



Training on Financing and Contracting Options for FSSM

Part B – Learning Notes and Training Material

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Center for Water and Sanitation

CRDF, CEPT University

January 2021

About this training module on Financing and Contracting Options for FSSM

India has seen impressive sanitation achievements in making cities open defecation free and has largely succeeded in achieving the goal of **Swachh Bharat Mission**. However, achieving **Sustainable Development Goal 6.2 for moving towards “safely managed sanitation”** i.e. collecting and treating all faecal waste safely, will require greater effort.

For moving ‘beyond toilets’ we need to **focus on conveyance, treatment and also reuse**. Data suggests that nearly 80% of faecal waste in India remains untreated¹ and discharged in the domestic environment, agriculture fields or in water bodies

Conventionally, in India, this entails treatment plants connected to large scale sewerage systems, typically funded by central and state government programmes. As a result, out of 4700 cities, only around 400 cities have sewerage connections with treatment plant². **Most cities have on-site sanitation systems**, which are financially viable for smaller cities² to service and manage.

The need for **Faecal Sludge and Septage Management (FSSM)** is now recognized at the national level through **National FSSM policy** and missions and activities such as **Swachh Sarvekshan** and **AMRUT programme**.

Indian states are now evolving FSSM strategies and implementing them in their cities through various state programmes and funds. Government of India has also made available programmatic funding through AMRUT and certain SBM components.

This module on “**Financing and contracting options for FSSM**” focuses on how cities can leverage available public funds, augment these with private financing, encourage private sector role in service delivery and explore other blended and innovative financing mechanisms. It will provide guidance on potential service and operation models in FSSM for both conveyance and treatment.

¹ Central Pollution Control Board (2015). Inventorization of sewage treatment plants. Retrieved from: https://nrcd.nic.in/writereaddata/FileUpload/NewItem_210_Inventorization_of_Sewage-Treatment_Plant.pdf

² Mehta M, Mehta D and Yadav U (2019) Citywide Inclusive Sanitation Through Scheduled Desludging Services: Emerging Experience From India. *Front. Environ. Sci.* 7:188. doi: 10.3389/fenvs.2019.00188 . Retrieved from: <https://www.frontiersin.org/articles/10.3389/fenvs.2019.00188/full>.

What does this training expect the participants to learn?

- Become familiar with the FSSM finance scenario in India
- Understand components of different FSSM business models for conveyance and treatment
- Understanding processes for private sector engagement and building balanced contracts
- Understand financial requirements, potential sources and budgeting for operationalizing FSSM in a city
- Learn about emerging innovative mechanisms for FSSM projects

What can participants expect to do after this training?

- Select an appropriate model for providing FSSM services in their city
- Develop viable options for financing this model
- Select a private player for providing services
- Develop appropriate contracts for engaging private players

Structure of the training

	Session	Objectives	Topics and Activities
1	FSSM Finance in India	<ul style="list-style-type: none"> • To stress on the emerging importance and emphasis on FSSM in India • Refresh concepts of sanitation value chain, steps for operationalising FSSM in a city, financial requirements for FSSM and potential sources for CapEx and OpEx • Understand the current scenario of FSSM finance in India 	<ul style="list-style-type: none"> • Pre –assessment quiz • Presentation on basics of FSSM and financing requirements Exercise on FSSM cost estimation • Exercise on developing city and state budget estimation
2	Business models for conveyance	<ul style="list-style-type: none"> • Introduce the types of models for operationalizing scheduled/ demand based desludging • Understand benefits, challenges, applicability for each model as well as operational and financial roles • Become familiar with national/international case studies of business models in conveyance 	<ul style="list-style-type: none"> • Presentation on conveyance business models • Video Case study and Quiz on PLAM desludging service • Exercise on Building a model for a financially feasible desludging business in a city

3	Business models for treatment	<ul style="list-style-type: none"> • Introduce the types of models for treatment • Understand benefits, challenges, applicability for each model as well as operational and financial roles • Present National/international Case studies of business models in treatment 	<ul style="list-style-type: none"> • Presentation on treatment business models + integrated models • Exercise on developing business model canvas
4	Private Sector Partnerships and contract management	<ul style="list-style-type: none"> • Understand the need and scope of involving private sector in FSSM • Understand the procurement and contracting process • Understand the components of successful contracts for engaging the private sector – for conveyance of FS and for operation of FSTP 	<ul style="list-style-type: none"> • Presentation on assessment of private sector, potential roles, contract structures and tendering process, performance based contracts • Three part exercise on procurement process and building contracts
5	Innovative financing options	<ul style="list-style-type: none"> • Understand potential to utilize public funds for leveraging innovative / blended finance and attract private/ commercial funds and impact investors • Understand different innovative financing options like Blended finance, Development Impact Bond, Pooled funds, market borrowings, etc and how this can be used in FSSM sector. • Present case studies/videos to explain different innovative financing options 	<ul style="list-style-type: none"> • Presentation on innovative financing options • Video case study and quiz on new and emerging financing options

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Session 1: FSSM Finance in India

Session 1. FSSM finance in India

1.1. About this session

This session aims to set the stage for the topics that are to be covered throughout the training under different sessions. It starts with making a case for FSSM as a viable solution for safely managed sanitation and explains how there is growing recognition for it in India. Next, for the uninitiated audience and for those that need a refresher, it gives a quick overview of the FSSM sector in India and on the basics of implementation. Lastly, it gives a context of the financial aspects of the sector in terms of requirements, sources of funding and emerging solutions.

1.2. Session Plan

Duration: 60 minutes

Table 1 Plan for first session

Activity	Time Duration	Material Method
Pre-assessment quiz	15 mins	Quiz available in Part C
Presentation on FSSM Finance in India	30 mins	Power point presentation
Exercise on FSSM cost estimation	15 mins	Exercise available in Part C

1.3. Activity 1 - Pre-assessment quiz

Before starting the training, participants are provided with a small quiz that aims to determine subject knowledge. Although appearing to be counterintuitive, this quiz covers material that the audience is not expected to know before the training as this will help trainers gauge the knowledge baseline and also gives the audience an indication of material that will be covered and the depth of knowledge required, thus it serves a 'road map' for the topics

Ideally, the same quiz should be repeated at the end of the training as a post-evaluation quiz. This helps give a quantifiable measure of success of the training course by demonstrating recognizable changes in their perceptions and understanding of the subject matter

Delivery methods: Trainers can go with a traditional paper-quiz method. However, this is only advisable for a small training group since it requires extra time and human resource to

collect and grade each quiz. For large groups, if the audience is comfortable with digital methods, trainers can use online feedback methods such as [Mentimeter](#) which provide options for real time voting and quick on-screen results.

1.4. Growing significance of FSSM in India

Achievements under Swachh Bharat Mission and need to move ‘beyond toilets’

Over the past six years, India has seen impressive achievements in sanitation for making cities open defecation free under the Swachh Bharat Mission. Over 62 lakh individual household toilets have been constructed with 5.9 lakh community toilets in order to make 99% of our cities open defecation free as of November 2020.

Figure 1 Status of Swachh Bharat Urban Mission as per 17th December 2020



Source: MOHUA, “Swachh Bharat Mission Urban – Dashboard” Retrieved from <http://swachhbharaturban.gov.in/dashboard/> on 17 Dec 2020

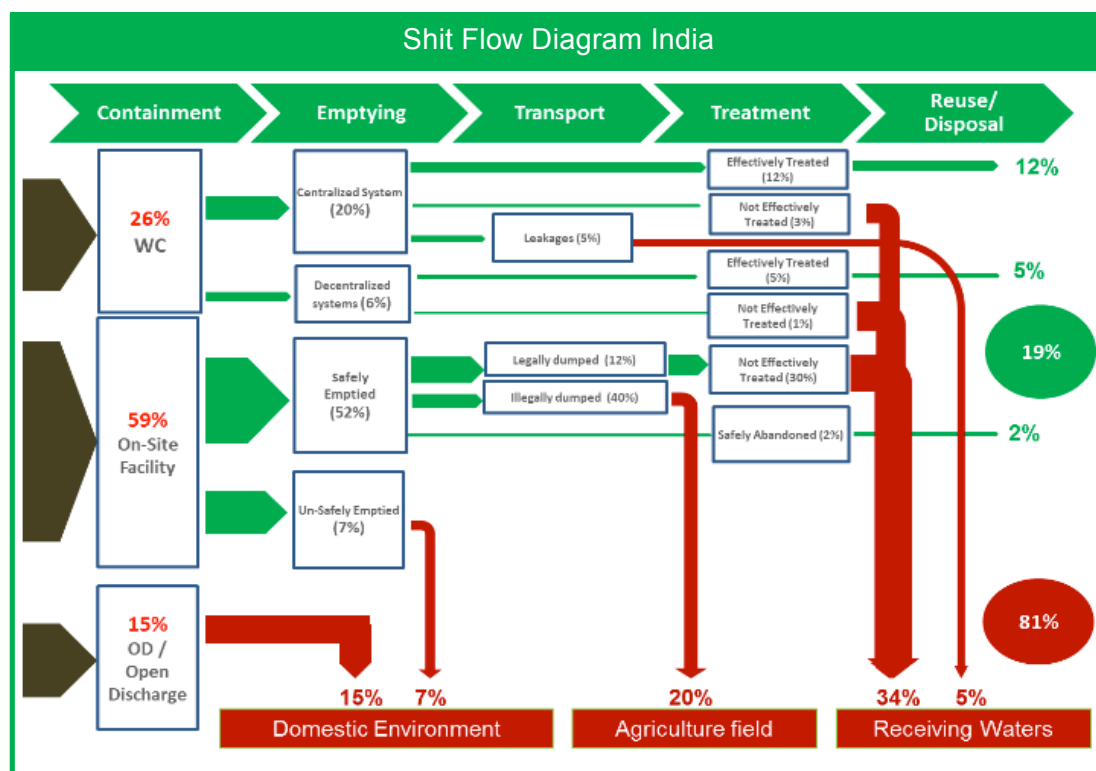
However, what happens to the water after it is flushed down the toilet? Focusing only on toilet construction leads to a situation where most of the waste remains untreated.

An excreta flow diagram (or shit flow diagram, SFD) is a tool to understand and communicate how excreta ‘flow’ through a city or town. It shows how all excreta generated in a city is or is not contained as it moves from defecation to disposal or end-use.

This SFD for India, developed using Census 2011 data, suggests that 81% of faecal waste in India remains untreated and discharged in the domestic environment, agriculture fields or in water bodies.

Untreated waste is one of the main factors for the spread of water borne diseases which are a major cause of infant and child mortality in India.

Figure 2 Shit Flow Diagram India



Source: CDD Society (2016), Faecal Sludge Management for Indian Towns. Retrieved from: <http://odi.org.in/resources/img/Presentation/Faecal%20Sludge%20Management.pptx>

Sustainable Development Goals

The Sustainable Development Goals (SDGs) or Global Goals are a collection of 17 interlinked global goals designed to be a "blueprint to achieve a better and more sustainable future for all". https://en.wikipedia.org/wiki/Sustainable_Development_Goals - cite_note-:172-1 The SDGs were set in 2015 by the United Nations General Assembly and are intended to be achieved by the year 2030. They are included in a UN Resolution called the 2030 Agenda.

The 17 SDGs are: (1) No Poverty, (2) Zero Hunger, (3) Good Health and Well-being, (4) Quality Education, (5) Gender Equality, (6) Clean Water and Sanitation, (7) Affordable and Clean Energy, (8) Decent Work and Economic Growth, (9) Industry, Innovation and Infrastructure, (10) Reducing Inequality, (11) Sustainable Cities and Communities, (12) Responsible Consumption and Production, (13) Climate Action, (14) Life Below Water, (15) Life On Land, (16) Peace, Justice, and Strong Institutions, (17) Partnerships for the Goals.

The goals also identify specific targets, along with indicators that are being used to measure progress toward each target. To facilitate monitoring, a variety of tools exist to track and visualize progress towards the goals. For example, the online publication SDG-Tracker, launched in June 2018, presents available data across all indicators. The SDGs pay attention to multiple cross-cutting issues, like gender equity, education, and culture cut across all of the SDGs.

India is also signatory to the ‘2030 Agenda for Sustainable Development’, adopted at the Sustainable Development Summit of the United Nations in September 2015. It comprises of seventeen Sustainable Development Goals (SDGs) and 169 associated targets. Of these, 3 SDGs namely SDG No. 6: Ensure availability and sustainable management of water and sanitation for all, SDG No. 11: Make cities and human settlements inclusive, safe, resilient and sustainable, and SDG No. 12: Ensure sustainable consumption and production patterns, are directly related to sanitation sector. This also obligates Government of India as well as State Governments to develop strategies to cover entire population with sanitation facility by year 2030.

SDG 6 relates to clean water and sanitation with the following goals -

- Target SDG 6.2: By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation. Special focus on needs of women and girls and those in vulnerable situations
- Target SDG 6.3: By 2030, improve water quality by reducing pollution and halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally

In order to achieve SDG 6, we will need to think beyond toilets!

Figure 3 Sustainable Development Goals



FSSM as a viable solution for safely managed sanitation

The Joint Monitoring Programme (**JMP**) for Water Supply and Sanitation by WHO and **UNICEF** is the official United Nations mechanism tasked with monitoring progress towards the Sustainable Development Goal Number 6 (SDG 6) since 2016.

JMP uses “service ladder” classifications to benchmark and compare progress across countries. The ladders for water and sanitation build on the established improved/unimproved facility type classification from the Millenium Development Goal era.

The sanitation ladder describes “safely managed sanitation” – the ultimate goal – to be “use of facilities that are not shared and where excreta are safely disposed of in situ or transported and treated offsite”.

