics of faecal sludge:

- Method and duration of storage
- Method of collection
- Social and geographical factors of region/area

### WHAT IS FAECAL SLUDGE AND SEPTAGE MANAGEMENT?

Faecal sludge and septage management (FSSM) is a systems approach towards creating sustainable and environmentally safe infrastructure for all components across the sanitation value chain of non-networked households.

FSSM is a set of solutions that addresses the absence of training, regulation and awareness of treatment options. A properly designed treatment plant, as part of FSSM, safely treats faecal sludge for proper disposal and/or use.

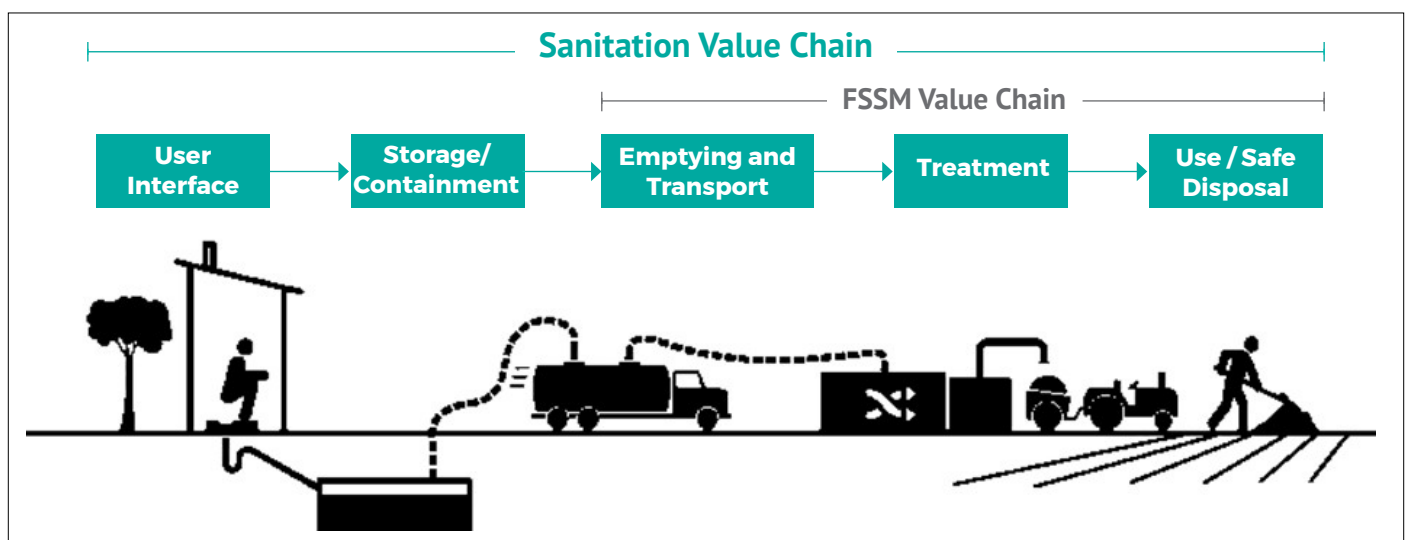
#### OBJECTIVES OF FSSM

- To end the practice of open defecation and improve access to sanitary latrines
- To safely store, collect, transport and treat faecal