Solutions for faecal sludge and septage management – such as septic tank + soak pit + vacuum truck + FSTP combinations - also fit this definition and in absence of conventional sewerage systems, are a viable solution to achieve “safely managed sanitation”

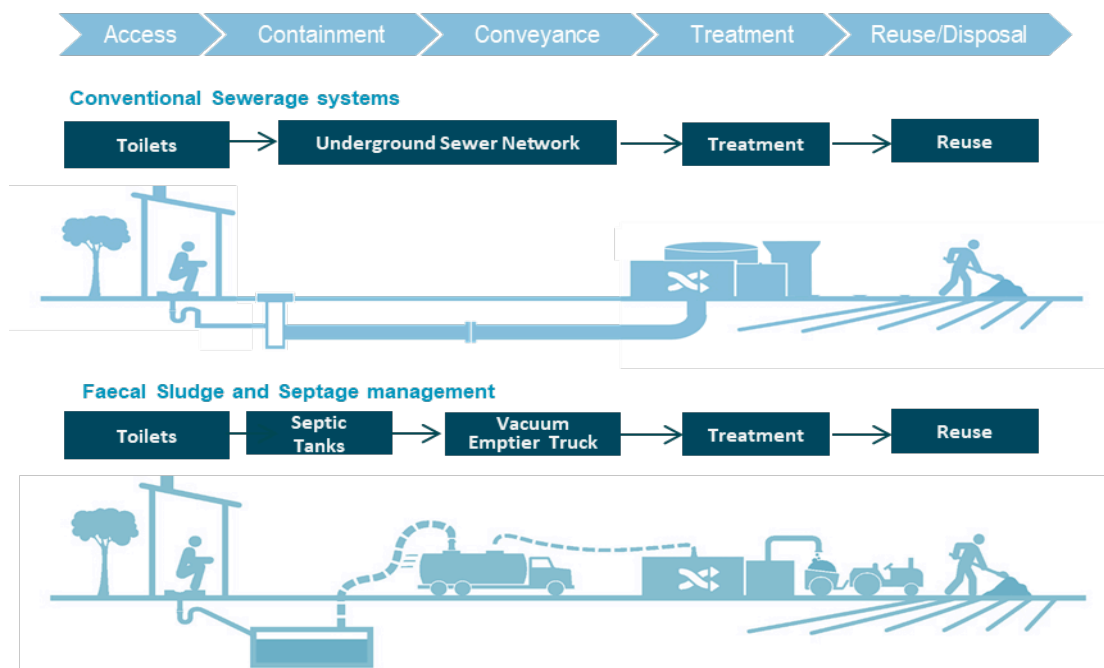
Table 2: Sanitation ladder of JMP (WHO-UNICEF)

Service Level	Definition
SAFELY MANAGED	Use of improved facilities that are not shared with other households and where excreta are safely disposed of in situ or transported and treated offsite
BASIC	Use of improved facilities that are not shared with other households
LIMITED	Use of improved facilities shared between two or more households
UNIMPROVED	Use of pit latrines without a slab or platform, hanging latrines or bucket latrines
OPEN DEFECTION	Disposal of human faeces in fields, forests, bushes, open bodies of water, beaches or other open spaces, or with solid waste

Note: improved facilities include flush/pour flush to piped sewer systems, septic tanks or pit latrines; ventilated improved pit latrines, composting toilets or pit latrines with slabs.

Source: UNICEF & WHO. Sanitation | JMP. [WASHdata.org](https://washdata.org), Retrieved from <https://washdata.org/monitoring/sanitation>

Figure 4 Safe management across sanitation value chain



In India, 60% of the population is already dependent on on-site sanitation systems and untreated wastewater requires urgent attention, FSSM is a viable solution.

While, sewerage and STP projects are being funded and initiated across the country, they take long periods to become functional. Such capital intensive projects are also not financially viable for smaller towns which have limited revenue and budgets.

In absence of existing or planned networks in these towns, FSSM is a more pragmatic solution. It is relatively inexpensive and quick to implement and does not require high technical expertise. Water requirements are also low and services can easily be expanded to new areas in growing cities.

The [national policy on Faecal Sludge and Septage Management](#) is formed in this perspective and guides the state to develop the framework for preparing FSSM plan at state level. The policy was a key turning point in the enabling environment for FSSM in India. It described the roles and responsibilities of institutions and stakeholders and a framework for preparing FSSM plan at state level. It also introduced and adopted San-benchmarks at National level for monitoring FSSM.

It promotes scheduled emptying of septic tanks at an interval of 2-3 years, private sector participation in FSSM and levying sanitation tax / user charges to meet the O&M cost for effective FSSM operations at city level.

Protocols by MoHUA under Swachh Bharat Mission (SBM) have also captured the importance of FSSM in their ODF, ODF+ and ODF++ protocols. ODF++ certification requires that in addition to all requirements for ODF and ODF+, all faecal sludge and sewage is safely

managed and treated, with no discharging or dumping of untreated faecal sludge and sewage in drains, water bodies or open areas.

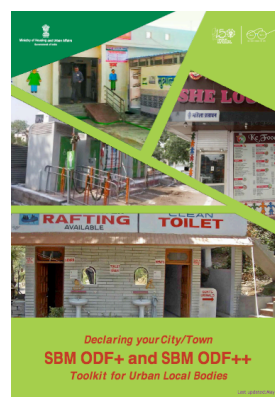
Table 3: Protocols for ODF+, ODF++ and Water plus

ODF	ODF+	ODF++	Water +
A city / ward can be notified/declared as ODF city/ ODF ward if, at any point of the day, not a single person is found defecating in the open.	Not a single person is found defecating and/or urinating in the open, and all community & public toilets are functional and well maintained	ODF+ AND Faecal sludge/septage and sewage is safely managed and treated, with no discharging and/or dumping of untreated faecal sludge/septage and sewage in drains/water bodies/open areas	All wastewater released from households, commercial establishments ,drains, nallahs etc. is treated to a satisfactory level before releasing the treated wastewater to the environment

Thus, FSSM has become a requirement to achieve ODF++ status for cities without sewerage and STPs as well as those cities which are not able to cover all areas with networks.

Declaring your City/Town SBM ODF+ and SBM ODF++

The purpose of this toolkit is to provide a readiness check guideline for cities and towns that have already achieved Defecation Free (ODF) status as per the ODF protocol prescribed by the Ministry of Housing and Urban Affairs (MoHUA) and are working towards ensuring sustainability of ODF status to ensure proper maintenance of toilet facilities, referred to as SBM ODF+, and safe collection, conveyance, treatment and disposal of all faecal sludge and sewage, referred to as SBM ODF++, in order to achieve safe sustainable sanitation for all. Similar to the ODF Protocol, this toolkit provides the detailed SBM ODF+ protocol and SBM ODF++ protocol laid down by MoHUA, along with declaration formats to be obtained from various stakeholders, that wards/ work circles (in case under jurisdiction of development authority) and cities are required to submit, as part of the SBM ODF+ and SBM ODF++ declaration and certification process. It also describes the procedure for certification of SBM ODF+ and SBM ODF++ claims by ULBs/ Development Authorities / Cantonment Boards, by a third party

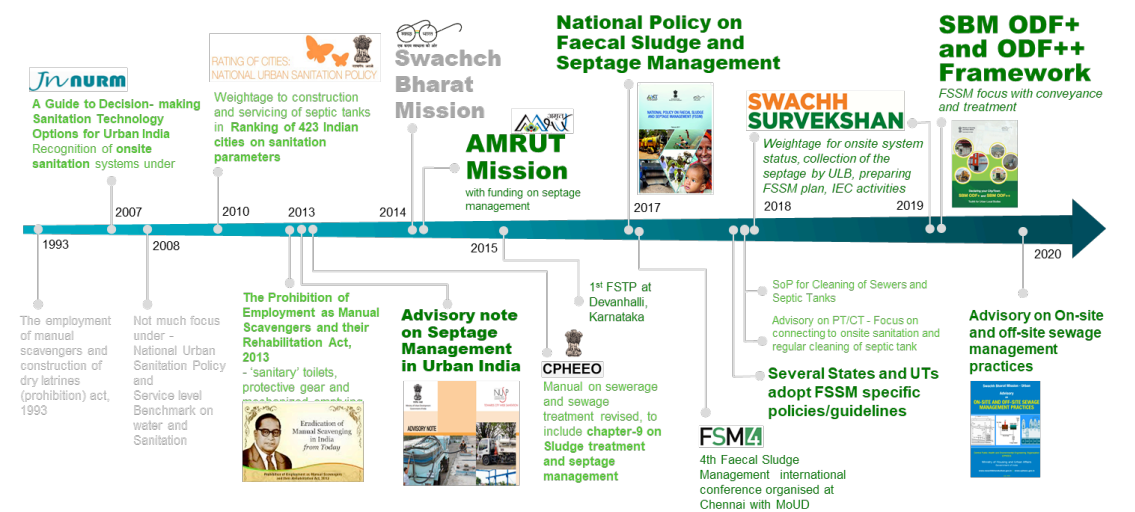


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Growing recognition for FSSM in India

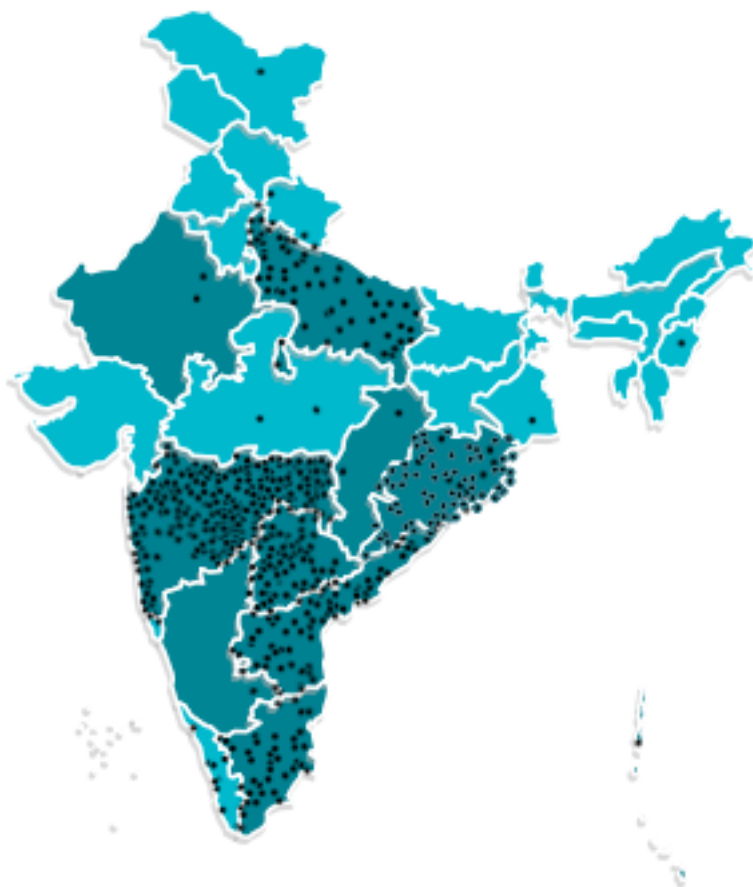


FSSM is fast gaining traction in India. In 2007, under JUNNURM, a guide to decision making sanitation technology options for urban India was launched under which onsite sanitation systems were recognised. In 2010, under the National Urban Policy, rating of 423 Indian cities was done on various sanitation parameters. In 2013, 'The Prohibition of Employment as Manual Scavengers and their Rehabilitation Act' came which focussed on safety protocols of sanitation workers. Also, the CPHEEO guidelines were revised from sewerage and sewerage treatment to sludge treatment and septage management and an advisory note on septage management was launched. In 2014, sanitation gained momentum with the launch of Swachh Bharat Mission and Amrut Mission with funding on septage management by the government. In 2015, the first FSTP was set up in Devanhalli, Karnataka. In 2017, National Policy of Faecal Sludge and Septage Management was launched. In 2018, under the Swachh Sarvekshan, weightage for onsite system status, collection of septage by ULBs, preparation of FSSM plans and IEC activities were considered. In 2019, MOHUA launched the SBM ODF+ and ODF++ framework with a focus on conveyance and treatment. An advisory on on-site and off-site sewage management was launched in 2020 thriving the FSSM momentum continuously.

With such positive and enabling environment in recent years, FSSM is receiving attention nation wide.

Many state governments are progressing with statewide FSSM plans and over 700 faecal sludge treatment plants are being mobilized across the country.

Figure 5: ~700 FSTPs being mobilized across India

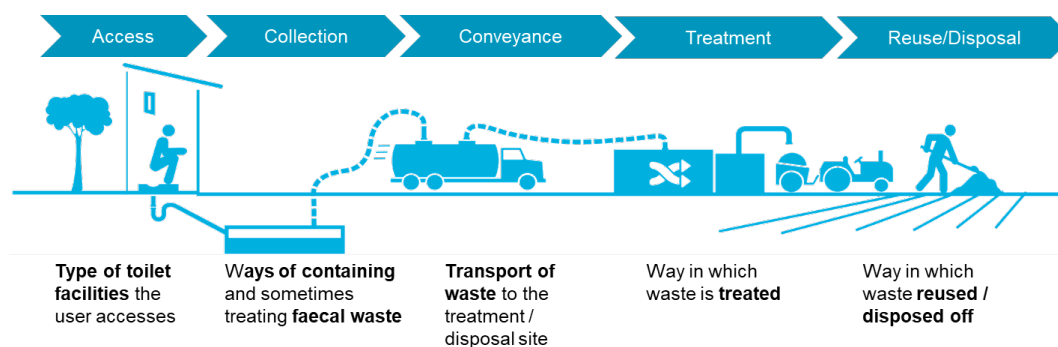


1.5. What does FSSM implementation entail?

FSSM value chain

Faecal sludge management refers to the processes for building a sustainable and environmentally safe infrastructure from containment to end use or disposal of faecal sludge from on-site sanitation systems (OSS). The Sanitation Value Chain also provides a useful method to divide different FSSM processes into different activities and identify the type of improvement actions that may be required.

Figure 6 FSSM value chain



Key activities in FSSM

In order to ensure efficient and end-to-end FSSM, planners need to assess services across all links in the FSSM value chain.

- **Access:** Describes the type of toilet facilities available to the residents. It is useful to assess dependency of residents on individual, community and public toilets. Ideally such information should be assessed for various zones/wards of the city.
- **Collection of septage:** Describes the ways of collecting, storing and sometimes treating the fecal waste generated by the users. It is necessary to identify the type of toilets (septic tanks, double pits etc.), and details related to location, size, design and access for emptying.
- **Conveyance:** It is also important to assess how the fecal sludge is conveyed from household/community toilets to the treatment / disposal site. One needs to identify who is involved in emptying, the equipment used (e.g. septic tank emptier, jetting machine) and its details related to type and size and the fees charged for emptying by public and/or private agencies. As far as possible, details should be collected for different wards/zones of the city. The monitoring system for FSM should also be assessed.
- **Septage treatment, disposal:** Assess how the collected fecal sludge is treated. In a large number of cities, it is often discarded in water bodies or on the ground without any treatment. It is important to assess the soil and water quality at the location where the septage is being treated / dumped
- **Extent and nature of reuse:** The treated sludge can be used as fertilizer or used to generate energy. Assess how the sludge is used, assess the market, if any, for treated sludge.

Assessments and subsequent planning across the value chain should provide definitive answers to the above questions. While some can be answered by city level observations, others might require more in-depth analysis and household surveys. Detailed assessment of services will need to be done across each link in the chain through appropriate field assessments.

Field assessments should answer the following questions –

Access

- Are all toilets connected to septic tanks (or other OSS) or other conveyance systems?

Collection

- Are septic tanks built as per standards?

Conveyance

- Are all septic tanks being emptied regularly?
- How can an emptying schedule be implemented?

- Are private desludgers already active? How can they be monitored?
- If ULB is responsible, how to recover operating costs for desludging?
- Are desludgers practicing safety protocols?
- Are trucks offloading sludge safely at designated location?