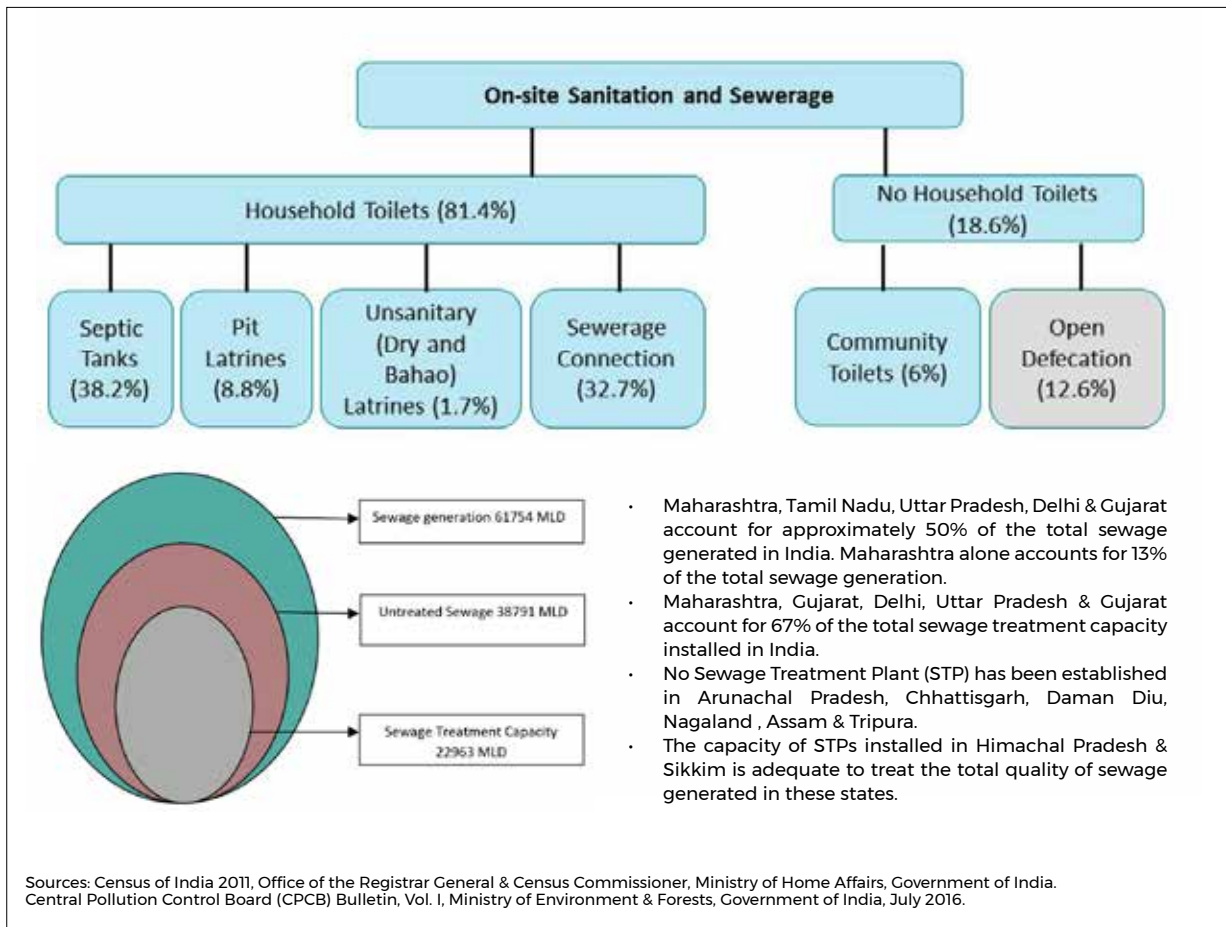


sludge generated in toilets

- To minimise the leakages in doing the above
- To build toilets and increase containment of sludge
- To dispose off and/or use end products in a beneficial manner



## WHY DO WE NEED FSSM?



### Large presence of on-site storage systems

- Approximately 47% of the households in India have toilets connected to septic tanks or soak pits, which are called on-site storage systems of faecal matter. These need to be emptied/desludged periodically.

### Absence of underground sewer systems & treatment plants

- As per Census of India 2011, only 8% of statutory towns in India have an underground sewerage network connectivity for more than 50% of population of a town. Only 32.7% of toilets in urban households are connected to sewer systems.
- While 64% of existing sewage treatment plants are not functional, only 37% of sewage generated is treated.

### Irregular desludging

- Regular desludging of septic tanks and pits does not take place.
- After desludging, the untreated faecal sludge is often dumped in remote locations, in water bodies, open lands or directly in agricultural fields.