Treatment

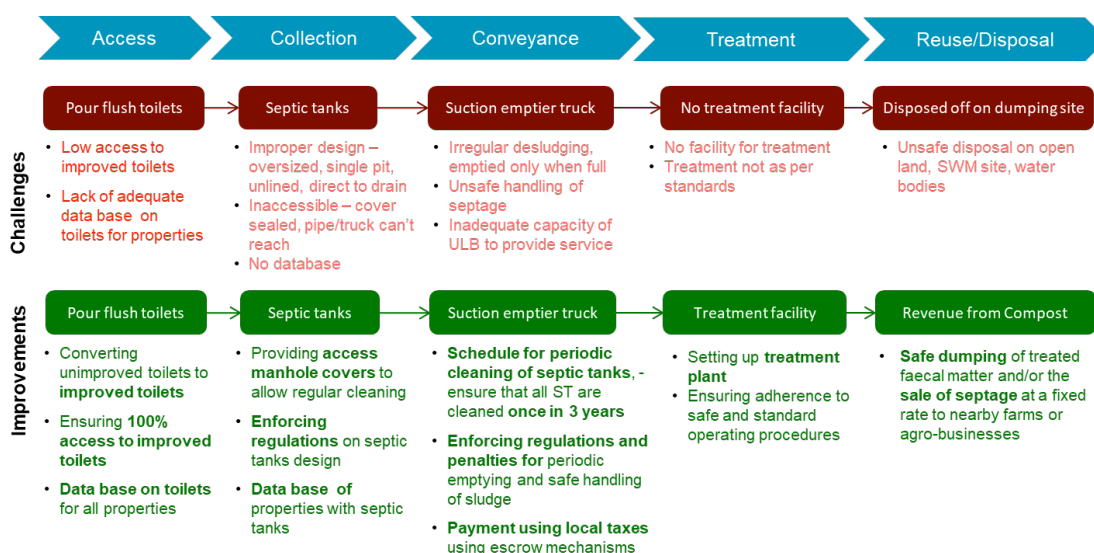
- Is there a treatment facility for sludge? If not is co-treatment possible?
- If treatment facility is to be built, what technology can be adopted?
- How to fund capital costs for a constructing treatment facility??

Reuse/Disposal

- Is sludge being treated as per safe disposal standards?
- How to dispose treated sludge/water safely?
- Is reuse possible?

The ultimate goal should be to move from a red – a typical scenario for small and medium towns as per the diagram below– to green –the ideal situation for safely managed sanitation.

Figure 7 Improvement activities – moving from RED to GREEN



Source: Adapted from Center for Water and Sanitation, CRDF, CEPT University (2015) "Training Module on Septage Management Plan". Available at: <https://pas.org.in/Portal/document/UrbanSanitation/uploads/Capacity%20building%20for%20Septage%20Management%20Plan.pdf>

Scheduled desludging vs demand desludging

While access to toilets has been sufficiently addressed under Swachh Bharat Mission and treatment plants are also being set up across the country, cities are now beginning to focus on conveyance services for faecal sludge from onsite systems like septic tanks.

CPHEEO guidelines recommend that the settled solids from a septic tank need to be desludged on a regular basis for it to function well. It suggests that “yearly desludging of septic tank is desirable, but if it is not feasible or economical, then septic tanks should be cleaned at least once in 2–3 years, provided the tank is not overloaded due to use by more than the number of persons for which it is designed”³

Demand based models for desludging service are often not able to achieve this frequency. Emptying is done on-call by households who do not usually do so until their tanks overflow. Reasons for this include low awareness and avoidance of desludging costs unless absolutely necessary.

Scheduled desludging represents a planned effort to ensure regular desludging. In this, every property is covered along a defined route and the property occupiers are informed in advance about desludging.

Such a service has been successfully implemented in two cities in Maharashtra (Wai and Sinnar) as a municipal service in an effort to move away from a ‘complaint redressal model’ to a regular service. This service is offered to all properties in the city and is un-linked to a ‘desludging fee’, making it especially inclusive for low income households and those staying in slums.

The desludging service is provided in these cities as per a planned schedule to cover all residential and non-residential properties over a 3-year cycle. For this, the city area has been divided into three zones and each zone is planned to be covered in a year. Desludging is done by a private company that has entered into a performance-linked annuity contract with the local governments. The payment to the private provider is made by the local government against the targeted performance. A “sanitation tax” is added to each property tax bill to cover the payments made by local government to the desludging company.

The benefits of scheduled desludging include –

- **Equitable and inclusive services** – all households / properties are covered by services. The payment is linked to property tax.

³ Central Public Health and Environmental Engineering Organisation (CPHEEO) (2013). *Manual on Sewerage and Sewage Treatment Systems, Part A Engineering, Chapter-9*. New Delhi: Ministry of Housing and Urban Affairs, Government of India.

- **Pricing** – Services are offered at lower prices, due to efficiency gains and the pricing is much less than the distress fee that households had to pay previously.
- **Behavior change** – Contribution to ODF sustainability as toilet usage can increase.
- **No manual labour** – Removal of need for manual labour due to regular emptying.
- **Infrastructure optimization** – Planned schedule and frequency for all. Clustered service visits. More predictable loads for treatment facility and route optimization of trucks.
- **Environmental benefits** – Lowered likelihood of septic tank overflows, increased efficiency of septic tanks resulting in lower pollutants (such as faecal coliforms) in drain effluent.

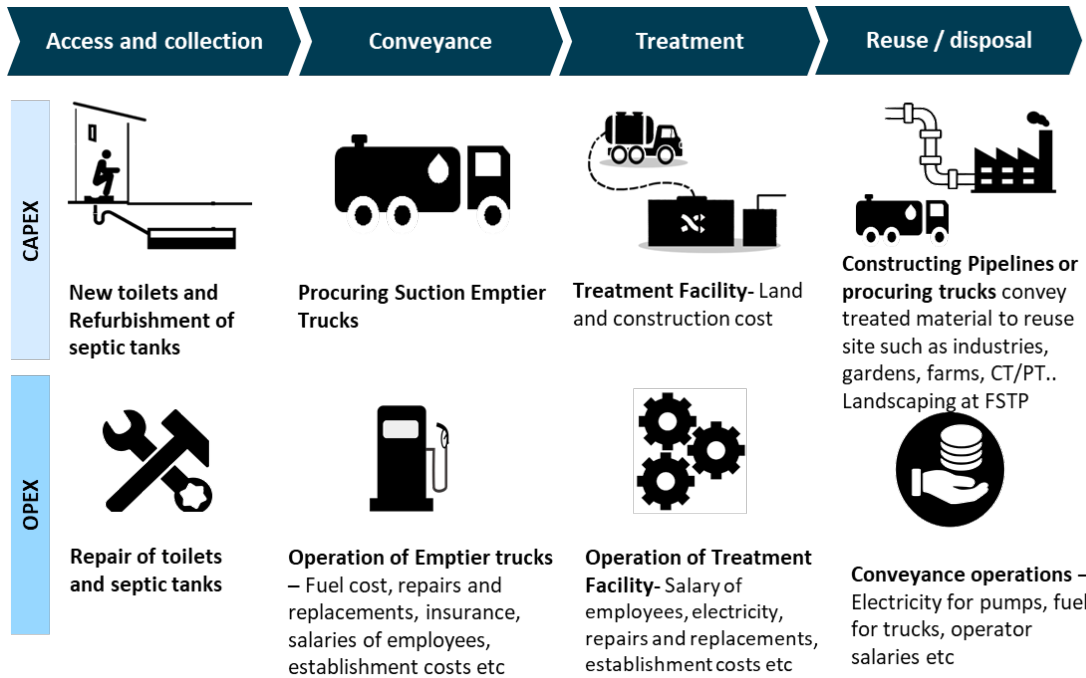
FSTP site and technology selection

In order to ensure that faecal sludge and septage are treated effectively, a Faecal Sludge Treatment Plant with appropriate technology has to be identified. One of the key factors for identifying the technology is the local context and site. The selection of the site needs to factor the availability of land and its cost, the distance to the site, geological parameters and reliability of electricity. Some of the other factors which influence the type of technology selected include the sludge characteristics and quantity and frequency of desludging, the capital and operating costs, the Simplicity in Construction & Operation - Level of mechanization required for operations, availability of spares and the technical performance of treatment option.

1.6. Financial requirements for FSSM in cities

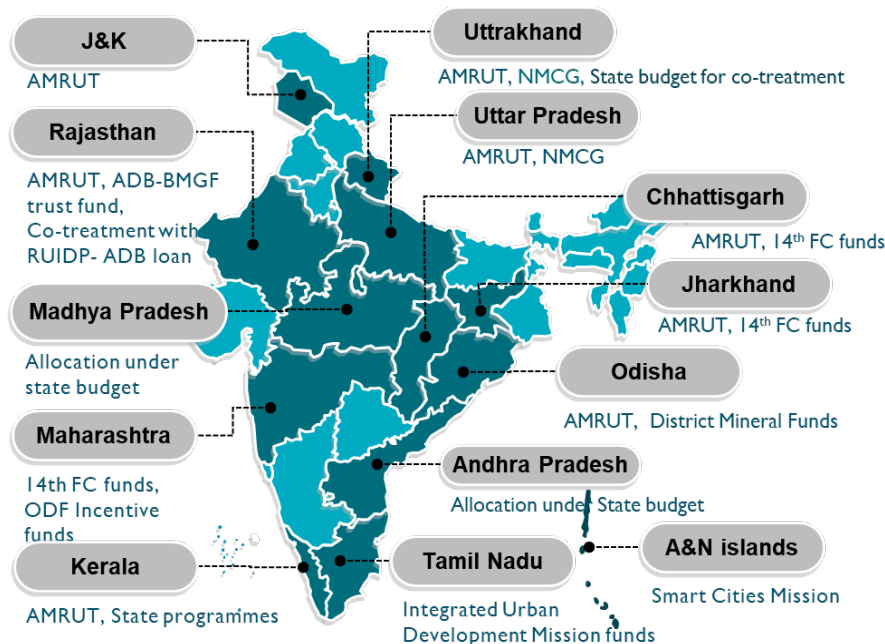
After understanding all the components of the FSSM value chain, it is essential to identify the possible financial sources to implement a FSSM plan in the city. With increasing recognition of FSSM solutions, financing sources and models have emerged as key. Sanitation services being the responsibility of local governments as per the 74th amendment to the Constitution of India, FSSM is typically viewed as a public good and thus public financing will have a significant role. While construction and repair of toilets/septic tank and operation of suction trucks (to some extent) can be funded by the end users, capital expenditure such as procurement of said trucks as well as construction of treatment plants will need to be funded through public financing. These come with added costs of daily operational expenditure such as fuel, electricity, salaries etc. In addition to these costs, there may also be additional activities such as awareness generation, improving data and monitoring systems and improving efficiency in collection of taxes and user charges by the local government.

Figure 8 Capex and Opex across sanitation value chain



In terms of programmatic funding, currently, funds can be availed from the Swachh Bharat Mission for construction of individual toilets, public toilets, community toilets and OSS systems. Whereas funds for procuring vehicles and equipment for conveyance of septage, establishing treatment plant and disposal site, are being availed from the AMRUT mission and Smart Cities Mission. Cities are also showing initiative by using their 14th FC funds for such projects. States also funding FSTPs through various programmes. Government of India can fund for FSTPs through national urban programs.

Figure 9 Funding sources across various states for FSSM



In an assessment done by CWAS-CRDF-CEPT University, for financing FSSM services, it was observed that costs for funding FSSM across India are not very high. For covering all cities, for the five year period of 2018-2022, capex for conveyance comes out to be ~INR 7000 crore and for treatment ~INR 10,000 crore. The opex cost is ~INR 5000 crore for conveyance and Rs. ~3000 crore for treatment. These estimates exclude cities which already have or have future plans for sewerage networks and treatment plants.

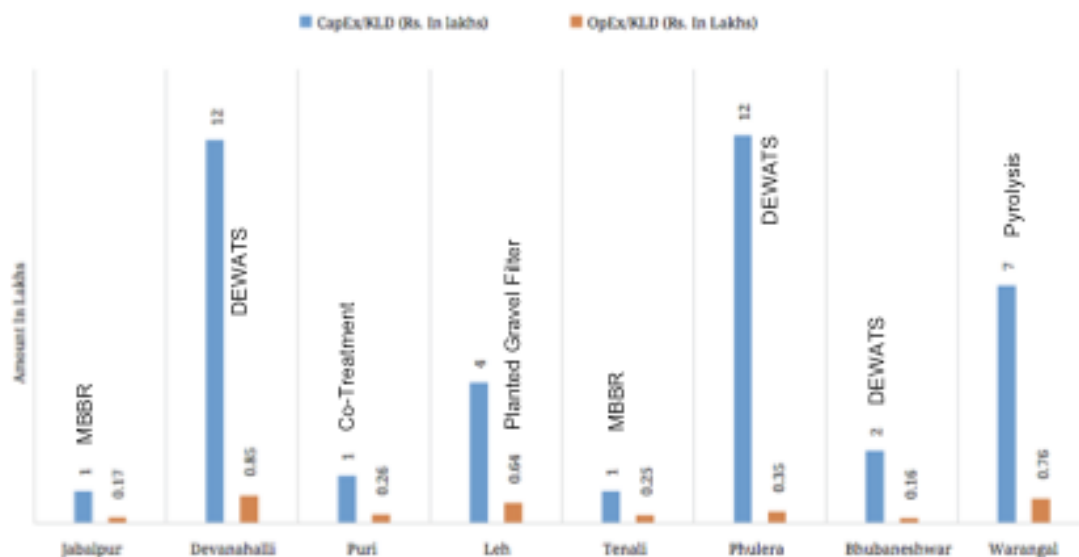
A different study done by [Intellicap](#) estimated that the required capacity for faecal sludge treatment will rise to 61 Million Litres per Day by 2024 .

“At least 2000 Faecal Sludge Treatment Plants (FSTPs) will be needed to meet this demand along with investment required to the tune of INR ~6000 Crore over the next 5 years.”- Intellicap, 2019.

CWAS’s studies across the four states of Maharashtra, Tamil Nadu, Andhra Pradesh and Odisha suggest that financing requirements for FSTPs is only 1 to 5% of state’s UDD budgets. Local governments have funds from Finance Commission allocations.

Cost of treatment depends greatly on technology selection. In a study conducted by the NIUA for [cost assessments of 8 model FSTPS in India](#), a fundamental analysis of the costing per KLD is carried out to understand the variation of the costing between technologies. Noticeably, costs of the FSTPs vary significantly, from as low as Rs. 1,00,000 per KLD to as high as Rs. 17,00,000. The variations are also since the extent of treatment significantly varies between technologies as revealed in more detail in the study. The type of treatment system being considered will, to a large extent, determine the CapEx distribution profile. Systems that require large structures such as DEWATS will incur higher construction costs. Complex hybrid systems such as MBBRs will have higher specialized consumable material such as chemicals and labour costs. Natural systems such as CWs and Planted Drying Beds will have a much greater civil works cost than conventional electro-mechanical systems due to the large surface areas involved.

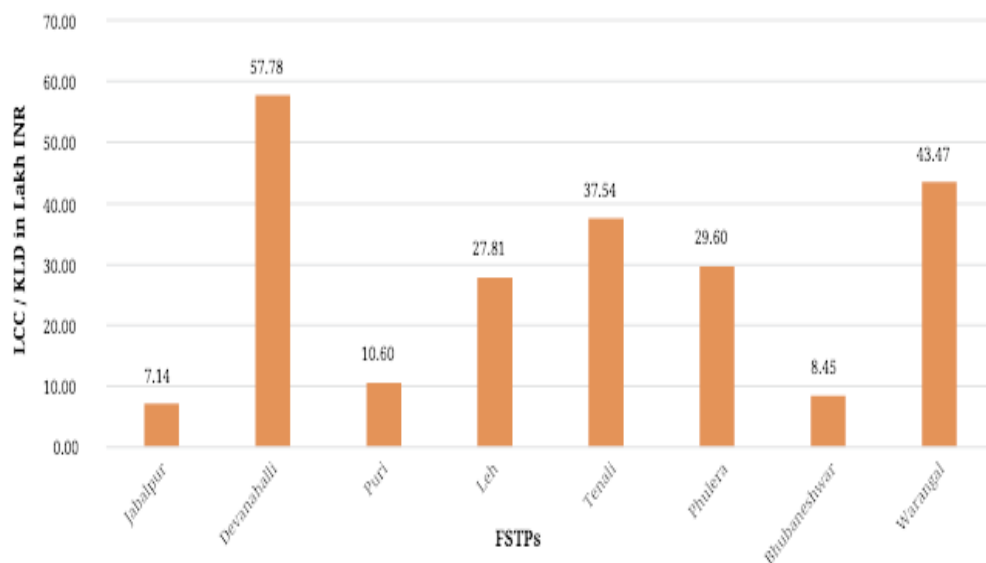
Figure 10: Comparative Capex and Opex for 8 FSTPs across India



Source: NIUA (2019) “Cost Analysis of Faecal Sludge Treatment Plants in India” . Retrieved from : https://www.pseau.org/outils/ouvrages/niua_cost_analysis_of_faecal_sludge_treatment_plants_in_india_2019.pdf

Life Cycle Costing or the total economic cost of a given system is determined by assessing both the capital and operational costs together over the entire life cycle of the system. The concept of LCC, now widely accepted, introduces a new level of transparency to costing, and exposed hidden costs that were not immediately apparent with traditional costing methods. This approach makes it possible to determine the most cost-effective solution amongst a range of alternatives by considering all cash flows over the lifetime of the system and allows practitioners to identify potential trade-offs between initial capital investment costs and long-term cost savings.

Figure 11 Lifecycle cost per KLD in Lakhs

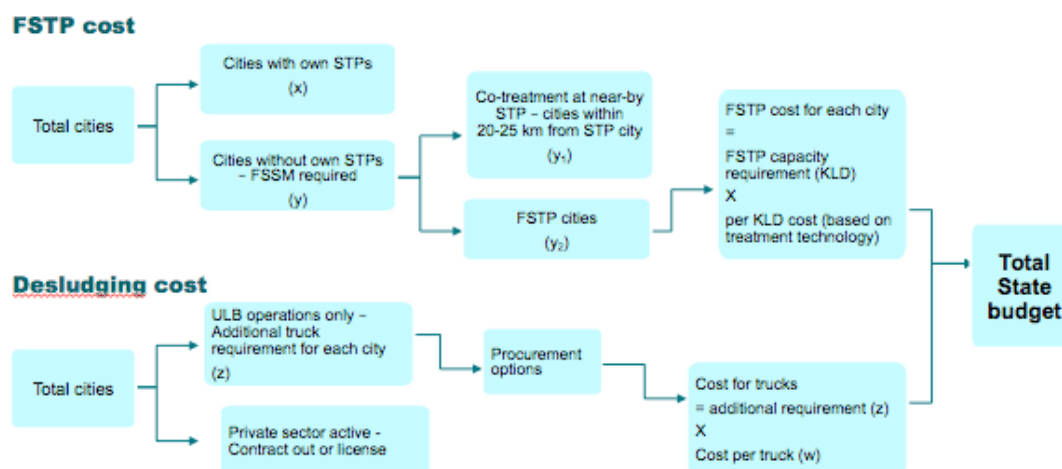


Source: NIUA (2019) “Cost Analysis of Faecal Sludge Treatment Plants in India” . Retrieved from : https://www.pseau.org/outils/ouvrages/niua_cost_analysis_of_faecal_sludge_treatment_plants_in_india_2019.pdf

Developing state strategy for FSSM finance

While local governments can plan for FSSM at city level, state governments need to strategize for scalability. Such statewide strategies begin by identifying existing treatment capacity and additional requirements across all cities. Co-treatment opportunities with STPs and cluster-based approaches, if possible, can be explored. If new FSTPs are to be built at scale, states may need to adopt standardized technology, designs and financing models and plan for convergence of programmatic funding. For conveyance, the state will have to assess requirements for additional trucks and may need to procure wherever ULBs cannot do so through own funds.

Figure 12 Steps for developing statewide FSSM strategy



1.7. Activity 2A - FSSM infrastructure estimation for a city

Participants should refer to the exercise workbook at this stage for this cost estimation exercise. Such estimations for a city will give a rough idea of the fund requirements for implementing citywide FSSM.

This activity entails a problem statement defining the current scenario in a city and its need for working out estimates for a FSSM plan. Using a similar approach, the participant can then workout calculations for their own city/state.

Delivery methods: Trainers can go with a traditional paper-quiz method. However, this exercise also includes calculations based on the formula provided. The trainer will need to guide the participants to understand the problem of the city and derive the parameters which will be used in the formulas. A pen-paper exercise is only advisable for a small training group since it requires extra time and human resource to collect and grade each exercise.

For large groups, if the audience is comfortable with digital methods, trainers can make the participants use the digital system and ask them to use software such as excel to carry out the calculations and vote their answers through any online platforms.

Answer key for activity 2A provided in Annexure 2.

1.8. Activity 2B – State budget estimation for FSSM services

Participants should refer to the exercise workbook at this stage for this budget estimation exercise. This exercise will give the participants a rough idea on how to estimate funds at state level for FSSM services.

This activity entails the current situation of a state with 10 cities and defines the status of each city. Using a similar approach from activity 2a, and understanding the need, the participants need to define the total infrastructure requirement and the funds allocation required at state level. The participant can then workout calculations for their own city/state.

Delivery methods: Trainers can go with a traditional paper-quiz method. However, this exercise also includes calculations based on the formula provided. The trainer will need to guide the participants to understand the situation of the state. A pen-paper exercise is only advisable for a small training group since it requires extra time and human resource to collect and grade each exercise.

For large groups, if the audience is comfortable with digital methods, trainers can make the participants use the digital system and ask them to use software such as excel to carry out the calculations and vote their answers through any online platforms.

Answer key for activity 2B provided in Annexure 2.

1.9. Potential funding sources for CapEx and OpEx

For developing a financing plan for FSM, potential sources of funds for capital expenditures will be required and terms and conditions for each will need to be identified. For construction of new septic tanks or refurbishment, possible sources for supporting capex include households, government subsidy and CSR funds. For conveyance of septage, capex can be sought from central or state grants, and under local government schemes. Establishing the FSTP and the disposal site are other major areas where more funds will be required if any private land needs to be procured. Background assessment of various ongoing programmes at the state and national levels will provide an idea of the possibility of accessing such funds to meet the capital expenditure requirements as well as for other needs such as awareness generation or data improvement measures.

Private sector participation is also a potential source of finance, especially for procuring suction trucks, but willingness of the private sector is to be assessed. State and central government will typically support only for capex and not for opex; the ULBs have to explore possible sources to cover opex costs. Potential sources for opex may include housing society fees, annual sanitation tax, and desludging fees taken from the property owners on the request of desludging their OSS systems. Assessment of current tariffs levels across FSSM service chain is required before levying new taxes for OpEx . Revenue generated by selling of product after the treatment of septage will also feed into opex revenues. For this, a landscape assessment of reuse market to assess possibility of selling compost or treated water

Figure 13 Potential funding sources for Capex and Opex for FSSM

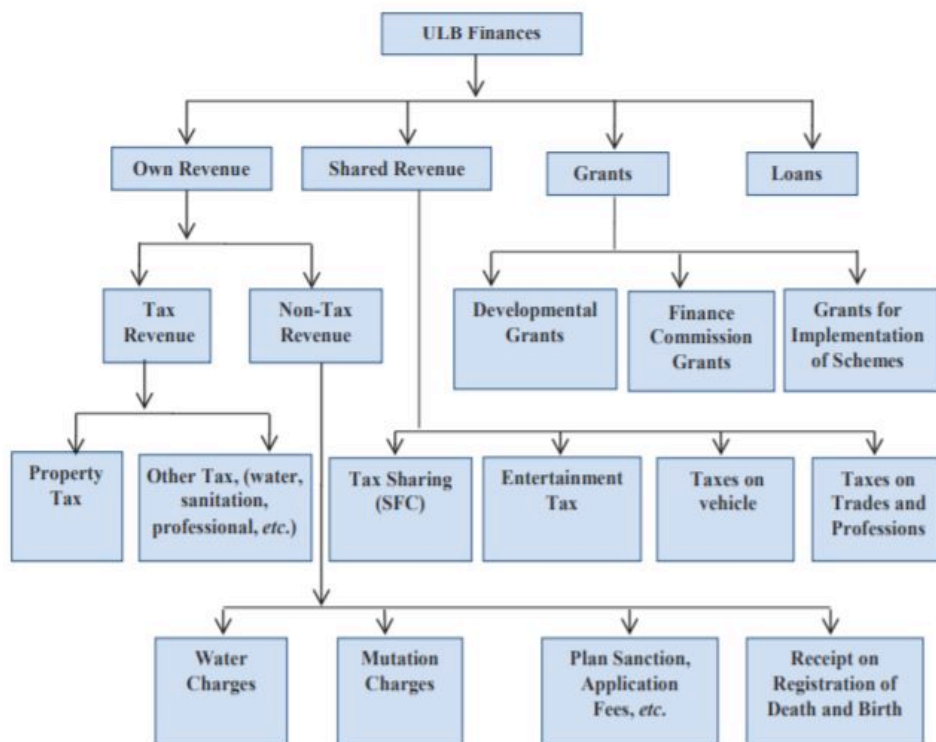
	Access	Conveyance	Treatment/ Disposal/Reuse
CAPEX	New toilets and Refurbishment of septic tanks	Suction Emptier Trucks	Treatment Facility- Land and construction cost
	Households	Central/State Grants	Central/State Grants, VGF
	Government Subsidy	Local Govt. funds	Local Govt. funds
	CSR fund, Crowdfunding, Credit	Private Sector/PPP	Municipal Bonds/Public Finance
			CSR, Crowdfunding, Donor agencies
			Private Sector/PPP
OPEX	Repair of toilets and septic tanks	Operation of Emptier trucks	Operation of Treatment Facility
	Households, Housing society fees	Sanitation Tax/Other Taxes	Initial period covered under grant funds
		User Charges (Emptying fees)	Sanitation Tax/Other Taxes

Source: Center for Water and Sanitation, CRDF, CEPT University (2017) “Training of Trainers for FSSM”. Prepared for NIUA under Sanitation Capacity Building Platform.

An Urban Local Government or a municipality is the layer of government which has the responsibility of development of cities and towns. The [74th Constitutional Amendment Act \(CAA\)](#), enacted in 1992, resulted in significant devolution of funds, functions and functionaries to this tier of government and hence functional autonomy of local governments. Following the passage of the 74th constitutional amendment which gave constitutional status to Urban Local Governments, various States created enabling legislation to transfer responsibilities of local infrastructure and service delivery to this tier of government.

Sources of municipal finance includes Taxes, Non-Tax, Fiscal Transfers and Loans/Grants, Capital Receipts and Contributions. Some of these such as tax and non-tax revenue are generated by these bodies themselves. But owing to rapid pace of urbanisation and the need for urban infrastructure development, own revenue generated by municipalities often falls short of their expenditure requirements. Thus, over and above their own revenue, most local bodies depend significantly upon the devolution of resources and grants from the State and Central governments; and borrowings from financial institutions.

Figure 14: Sources of funds for ULBs



As per the Constitution, the Government of India has been making allocations to local bodies through five year plans and finance commissions (Central Finance Commissions, State Finance Commissions). Beginning from the First Five Year Plan allocations have been made to Urban Local Governments for various purposes.

As regards the Central Finance Commissions, which primarily make recommendations on the distribution of tax revenues between the Union and the States, and also amongst the States, the Tenth Finance Commission introduced exclusive grants for rural and urban local governments. Since then various Finance Commissions have given concrete recommendations regarding municipal finances and the criteria for devolution of funds to Urban Local Bodies.

Levying taxes or user fee is an important source of revenue to make treatment plant financially sustainable. Many states in India have municipal acts which allow for levying certain special taxes for sanitation services. Various states have legal provisions in their tax structure for charging tax and are already charging fees in terms of sanitation tax/user charge, which is a major source of revenue. Gujarat, Maharashtra, Uttar Pradesh, Uttarakhand and Punjab have provisions for taxations in different heads like general sanitation tax for Gujarat, Special sanitary tax for Maharashtra etc. In case of West Bengal, Punjab, Haryana, Rajasthan there are provisions for fees and user charges for drainage, scavenging etc.

Table 4 Provisions related to sanitation tax in state municipal acts

State	Provisions related to sanitation services	Provision for Sanitation Tax	State's Municipalities Act
Andhra Pradesh	1. Pay for clearance of sullage 2. Scavenging tax as a part of property tax	1. Owners of buildings to pay for clearance of sullage from their buildings by connecting their house-drains with public drains 2. a scavenging tax to provide for expenses connected with the removal of rubbish, filth or the carcasses of animals from private premises	The Andhra Pradesh Municipalities Act, 1965. Part IV and V. Chapter-1, Section 85 and Section 148
Odisha	1. Latrine Tax 2. Drainage Tax	1. a latrine tax on the annual value of holdings 2. a drainage tax on the annual value of holdings	The Orissa Municipal Act, 1950, Chapter XIII. Section 131
Gujarat	1. Special sanitary cess 2. General sanitary cess 3. Drainage tax	1. a special sanitary cess upon private latrines, premises or compounds cleansed by municipal agency, after notice given as hereinafter required a 2. general sanitary cess for the construction and maintenance of public latrines and for the removal and disposal of refuse 3. a drainage tax	The Gujarat Municipalities Act, 1963. Chapter VIII. Section 99
Uttar Pradesh/ Uttarakhand	1. Conservancy tax 2. Scavenging tax	1. a conservancy tax for the collection, removal and disposal of excrementitious and polluted matter from privies, urinals, cesspools 2. A scavenging tax	The Uttar Pradesh Municipalities Act, 1916. Chapter V. Section 128.
Tamil Nadu	1. Sewerage tax	1. Sewerage tax can be levied at a rate not exceeding fifteen percent of property tax as the council may determine	The Tamil Nadu Urban Local Bodies Act, 1998. Chapter VI. Section 80.

To identify funding sources for CapEx, assessment of ongoing programmes at the state and national levels is required. States have earmarked funds/ grants for procurement of vacuum trucks for urban local governments. For treatment units, cities may mobilize 14th FC funds, other own funds or ongoing national or state programmes.

Session 2: Business Models for conveyance

Session 2. Business models for conveyance in FSSM

2.1. About this session

This session describes seven business models that are used for conveyance in FSSM. The models are based on conveyance types i.e. demand based desludging and scheduled desludging. This session explores the benefits, challenges and applicability of these models and also explains them through various national and international practices. The objectives of this session are:

- Introduce the types of models for operationalizing scheduled or demand based desludging.
- Understand benefits, challenges, applicability for each model as well as operational and financial roles.
- Present national and international case studies of business models in conveyance.