### Absence of a management system

- There is no system in place to manage the accumulating faecal sludge safely and properly. There are insufficient suction emptier trucks and safety equipment. The personnel/human resource is untrained, and regulations and safe practices are not adhered to.

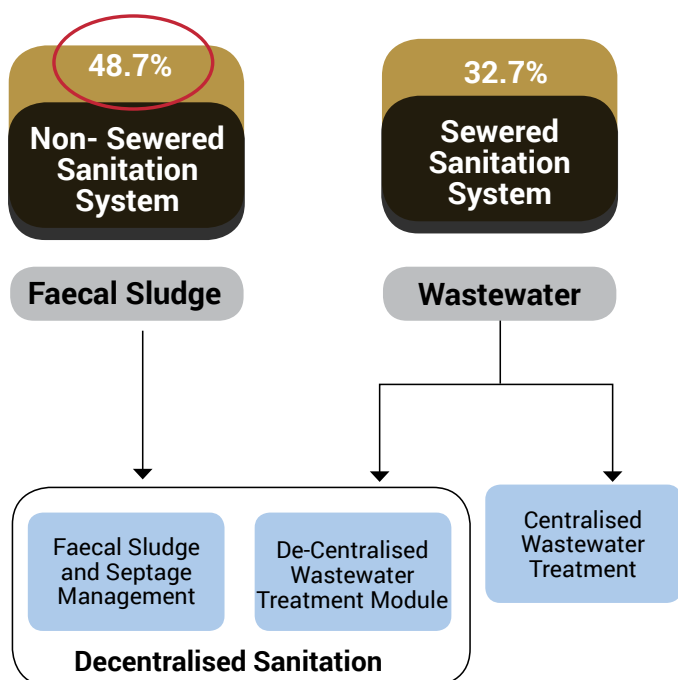
### Health & environment

- Effluents from on-site storage systems, which are not desludged regularly and properly, pollute the environment.
- Untreated faecal sludge when used in agriculture, is unhygienic and has negative implications for human health.
- Manual emptying by personnel & micro-enterprises without proper equipment & safeguards causes health hazards.

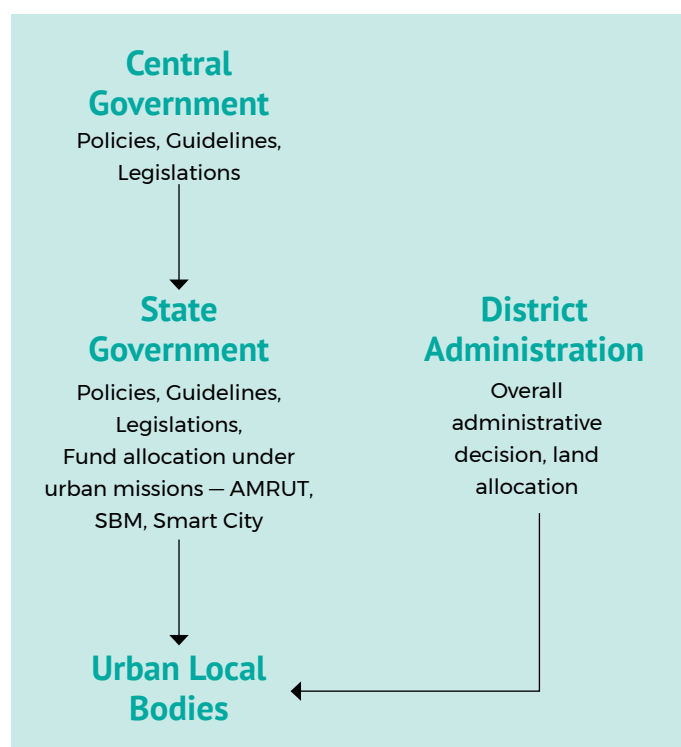
## CONSTITUTIONAL, LEGAL AND POLICY FRAMEWORKS