2.2. Session Plan

Duration: 90 minutes

Table 5 Plan for second session

Activity	Time Duration	Material Method
Presentation on conveyance business models	30 mins	Power point presentation
Case study movie and quiz	20 mins	Video and quiz
Exercise on Building a model for a financially feasible desludging business in a city	40 mins	Exercise available in Part C

2.3. What are Business models?

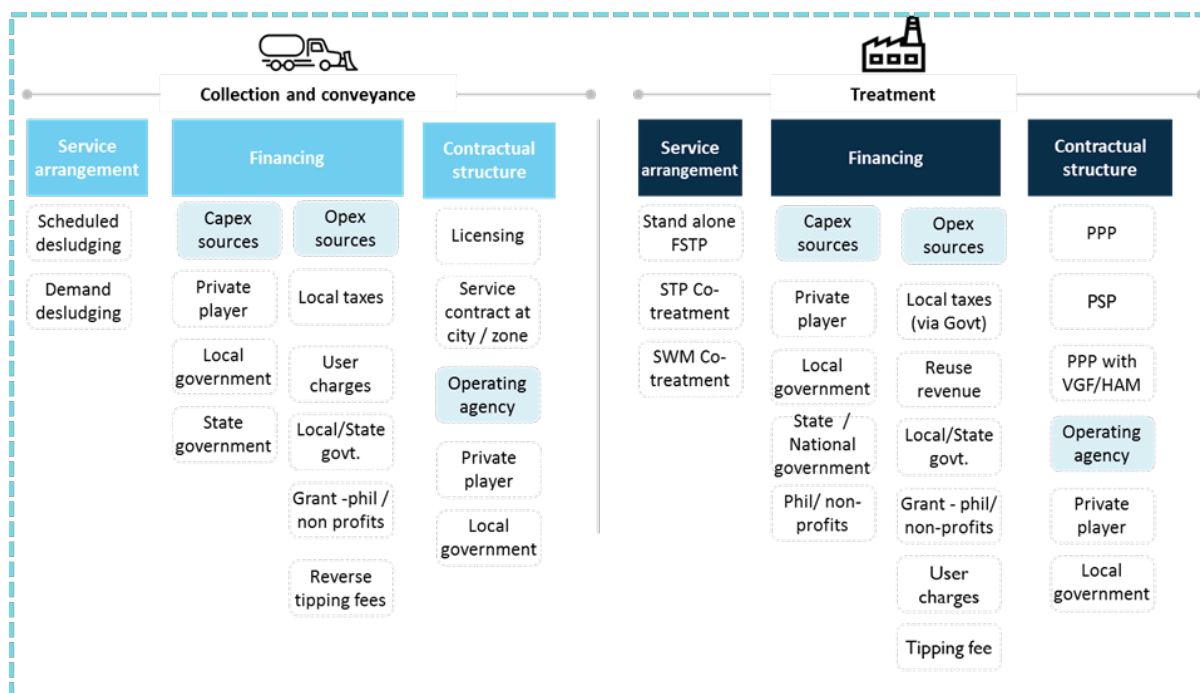
A **business model** is defined as a Service Model for a public service, it outlines the manner in which the service is structured, financed and management arrangements for it are delivered. Sanitation and FSSM in particular requires this approach.

Key Highlights of Business Models:

- Citywide Sanitation where sanitation services are accessible across all areas within the city.

- Equitable services, ensuring that the services are available and accessible to everyone including those in vulnerable communities.
- Cost effective so that it is affordable for the consumers, the service providers and the ULB.
- Sustainable to finance its own cost of capital, operations and management.

Figure 15 Core Parameters that define business models



Source: CWAS (2019) “Business models for Faecal Sludge and Septage Management” CEPT University

Business models are designed separately for conveyance and treatment; though there is also possibility for an integrated model. The core parameters for that define a business model are the service arrangement, the capex and opex finance mechanisms and the contractual structure.

Table 6 Core parameters which define a business model

Core parameters defining business models	Rationale
Service arrangement	<ul style="list-style-type: none"> • The type of service delivery in Conveyance for example are scheduled vs. on-demand desludging. • The type of service arrangement in Treatment include FSTPs, co-treatment at STPs. • The service arrangement is the key determinant of environmental outcomes.

<p>Financing</p>	<ul style="list-style-type: none"> • There are a range of potential actors to fund capex, example government, private operators and philanthropic funds. • Their relevance is determined by the nature and quantum of funding and commercial viability of the model. • There are a range of potential sources of opex funding e.g. taxes, user charges, grants and reuse. • It is dependent on a wide range of factors such as availability of markets, financial capacity of ULBs, willingness to pay of households etc.
<p>Institutional/ contractual structure</p>	<ul style="list-style-type: none"> • This parameter is crucial to define project structuring and identify responsibilities of players involved in the project. • It helps to define who will be responsible for construction, operation and maintenance and monitoring aspects of project. • This will drive the terms of the contractual arrangement e.g. long term public-private collaboration through PPP or PSP, or a license

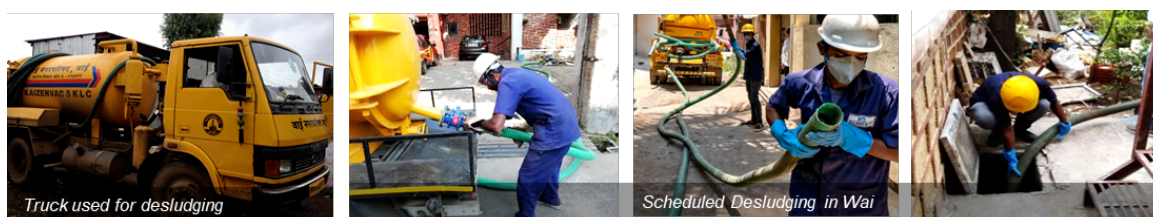
Types of Conveyance Systems:

There are two types of service arrangements in conveyance. One is demand based desludging while other is scheduled based emptying.

Demand desludging: where the cleaning or desludging is done when households or users call for the service typically when their septic tanks are full.

Scheduled desludging: where regular cleaning or desludging of septic tanks is done as per schedule based on pre-defined intervals of every 3 to 5 years.

Figure 16 Images depicting desludging activity

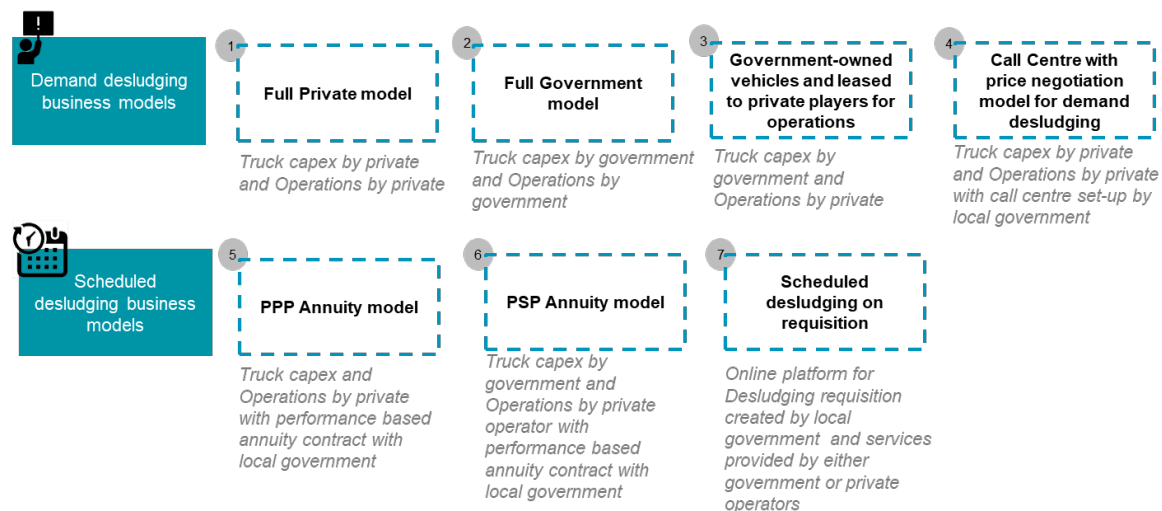


Source: CWAS, CEPT University

2.4. Emerging Models of Conveyance Systems:

The conveyance service is provided either by ULBs or private operators. These models are different for the different types of service arrangements though they involve mostly the same players. These models are mainly classified based on their approach for desludging, i.e. demand-based desludging and scheduled based desludging. There are four service models for demand-based desludging and three for scheduled desludging.

Figure 17 Emerging Models of Conveyance Systems



Conveyance Prototype 1: Full Private Model for demand based desludging

Model Description:

The private operators buy their own trucks and undertake desludging operations after receiving licensing or registration from local government and collect user charges from households. Households request for desludging, typically only when tanks have overflowed.

Benefits:

This model is commercially viable since the charges are market based. It doesn't require high ULB financial and implementation capacity needs.

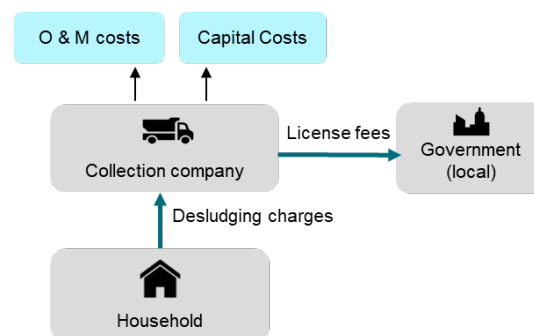
Challenges:

- It enables environmental and health hazards from tank overflows.
- The profits from the conveyance stage get appropriated by the private sector.
- The user charges are higher than needed due to inadequate demand and the need for adequate profit margins.
- It may lead to open defecation by low income users as they do not want the tanks filling up and have to pay high prices.
- It is essential for ULBs to provide designated disposal sites and effectively monitor the safe cleaning and disposal practices.

Applicability:

It is applicable in cities where the ULB's financial and operational capacities are less and there is presence of an adequate number of private sector desludging operators. The fully private models are prevalent globally and in many states across India.

Figure 18 Full Private Model for demand based desludging



Case of Andhra Pradesh, India

In Andhra Pradesh, most ULBs have active private players for desludging services. The private operators have to register with the ULB and are only allowed to operate within the ULB limits. The tipping fees is not applicable, since part of the registration to operate a truck includes a condition to dump at the treatment site. The opex is recovered through user charges generally ranging Rs. 1000-2500 per trip.

Note: This type of model is also seen in many other cities of India

Case of Kumasi, Ghana

In Kumasi, Ghana, private truck operators have to obtain licenses from the Waste Management Department (WMD) at Kumasi Metropolitan Assembly (KMA). City authority moves away from providing direct services and facilitate participation of the private sector in providing desludging services. WMD in KMA has set rules for private sector participation and vets the operator before issuing a license. Private truck operators have to pay disposal fees to KMA's treatment plant. In Kumasi, strict monitoring combined with the threat of the license being revoked, which would highlight failure to comply with the regulations and community shaming, has drastically reduced illegal dumping of Faecal Sludge.

Figure 19 Desludging in Khumasi, Ghana

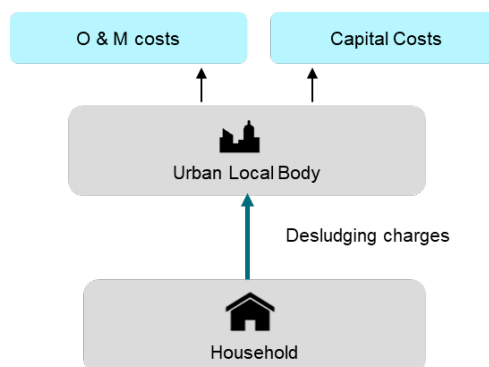


Conveyance prototype 2: Full government model for demand desludging

Model Description

In this model, the local or state government buys the trucks; undertakes desludging operations and collects user charges from households. The ULB will have to manage the capital costs as well as the operation and maintenance costs. The households

Figure 20 Full government model for demand desludging



request for desludging services typically only when tanks overflow.

Benefits

This model becomes financially feasible for the government since charges factor in the opex recovery.

There is no contracting and monitoring arrangement requirements between multiple players since the government is the single service provider.

Challenges

The ULB is required to have high implementation capacity.

The capex and opex burden is on the ULB.

It could possibly lead to low service delivery levels of publicly owned trucks and not maintained and if response to household demand is inefficient.

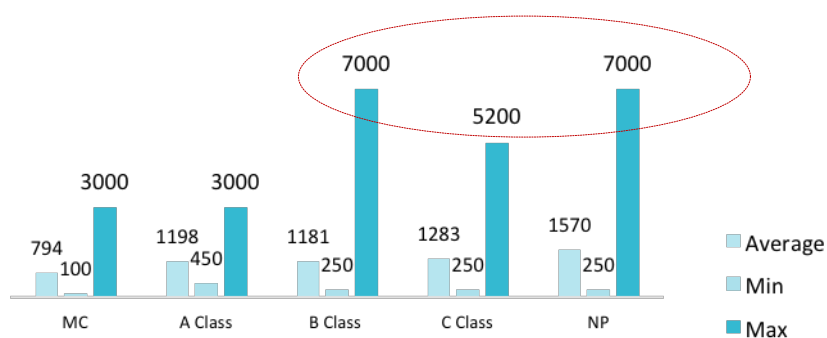
Applicability

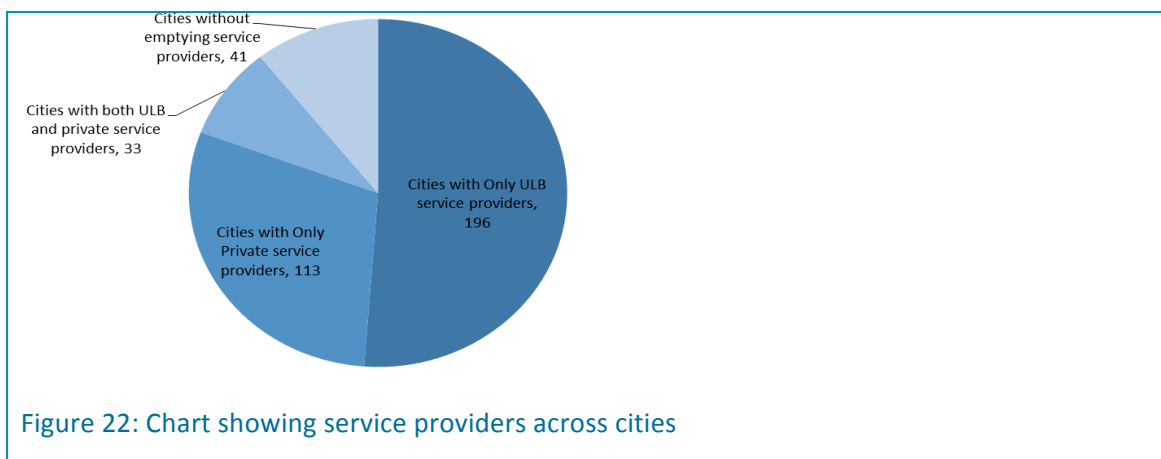
It is applicable in cities where the ULB's financial and operational capacity is more and presence of private sector desludging operator is not available.

Case of Maharashtra- Local government demand based model

Large number of medium and small size cities in Maharashtra are dependent on local government for desludging services. Local government mostly has 1-2 trucks which provide emptying service on the demand of HHs. User charges are collected at the time of emptying services based on the number of trips and distance covered. In some cities, private sector are also present but without any licensing and registration process. Currently only 9 cities have private operators on contract basis.

Figure 21: Chart showing average desludging charges across various class of cities



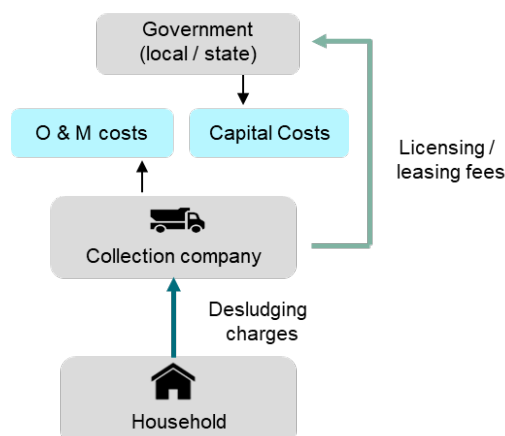


Conveyance prototype 3: Government-owned vehicles and leased to private players or SHGs for operations using demand based desludging

Figure 23: Govt. owned vehicles and leased to private players for operations using demand based desludging

Model description

In this model, the private enterprise or Self-Help Groups (SHGs) leases vehicles from the government, for which they pay a licensing or leasing fees. They provide cleaning in response to service requests from households. The households request for desludging, typically only when the tank overflows. User charges are either collected by private operator or by local government.



Benefits

- This model is commercially viable since charges are market based.
- ULBs don't require high implementation capacity needs since operations are undertaken by the private operator.
- It is likely to have high performance levels due to the private sector operations and incentives.

Challenges

- The capex burden is on the ULB.
- Equity can be a challenge in the absence of rate cards.
- It requires high contract monitoring capacity within ULBs.

Applicability

It is applicable in cities where the ULB's financial capacity is more but operational capacity is less and there is presence of private sector desludging operators.

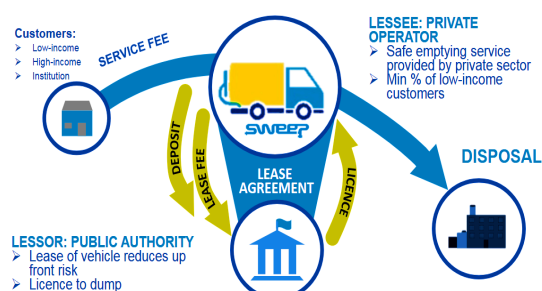
Case of Odisha: Government has adopted the model of owning emptier vehicles and leasing it to private operators for operations

OWSSB (State government agency) had purchased emptying trucks and allocated them to ULBs based on estimated sludge generation in their cities. The OWSSB used OUIDF funding to buy trucks. The local government had issued tenders for inviting private operators to operate these vehicles. Only 15 ULBs out of 43 ULBs have received response from private operators. The key reason is low presence of private operators, low business in smaller cities due to high presence of insanitary toilets and high security deposit against leasing of trucks. The ULB has a contract with the private player, where the private player will operate the trucks and carry out desludging services in the city and charge a cleaning fee from the households. User charges (Rs.900 per trip) are fixed by government and are collected from household either by ULB or private players depending on contract/ licensing terms. As per the tender, it is expected that the operator does 6 desludging operations per vehicle per day. Private agency are responsible for these activities for a period of seven years. Local governments have to monitor the entire service and conduct various awareness generation programs through IEC modes.

Case of Dhaka, Bangladesh- PPP arrangement with private sector with service fee

In Dhaka in 2015, WSUP designed a PPP to be delivered through a lease contract between DWASA and a cleaning services business with well-defined roles and responsibilities. Under this agreement, DWASA provided the company with two 2,000 litre vacuum tankers to use under the ‘SWEEP’ brand. Until recently, focus was on medium and large customers to establish commercial viability. New clause introduced in mid-2017 mandating 30% of customers from low-income Communities. For service fees to be paid by consumers, differential pricing model was introduced to facilitate service offering to low-income customers. Entrepreneurs have flexibility to set price and respond to the market accordingly.

Figure 24 SWEEP model in Bangladesh



Source: Rahman, H. and Dobbie, C. (2019) “Embedding and scaling an innovative PPP model for citywide services in Dhaka, Bangladesh” Presentation at FSM5, 2019

Engagement of SHGs in desludging activity in Vasai-Virar

23 members from the City Level Federation awarded desludging contract by the ULB in Vasai-Virar. Under this contract, after completing the desludging activity, SHG members generate a bill and submits to the ULB based on which they are paid Rs 500 per tank.

Figure 25 Vasai Virar - SHG engagement



Conveyance prototype 4: Call center with price negotiation model for demand desludging

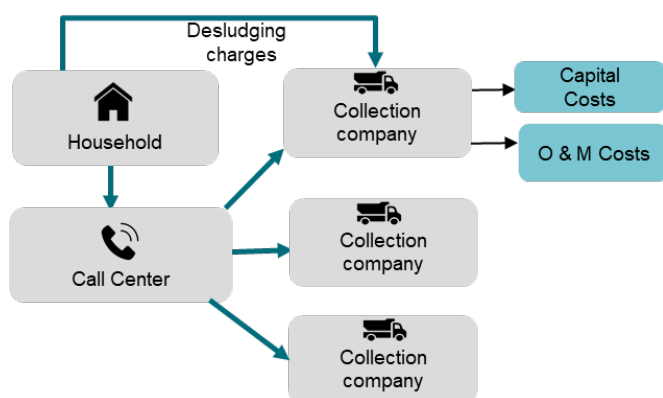


Figure 26: Call center with price negotiation model for demand desludging

Model description

In this model, a call center is established for linking households with private desludging operators with the mechanisms of emptying charges negotiation. In this, households sends the desludging request to the call center. The call center contacts the emptier in vicinity of households for quotations. The emptiers send their quotation to the call center. The center then sends the lowest quotation to the households. On confirmation from the households, the center assigns the service to the private player. The center also checks the quality of service and households satisfaction.

Benefits

It provides easy access to emptying services.

It enables creating consortium of emptiers.
 The service is available at a reasonable cost through healthy competition.
 It is likely to enable high performance levels.
 It helps to provide more equitable and affordable emptying services.
 This business model can potentially reduce the emptying fee and help to provide more equitable and affordable emptying services.

Challenges

It requires high levels of monitoring and implementation capacity.

Applicability

It is applicable in large cities where there are multiple private players present and there is competition among them. Eg: Bangalore, Delhi, Hyderabad, Pune, etc.

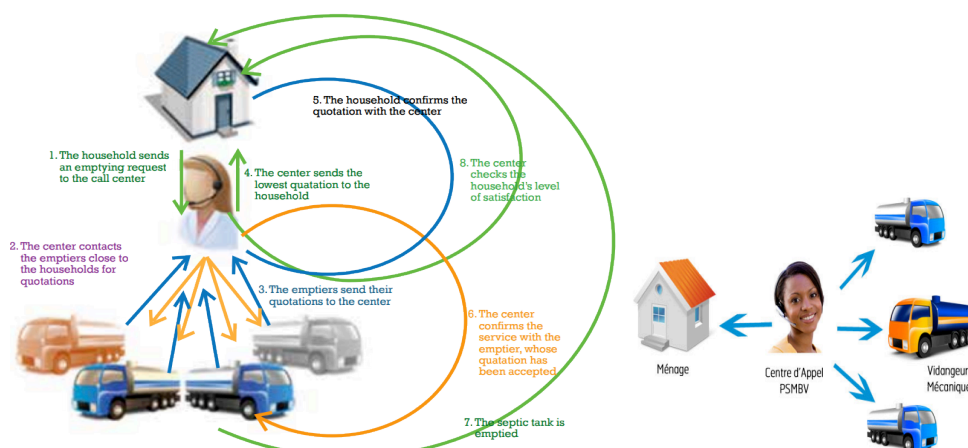
Case of Dakar, Senegal- Call center model for market based desludging services

The PSMBV (Program for Market structuring of faecal sludge management) has initiated innovative activities, including the establishment of a call center to connect Faecal sludge desludging operators to households in need on mechanical desludging.

What has been achieved?

Easy access to desludging services- Call center Services available all around Dakar
 Creating consortium of emptiers - 138 desludging trucks are listed in the call center platform database
 Transferred sludge volumes at stations have increased since the scaling of the call center
 The average price of the desludging service through the call centre has declined from USD 56 (before program) to USD 46 (between 2012 and 2016, a drop of 18%).

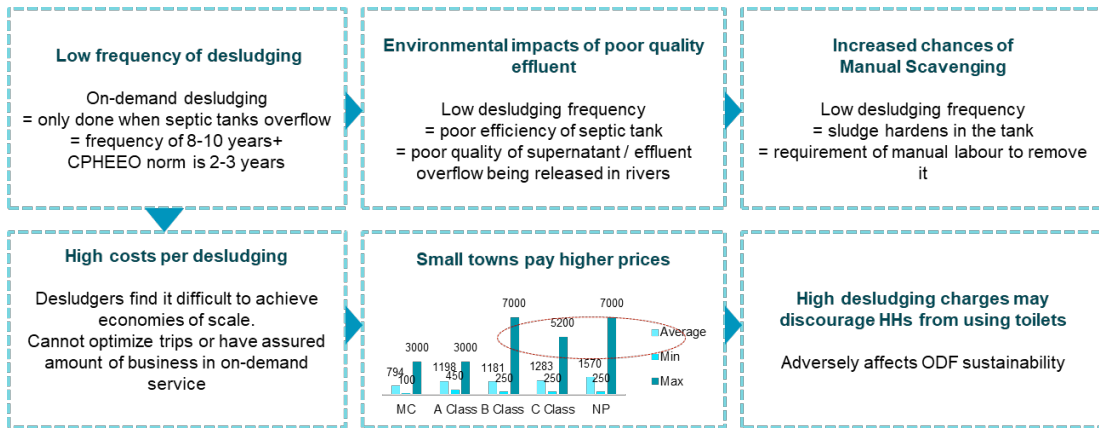
Figure 27 Dakar call center model



Source: Program for the Structuring of the faecal Sludge market for Poor PeoPle in Dakar Suburban areas (Pikine and Guédiawaye); Post, V. "Business models in sanitation" Presentation at IHE Netherland.

Despite its widespread use, demand based desludging poses many serious issues of equity and negative environmental impacts.

Figure 28 Challenges of demand based desludging



This is a common business model and is based on user charges levied at the time of emptying. In most cases charges are high ranging from Rs. 1000 to Rs. 1500. In some cities it is reported that a very high fee of Rs. 7,000 is charged. Desludging charges are generally higher in smaller cities and in areas outside the ULB jurisdiction. Households are generally willing to pay these high charges as they have no other recourse but to pay whatever the emptier demands.

Scheduled desludging can achieve regular desludging as recommended by CPHEEO

Figure 29 Scheduled desludging vs Demand based desludging

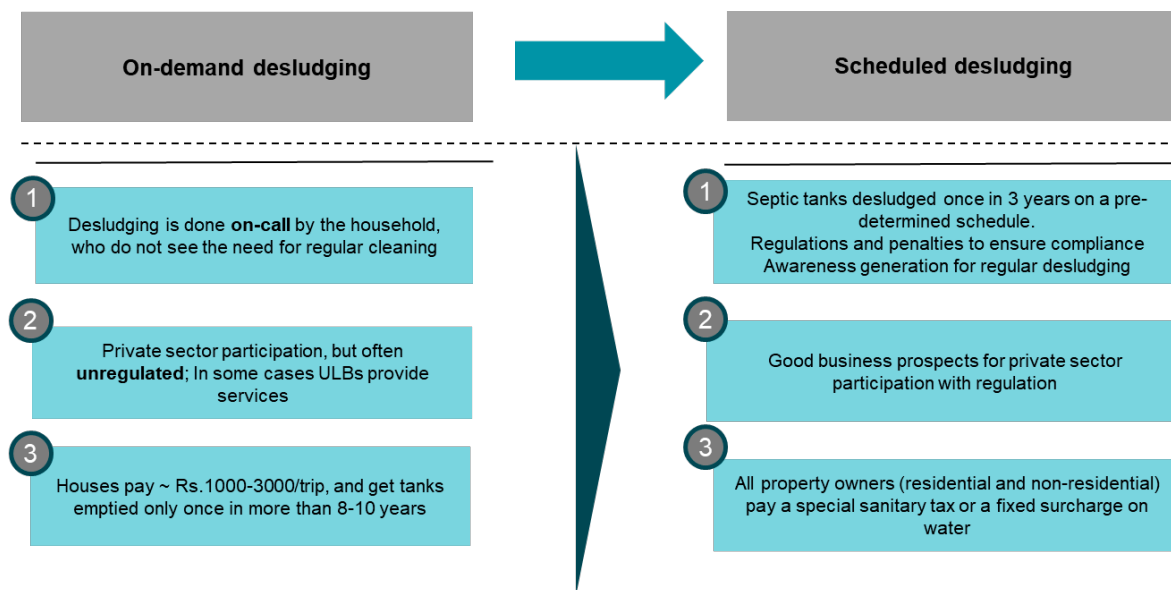
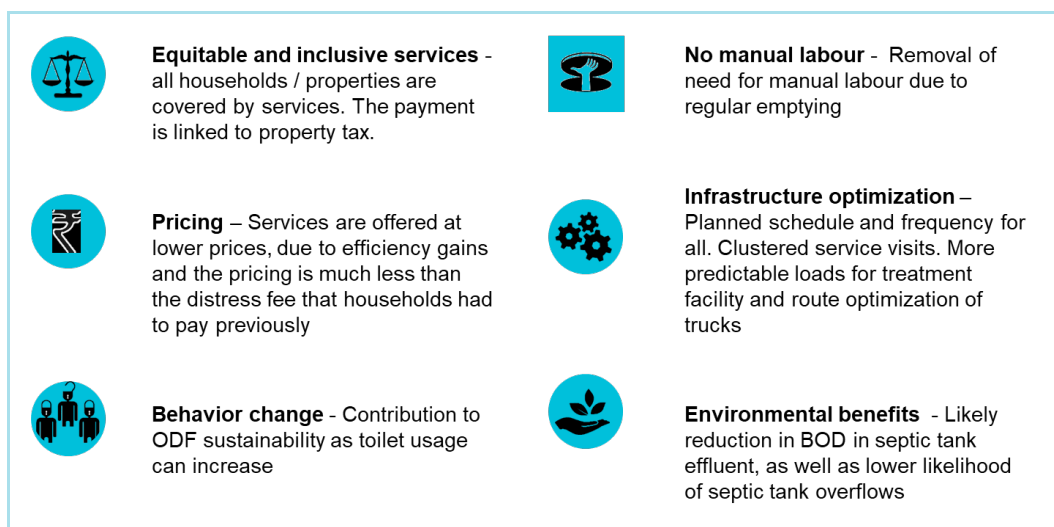


Figure 30 Benefits of Scheduled Emptying



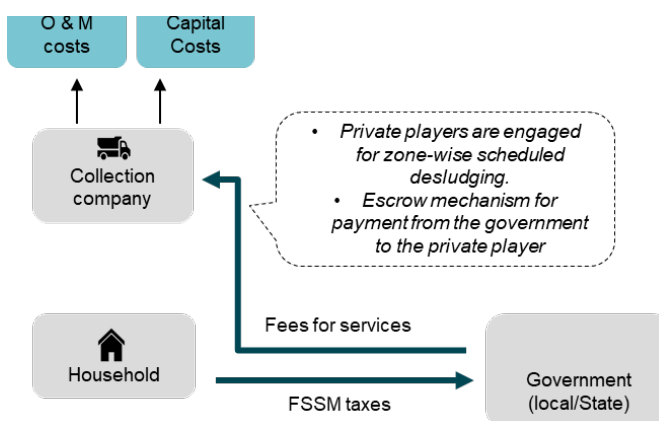
Based on MOUD and CPHHO with JICA(2013), “Manual on Sewerage and Sewage Treatment Systems - 2013 ; Part-A Engineering”, Chapter 9., p. 9-22

Conveyance prototype 5: PPP Annuity model for scheduled desludging

Model description

The private service provider brings trucks and operates them through a performance - based contract to carry out scheduled desludging on a pre-determined schedule set by local government. The fees as per the bid are paid to private operators per septic tank or per trip emptied. The city collects a special tax or a surcharge on water to cover the payment of fees. For large cities and for metropolitan areas where partial sewerage network is present, scheduled desludging model can be explored for areas with onsite sanitation systems. These could be through zonal contracts with private operators.