<b>Constitutional Provisions</b>	<ul style="list-style-type: none"> <li>• Article 17: Abolition of untouchability</li> <li>• Article 21: Protection of life and personal liberty</li> <li>• Article 47: Duty of the state to improve public health</li> <li>• Article 48-A: Protection and improvement of environment</li> <li>• Article 51-A(g): Protection and improvement of natural environment</li> <li>• Part IX-Eleventh Schedule (Panchayat)</li> <li>• Part IXA-Twelfth Schedule (Municipality)</li> </ul>
<b>Legal Provisions</b>	<ul style="list-style-type: none"> <li>• Environment (Protection) Act, 1986</li> <li>• Water (Prevention and Control of Pollution) Act, 1974</li> <li>• Solid Waste Management (SWM) Rules, 2016 under the Environment (Protection) Act</li> <li>• Model Building Bye-Laws (MBBLs), 2016 framed by the Town and Country Planning Organisation</li> <li>• Provisions of the National Building Code of India published by the Bureau of Indian Standards</li> <li>• Employment of Manual Scavengers and Construction of Dry Latrines (Prohibition) Act, 1993</li> <li>• Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013</li> </ul>
<b>Policies</b>	<ul style="list-style-type: none"> <li>• National Urban Sanitation Policy 2008</li> <li>• Advisory Note: Septage Management in Urban India 2013</li> <li>• National Policy on Faecal Sludge and Septage Management 2017</li> <li>• States that have adopted state level FSSM policy/guidelines in line with National Policy on Faecal Sludge and Septage Management 2017 are Maharashtra, Odisha, Rajasthan, Tamil Nadu, Gujarat, Jharkhand, Andhra Pradesh, Himachal Pradesh</li> </ul>

## TYPES OF SANITATION SYSTEMS



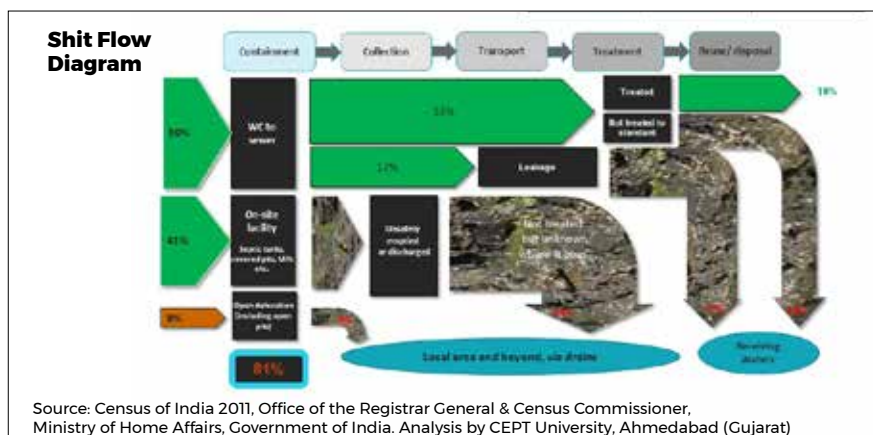
## INSTITUTIONAL FRAMEWORK FOR FSSM: EMPOWERING URBAN LOCAL BODIES



Source: Census of India 2011, Office of the Registrar General & Census Commissioner, Ministry of Home Affairs, Government of India  
 Analysis from Handbook on Decentralised Wastewater Treatment Module, South Asia Urban Knowledge Hub (K-hub), ADB and National Institute of Urban Affairs (Delhi), 2017

## WHAT IS FSSM PLANNING?

Before you begin to develop an FSSM plan, you need to collect data on the existing sanitation situation as well as the faecal sludge and excreta generated in your city/town and if/how single stages of faecal sludge value chain are already covered. A Shit Flow Diagram (also often described as Excreta Flow Diagram) is a tool to understand and communicate/visualize how excreta physically flows through a city/town. The destination and fate of all excreta generated can be tracked using this tool, thus providing a suitable FSSM delivery context for further planning.