Figure 31 PPP Annuity model for scheduled desludging



Benefits

- It reduces the capex burden on the ULBs.
- It generates revenue through taxes to pay for service.
- The performance-based contracts tend to lead to higher service levels.
- The guaranteed revenues can induce higher private sector participation.

Challenges

- Deploying this model requires high-levels of ULB capacity.

Significant behavior change is needed to mobilize the tax.

The limited government capacity, especially in small cities, to design and implement such contracts.

Monitoring of private operations and ensuring that de-sludge septage is disposed at treatment site.


Applicability

It is applicable in cities where there is presence and willingness of the private sector to invest in trucks capex and take on contracts. The local government should have capacity to monitor the operations.

Case of Wai, Maharashtra-PPP annuity model for scheduled desludging

In Wai, ULB appointed the private player to carry out scheduled desludging service in the city. The Capex cost of the truck and Opex cost of the desludging service will be initially mobilized by the private player which will be paid back by the local government using annuity payments. The private player will be paid against performance linked to the number of septic tanks emptied. The household will pay sanitation tax to the local government, which will ensure that adequate funds are available to recover the cost of desludging service. The risk of late payment raised by private players is attempted to be mitigated through an escrow account mechanism.

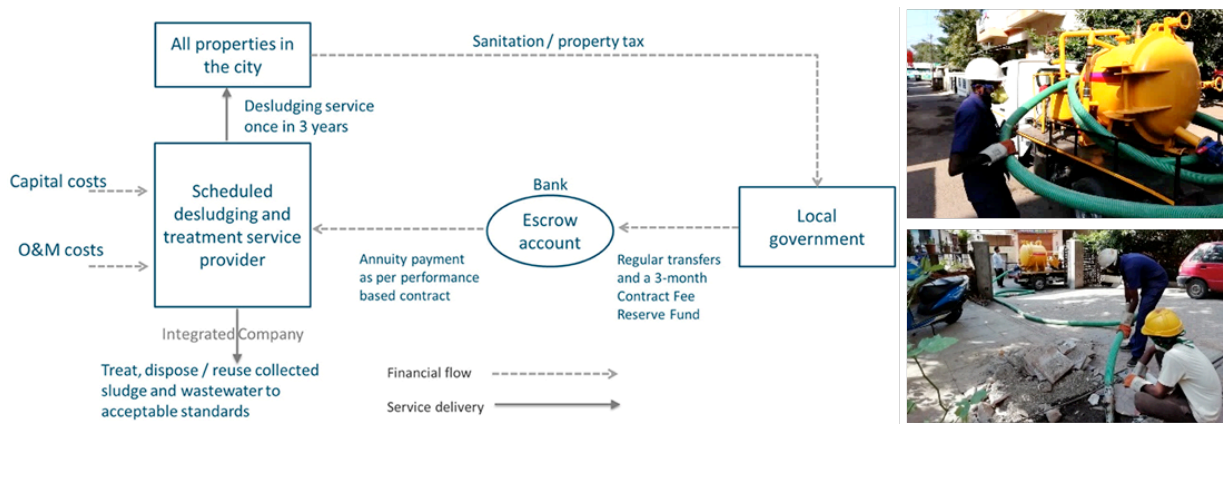
Unlike user charge, the payment for the service is not paid at the time of desludging but through a sanitation tax (levied as a flat charge or as a % of property tax) paid annually. Sanitation tax much less than the cost incurred per household previously for emergency emptying due to trip optimization. The sanitation taxes levied by ULB is for recovering OpEx. This could be graded to make it affordable for all.



For more details, refer: **City Wide Inclusive Sanitation Through Scheduled Desludging Services: Emerging Experiences from India**

Link: <https://www.frontiersin.org/articles/10.3389/fenvs.2019.00188/full>

Figure 32 Performance Linked Annuity Model (PLAM) for conveyance in Wai, Scheduled desludging in Wai

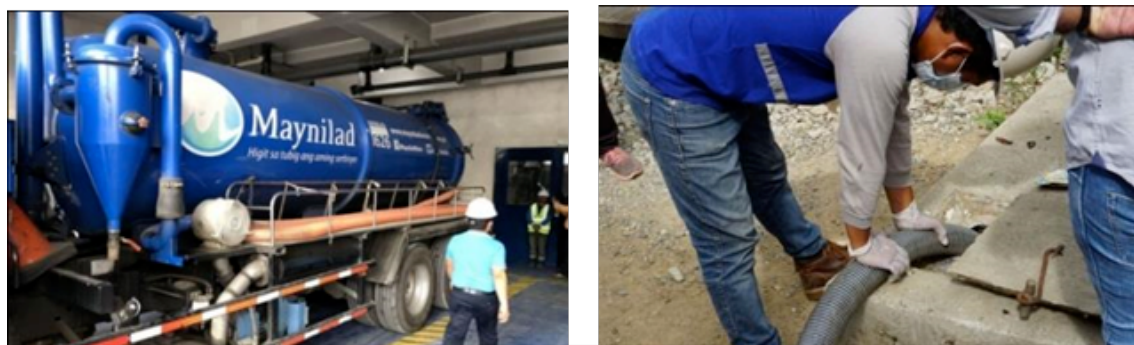


Case of Philippines - Scheduled desludging by private concessionaires through environment tax

A national legislation (Clean Water Act) recognized the full service chain of sanitation and scheduled septic tank desludging cycle. Private firms operate under a concession agreement with the Metropolitan Waterworks and Sewerage System, originally a public organization privatized in 1997. The services are provided by a private concessionaire (Manila) or city water district (Baliwag, Dumaguete).

In Manila Metro, scheduled desludging by two private concessionaires; Manila Water Company and Maynilad Water Services, Inc. In Dumaguete – a similar model is used but with the Water District Authority. The water district is responsible for collection and transportation of sludge while Dumaguete City local government unit (LGU) is responsible for O&M of treatment plan. The capital cost is shared by the water district and the LGU. The tariffs are set by law to allow these companies to cover capital and operating costs, with some built-in profit. An environment fee of 20% of water bill or a tariff linked to water consumption for regular desludging services is levied. Effective awareness programs and IEC activities, charges and penalty norms for denial of desludging service ensure its applicability. Safe desludging practices like use of safety gears have been put in place.

Figure 33 Scheduled desludging by private concessionary in Manila



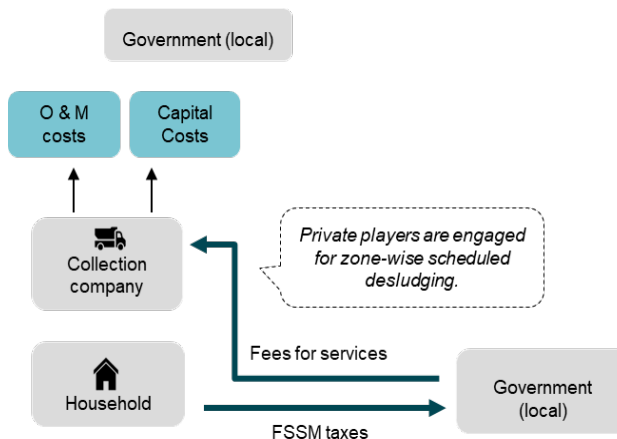
Source: Presentation made at International Twinning Program on FSSM in Philippines.

Conveyance prototype 6: PSP Annuity model for scheduled desludging

Model description

In this model, a private service provider leases or operates local or state government-owned trucks and carries out desludging operations on a performance based contract. The fees is determined as per the bid to private operators per septic tank or per trip emptied. The city collects a special tax or a

Figure 34 PSP Annuity model for scheduled desludging



surcharge on water to cover the payment of fees.

Benefits

It generates revenue through tariffs to pay for service.

The performance-based contracts tend to lead to higher service levels.

It covers service gaps where there are few private players or are players with low financial capacity.

Challenges

Deploying this model requires high-levels of ULB capacity, both from a financial and technical perspective.

Significant behavior change is needed to mobilize the tariff collection.

Monitoring of the private operations and ensuring that they are not dumping openly becomes essential.

The government capex may incentivize more and smaller private providers to participate.

Applicability

It is applicable in cities where there is private sector presence, but low capacity to invest, while local or state government has the financial and monitoring capacity.

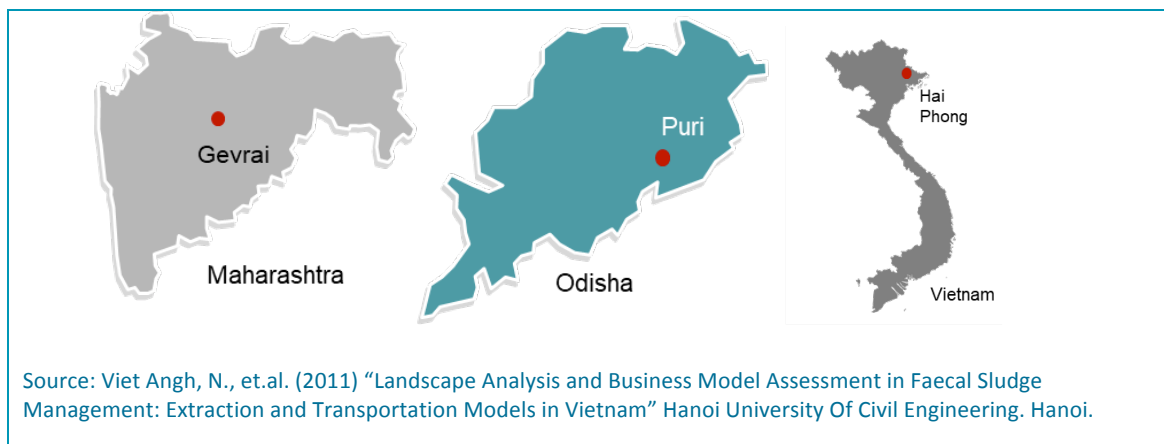
The government capex may incentivize private players to participate.

Case of Gevrai, Maharashtra and Puri, Odisha- Planning PSP model for scheduled desludging

Both the cities are planning for scheduled desludging options for conveyance. Trucks will be provided by government and private sector will be contracted for operations of scheduled desludging model. FSSM taxes (as part of property tax) will be collected by local government from households. Local government will monitor private sector activities and oversee to disposed collected sludge at treatment plant only. Payment to private sector will be on performance or number of septic tanks emptied. Payments to private operators will be made through an escrow account by the Government.

Vietnam- Scheduled desludging in Hai Phong with surcharge on water bill

Hai Phong Sewerage and Drainage a state Company limited (Hai Phong SADCO) is responsible for provision of sanitation services. Its GIS database has 86,501 septic tanks under scheduled desludging across 4 urban districts. Desludging interval for household septic tanks is once in 5 - 6 years, and for communal apartments once in 1 - 2 years. Scheduled desludging is covered by the city's budget and waste water fee of 15% surcharge on water bill. In the city of Hai Phong, scheduled faecal sludge desludging service for the communities is only through the surcharge.



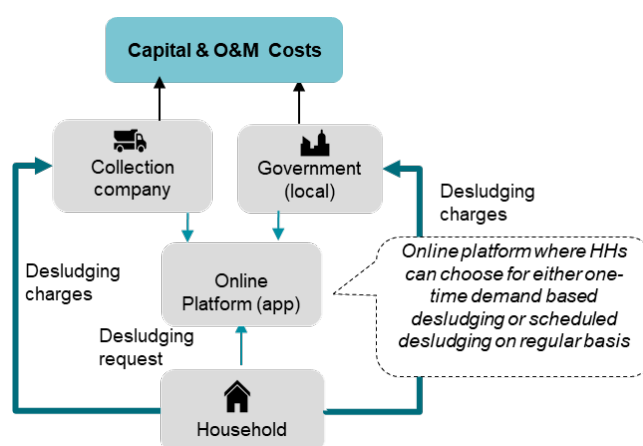
Conveyance prototype 7: Scheduled desludging on requisition

Model description

In this model, the scheduled desludging service is provided to only those households that request regular desludging. An online platform is created by local government, where households can register for desludging request and can choose from options of either one-time demand-based desludging or scheduled desludging on regular basis.

The service are either provided by government or by a private provider registered on an online platform. The desludging rates are fixed by the government on basis on demand desludging requisition or scheduled desludging requisition, with incentives to those preferring scheduled desludging models.

Figure 35 Scheduled desludging on requisition



Benefits

It can be explored as a potential model for transition from on-demand to scheduled desludging.

Challenges

The focus on IEC to generate buy-in by household or property owner.

Applicability

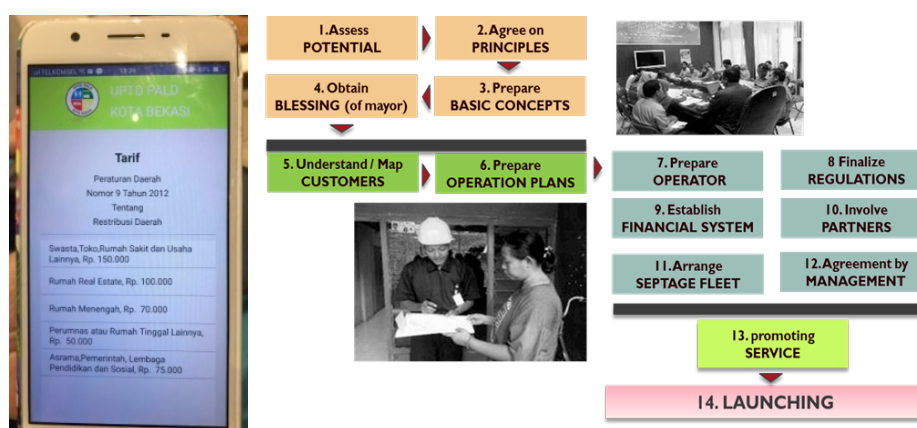
It is applicable in areas where there is considerable variations across properties in containment sizes in a given city.