## WHO ARE THE STAKEHOLDERS IN FSSM?

- Households & the community
- Decentralized government services
- Community-based organizations / NGOs
- Public authorities (e. g. local, city, national)
- Public utilities
- Private sector
- Farmers, farmers' associations and cooperatives
- Donors

## WHAT ARE THE STEPS IN FSSM PLANNING?

### 1 Set objectives

- Develop a vision and objectives for your FSSM plan:
- Specific
- Measurable
- Attainable
- Relevant
- Time-based

### 2 Set conditions

- Financial: within the available budget
- Geographical: within the city limits
- Timeline: within a fixed period of time

### 3 Form the team

- Political body
- Consultants
- Executive body

### 4 Identify stakeholders

- High influence, low interest group
- High influence, high interest group
- Low influence, low interest group
- Low influence, high interest group

### 5 Stakeholder involvement approach

- Information
- Consultation
- Collaboration
- Empowerment/Delegation

### 6 Landscape study

- Consultation workshops with urban local bodies and Executive Body,
- Qualitative and quantitative tools to represent existing sanitation scenario

### 7 Consultation workshops

- To understand existing systems and practices across the sanitation value chain

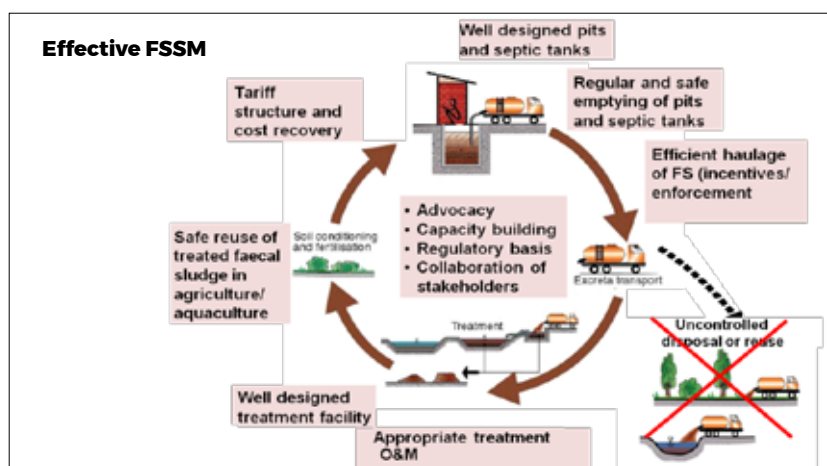
### 8 Technical objectives

- Socially acceptable technology
- Easy to integrate with existing infrastructure
- User interface
- Containment: Installation of septic tanks & pits
- Collection & conveyance: Procurement of desludging vehicles/operations and maintenance
- Treatment: Construction of treatment units/operations & maintenance
- Reuse/disposal: Setting up reuse infrastructure (biogas, co-composting plant)

## HOW IS FSSM IMPLEMENTED?

Urban local bodies, such as the municipality, desludging service providers operating in the urban areas and other stakeholders come together to develop regulations, create sustainable operating models, and undergo capacity building. Service providers are enabled to work within a legal framework.

A treatment plant is installed and made the designated point where faecal sludge can be treated and disposed off safely.



## PUBLIC SOURCES OF FINANCING FOR FSSM

There are various sources of finances available for undertaking FSSM projects. The following table summarises the key options of financing through Centrally sponsored Government schemes/entities:

Source	Component	Amount allocated	Issues/ Concerns
<b>Atal Mission for Rejuvenation And Urban Transformation (AMRUT)</b>	Fecal Sludge and Septage Management	<ul style="list-style-type: none"> <li>Based on SLIPS and SAAPS prepared – O&amp;M not covered in project costs though computed for 5 years</li> <li>80% of annual budgetary allocation as project fund</li> <li>10% of annual budgetary allocation for reforms</li> </ul>	<ul style="list-style-type: none"> <li>Most of SLIPs/SAAPs focussed on centralized sewer systems with Large STPs</li> <li>Lack of understanding on the concepts/ planning aspects</li> </ul>
<b>Swachh Bharat Mission (SBM)</b>	<ul style="list-style-type: none"> <li>Construction of toilets</li> <li>Construction of toilets with septic tanks/pits</li> </ul>	<ul style="list-style-type: none"> <li>Households toilets- ₹4,000 per household.</li> <li>No bar on additional resources to be provided by State Government/ULB</li> <li>40% Grant/VGF for community toilets and remaining through other resources</li> </ul>	<ul style="list-style-type: none"> <li>Beneficiary identification</li> <li>End usage of the toilets due to other issues like continuous water supply, behavioural issues etc.</li> <li>Land availability and viability in case of CTs &amp; PTs</li> </ul>
<b>Backward Grant fund- CTs &amp; PTs</b>	All Components	₹250 Crore for Capacity Building and ₹5000 Crore for development grant	<ul style="list-style-type: none"> <li>Only about 5.4% of the total development grant used in sanitation</li> <li>Delays in fund allocation from Centre to States</li> </ul>
<b>National Safai Karamcharis Finance &amp; Development Corporation (NSKFDC)</b>	All Components	<ul style="list-style-type: none"> <li>Various soft loans for starting feasible businesses in sanitation – 1% - 6% with 10 years repayment</li> <li>Upto 90% of unit cost with maximum of ₹15 lakhs, balance 10% from Channelizing Agencies (CA) or promoter</li> </ul>	<ul style="list-style-type: none"> <li>Limited to only Safai Karmacharis/Manual Scavengers and their kin &amp; CA</li> </ul>
<b>Central and State Finance Commissions</b>	All Components	At the discretion of State Government	

Source: Handbook on Decentralised Wastewater Treatment Module, South Asia Urban Knowledge Hub (K-hub), ADB and National Institute of Urban Affairs (Delhi), 2017

## SOURCES OF PRIVATE FINANCING FOR URBAN SANITATION

Source/Financing Mechanisms	Reach to target urban household without toilets on premises	Current/potential interest in urban sanitation	Favourability of loan/collateral terms
Microfinance (MFIs/ SHGs)	Both MFIs and SHGs cater to this clientele and will have high reach	Interest in sanitation has emerged in recent years. However, efforts will be needed to focus on urban areas	Favourable collateral terms but high interest on loans
Housing Finance Institutions (HFIs)	Only a few HFIs have focused on the low market segments that do not have toilets	Specific sanitation products are not currently offered. These can be introduced as a part of housing improvement products. Good potential in meeting urban sanitation finance demand.	Lower cost of loans but stringent requirements for collateral and formal sector employment of loan applicant.
Commercial Banks	Potential reach of banks is high especially with the new financial inclusion policies	No focus on sanitation so far. Can be enhanced if sanitation is explicitly included in priority lending.	Collateral requirement can be stringent.
Corporate sector and local beneficiaries	Potential reach to low market segments is high but limited experience in urban areas.	Interest in sanitation exists as sanitation is included in CSR requirements. However, efforts will be needed to focus on urban areas.	Available as grants
Social Impact Investors (through instruments such as social impact bonds/mutual funds)	Potential reach is high but there is a dearth of agencies engaged in these activities. A new compact with urban local governments will be needed.	Potential interest in sanitation may be high given evidence of health and environment impact as well as for dignity and security of women.	Potentially favourable terms for debt, but stringent requirements for capability of agencies receiving funding and outcome verification.
Crowd funding	Low reach at present but high potential reach	A few Indian portals exist (for e.g., Milaap BitGiving). However, efforts needed to focus on urban sanitation and building capacity to access global platforms.	Most funds are likely to be grants/ donations or loans. For any equity, Securities and Exchange Board of India (SEBI) rules are under discussion and will apply.

Source: Mehta, Dinesh and Meera Mehta, Financing Sanitation, 2014, available at [http://www.ideasforindia.in/article.aspx?article\\_id=370](http://www.ideasforindia.in/article.aspx?article_id=370)

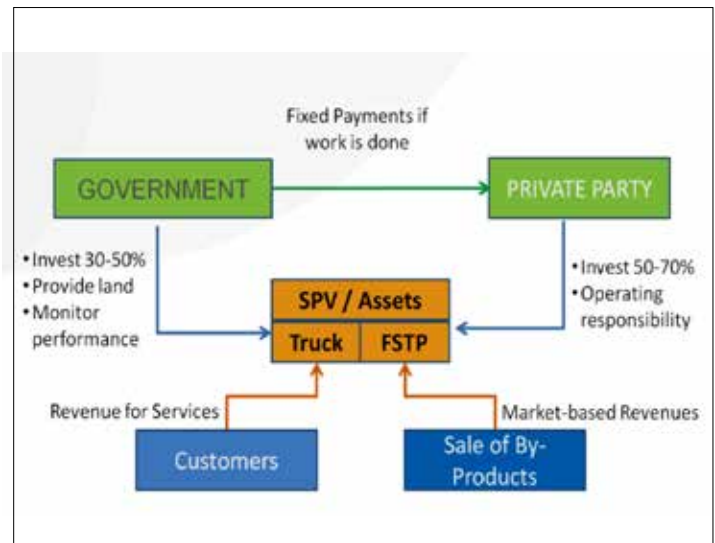
## MODELS FOR FINANCING AND CONTRACTING FOR FSSM

### Types of Contracts

	Construct and Manage	Service Contracts	PPP (HAM)
Process	Govt Builds Govt Operates	Govt builds. Private Operates	Govt and Private Build and Operate
CapEx by Govt	100%	100%	30-50% + land
CapEx by Pvt.	--	--	50-70%
OpEx by Govt.	100%	70-100%	50-80%
Contract Period	--	3-5 yrs	12-20 yrs

Source: Service Contracts and PPPs are more effective in the long run.

### Hybrid Annuity Model



## PROCUREMENT OF FSSM SERVICES

Based on the financing options and other factors such as financial feasibility, size of project, demand for the project and capacity of the urban local body, the following contract options for engaging private sector in providing sanitation services can be considered. The types of contracts in practice are as follows:

<b>Engineering Procurement Construction (EPC) contract</b> <b>For asset creation</b>	<ul style="list-style-type: none"> <li>The investment/funding is undertaken by the implementing authority/ULB</li> <li>Designs and specification are fixed before finalizing the contract</li> <li>Services of private sector utilized for construction activity with a defects liability period</li> </ul>
<b>Turnkey contract</b> <b>For planning/ designing &amp; creation of asset/s</b>	<ul style="list-style-type: none"> <li>Short duration contract with investment/funding by implementing authority/ULB</li> <li>Design specifications to be proposed by private operator based on implementing authority/ULB's requirement</li> <li>Decision on the designs to be taken by the implementing authority/ULB</li> <li>Operations to be undertaken by implementing authority/ULB separately</li> </ul>
<b>O&amp;M contract</b> <b>For operating assets</b>	<ul style="list-style-type: none"> <li>Long duration contract entered into for providing O&amp;M services by the private operator</li> <li>Expenses for the operations borne by implementing authority/ULB</li> <li>Service/performance standards pre-decided and monitored strongly throughout the contract period</li> </ul>
<b>PPP Contracts</b> <b>Build-Own-Operate-Transfer</b> <b>Build-Operate-Transfer</b> <b>Design-Build-Finance-Operate-Transfer</b>	<ul style="list-style-type: none"> <li>Undertaken with financing either by the private operator or the implementing authority/ULB</li> <li>Long-term contract including all activities related to asset creation as well as operation</li> <li>More complex financial terms and conditions for revenues/expenses pre-defined before contract execution</li> <li>Include a comprehensive monitoring and regulation framework</li> </ul>