Case of Indonesia- Regular desludging on requisition

Mobile based app and Dashboard for desludging requisition and monitoring- Bekasi City

Android Based App is developed for households to request desludging services. A single app provides access to the LG trucks and private trucks. HH register on the on-line platform, HHs inform their regular desludging period and based on their request service is provided. A dashboard is prepared to monitor the activities of the desludging vehicles. The LG monitors the LG trucks as well as the private trucks. Access to the dashboard is given according to the stakeholder. Bar-code is placed at every registered HH.

Figure 36 Mobile based application for desludging requisition, Step by step process for regular desludging in Indonesia

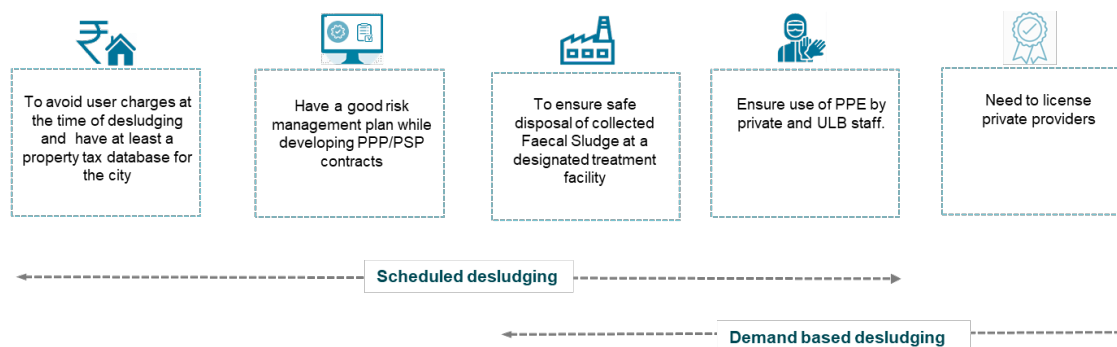


Source: Bustraan, F. (2018) "Introduction of Scheduled Desludging Services in Indonesia" Presentation at National Workshop Decentralized Sanitation Solutions at Mumbai – 18 November 2018

2.5. Conveyance Business Models- Summary & Key Inferences

In this portion of the value chain, a high level of private participation reflects high business opportunity. The current practice of On-demand desludging through private operators or ULBs is the most prevalent model across cities and states in India. However, scheduled desludging is needed to ensure regular and timely desludging, it helps achieve equitable services, including the poor; it has a positive environmental impact, it removes the need for manual labour and help build a good database on real situation of onsite facilities. The involvement of the private operators hints a limited need for government investment for conveyance. An appropriate regulatory and policy guideline at the state level is needed to minimize risks. In order to mitigate payment risks, there is a need for regulatory measures and formulation of guidelines at the state level for engagement of private sector. The possibility of guarantee fund also needs to be explored. Bundled contracts to offer larger conveyance contracts to induce larger operators and Scheduled desludging models for zones in large cities emerges as most promising models.

Figure 37 Precautions while using these conveyance business model prototypes



2.6. Activity 3: Video case study and quiz on PLAM model in Wai

The activity, through a video, explains the Performance Linked Annuity Model (PLAM) used for financing FSSM in Wai, a city in Maharashtra. The video thoroughly explains the condition of Wai city and the steps the city has taken to implement the FSSM plan. It majorly focuses on the development of the PLAM contract and involvement of private operator. This will help the participants to understand all the significant aspects of the PLAM model. This is followed by a quiz for the participants to self-evaluate their understanding.

Delivery method: The trainer should initially play the PLAM video. After the video, if there are any queries from the participants the trainer should address them and if needed conduct a discussion for the same. Following this course, the self-evaluating quiz must be conducted. Trainers can go with a traditional paper-quiz method. However, this is only advisable for a small training group since it requires extra time and human resource to collect and grade each quiz. For large groups, if the audience is comfortable with digital methods, trainers can use online feedback methods such as [Mentimeter](#) which provide options for real time voting and quick on-screen results.

The answer key to the self evaluating quiz is available in annex-3

2.7. Notes for Trainers

The trainer should highlight key business models for conveyance with benefits from practical case studies mentioned. Scheduled desludging method of conveyance has major benefits over demand based desludging, hence, the trainer should keep in mind to highlight this point. Emphasis should be given on PPP based business model approach. The applicability of the model should be decided based on the financial condition of the local body.



For more details, refer: Business Models for FSSM-A landscape study for four Indian states

This report is based on a study of 'Business Models for Faecal Sludge and Septage Management (FSSM) in Urban Areas' covering four states of Maharashtra, Andhra Pradesh, Odisha and Tamil Nadu. The study was funded by the Bill and Melinda Gates Foundation. This study explores private sector engagement in FSSM in both conveyance and treatment and different business models are reviewed. It identifies a number of prototypes for FSSM services. Measures for their sustainable adoption and use are also discussed

Document Link:

https://www.pas.org.in/Portal/document/UrbanSanitation/uploads/Financing_and_business_models_for_FSSM_an_executive_summary_on_the_landscape_study_of_four_Indian_states.pdf

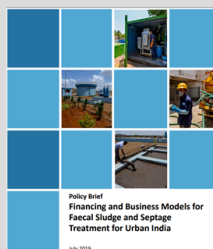


For more details, refer: Financing Faecal Sludge and Septage Management (FSSM)-A landscape study for four Indian states

This report is based on a study of 'Financing of Faecal Sludge and Septage Management (FSSM) in Urban Areas' covering four states of Maharashtra, Andhra Pradesh, Odisha and Tamil Nadu. The study was funded by the Bill and Melinda Gates Foundation. The study has identified financing requirements and potential sources of financing for capital and operating expenditure. It also examined the important role of public finance in supporting and/or leveraging finance for provision of FSSM services. A number of innovative finance options to leverage additional resources are also discussed.

Document Link:

<https://www.pas.org.in/Portal/document/UrbanSanitation/uploads/Financing%20FSSM%20-%20landscape%20study%20of%20four%20Indian%20states.pdf>



For more details, refer: Policy Brief: Financing and Business Models for Faecal Sludge and Septage Treatment for Urban India

This policy brief identifies the possible financing options and business models for setting up Faecal Sludge Treatment Plants (FSTPs) as a part of citywide FSSM services. It is based on a study carried out in four states Andhra Pradesh, Odisha, Maharashtra and Tamil Nadu. The study assessed financing requirements and potential sources of funds for both capital and operating expenditure.

Document Link:

<https://www.pas.org.in/Portal/document/UrbanSanitation/uploads/Policy%20brief%20-%20Financing%20and%20business%20models%20FSSM.pdf>

2.8. Activity 4: Building a model for a financially feasible desludging business in a city

This activity, as a continuation of the exercise under activity 2, will help the participants in understanding various steps involved in building a model for a financially feasible desludging business. This activity is developed to identify financing investments for implementing desludging services through various approaches and business models. The business model calculations are based on the inputs provided about population of city, number of septic

tanks, service provider, etc. The activity given below will help the participants in understanding various steps involved in building a model for a financially feasible desludging business.

Delivery method: Trainers can go with a traditional paper-quiz method. However, this exercise also includes calculations based on the formula provided. The trainer will need to guide the participants to understand the problem of the city and derive the parameters which will be used in the formulas. A pen-paper quiz is only advisable for a small training group since it requires extra time and human resource to collect and grade each quiz.

For large groups, if the audience is comfortable with digital methods, trainers can make the participants use the digital system and ask them to use software such as excel to carry out the calculations and vote their answers through any online platforms.

Answer key for activity 4 provided in Annex-4.

2.9. Bibliography for session two

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Session 3: Business Models for treatment

Session 3. Business models for treatment

3.1. About this session

This session describes four business models that are used for treatment in FSSM. The models are based on type of funding that is used to fund the faecal sludge treatment plants. The session also describes integrated models for conveyance and treatment. It mentions the benefits, challenges and applicability of models and also explains the models through various national and international practices. The objectives of this session are:

- Introduce the types of models for treatment.
- Understand benefits, challenges, applicability for each model as well as operational and financial roles.
- Present national/international case studies of business models in treatment.

3.2. Session Plan

Duration: 60 minutes

Table 7 Plan for third session

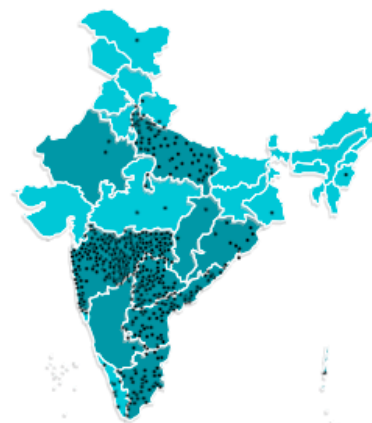
Activity	Time Duration	Material Method
Presentation on treatment and integrated business models	30 mins	Power point presentation
Exercise on Developing business model canvas	30 mins	Exercise

3.3. Emerging business models for treatment

In order to ensure safe disposal of faecal sludge management there is a need for Faecal Sludge Treatment Plants (FSTP). Currently there are several FSTPs already functioning in different states in India. Many states are progressing with state-wide roll-out for FSTPs and large number are being planned. The country requires 4,000 FSTPs to address the need for faecal sludge management. There are around 400 upcoming FSTPs in India which are in their planning or implementation phase coming in the states of Andhra Pradesh, Telangana, Tamil Nadu, Odisha, Uttar Pradesh, Chhattisgarh, Maharashtra and Karnataka.

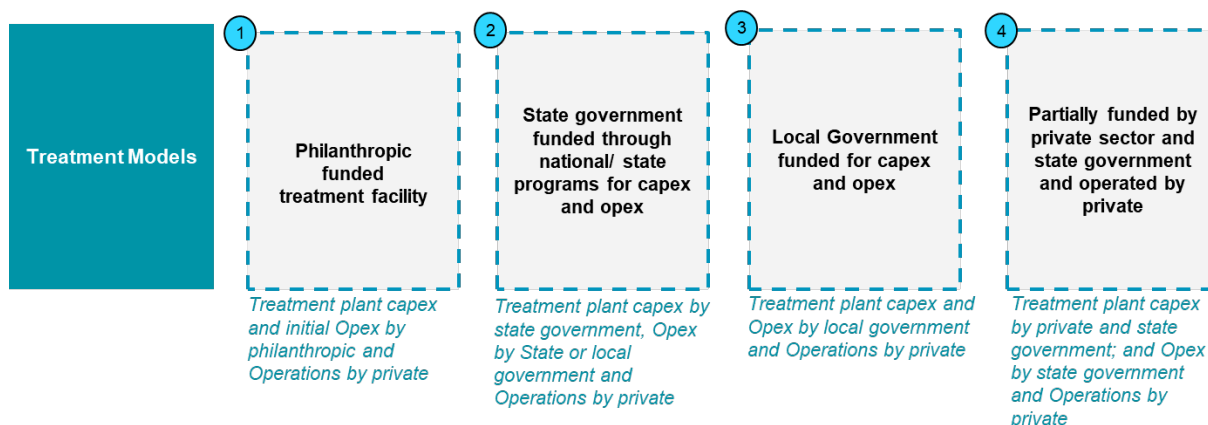
Figure 38 FSTPs in India

Andhra Pradesh 76	Telangana 72	Tamil Nadu 48
Odisha 17	Uttar Pradesh 52	Chhattisgarh 159
Maharashtra ~311	Karnataka 55	Rajasthan 3



Various business models for treatment of faecal sludge and septage have been developed which include philanthropic funded treatment facility model, state government funded through national or state programs model, local government funded model, or partially funded by private sector and state government but operated by private model.

Figure 39 Emerging Business Models in Treatment



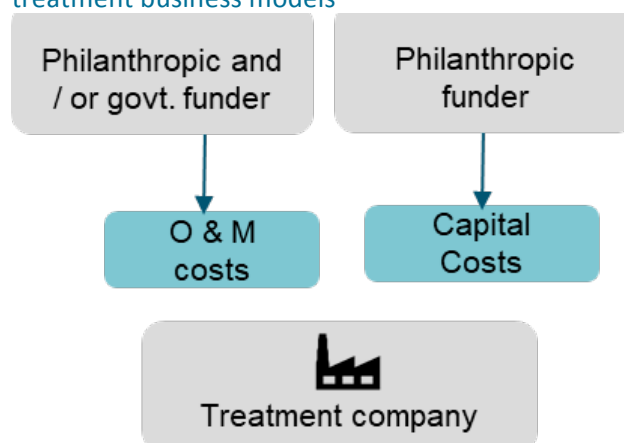
Treatment Prototype 1: Philanthropic/ Non-profit funded treatment business models

The philanthropic or non-profit funded business models for treatment facility where the capital costs are borne by a philanthropic funder and the operation and maintenance costs are borne by a philanthropic or government funder.

Model Description

In this business model, capex requirements are met through philanthropy support. It is operated by a private player who work with the philanthropic funder to develop and test treatment technologies or models. The Opex recovery is done from sources such as the government or philanthropic funders. The treatment plant is handed to the city government after successful pilot of project (after 2-3 years as per MoU with the government).

Figure 40 Philanthropic/ Non profit funded treatment business models



Benefits

- It helps in plugging the funding gap for new treatment technologies and models.
- There is no financial or implementation burden on governments.

Challenge

- The major challenge is that philanthropic funds are not a sustainable source of funds for the long term.

Case studies from Wai, Narasapur, Warangal, Coimbatore

Coimbatore (2 towns)	Wai	Narasapur
<ul style="list-style-type: none"> • Plant capex is funded by BMGF but constructed by a private player. • Plant will initially be operated by a private player, then handed over to ULBs. Operating costs initially funded by BMGF, and later guaranteed funding by the ULB • Cluster approach i.e. common FSTP for two towns 	<ul style="list-style-type: none"> • Plant capex funded by BMGF. A private player will design, build and operate the plant (DBOT). • Tide Technocrats has a 2 year O&M contract, funded by BMGF. • Plant O&M is planned to be funded through sanitation / property tax in the future. 	<ul style="list-style-type: none"> • BMGF has provided a grant to Tide Technocrats for the FSTP. • One year O&M (funded by BMGF) is built into the contract with Tide Technocrats. The FSTP will be manned by five staff members, hired by Tide. • Only licensed operators are allowed to deposit the faecal sludge at the FSTP.
Warangal	Others	
<ul style="list-style-type: none"> • FSTP using pyrolysis technology is being funded by BMGF, under a DBOT model. • The plant will be operated by a private player. BMGF will provide opex for the FSTP for the initial year. 	<ul style="list-style-type: none"> • Devenahalli uses a mix of funds, including capex funding and one year opex from CDD and BMGF. • Dhenkanal uses BMGF funds capex and 1-2 years of opex. Revenue generation options for the long term are being explored e.g. reuse revenues. 	

Treatment prototype 2: State government funded through national/ state programs for capex and opex

The state government funded through national or state programs for capex and opex model is where the capital costs are borne by the state and the treatment facility is constructed and operated by a private operator or SHG. The opex recovery is from the state government in initial period and thereafter through local government.

Model description

The state government funds plant capex and initial opex through either National or State level programs (like AMRUT). The plant is constructed and operated by a private player. Opex recovery is done from the government in initial period and thereafter by the local government.

Benefits

- The government participation in capex funding incentivizes private participation with lower financial burden and project risks for the private player.
- The operations of the treatment plant are sustainable since implementation responsibility is with the private operator.

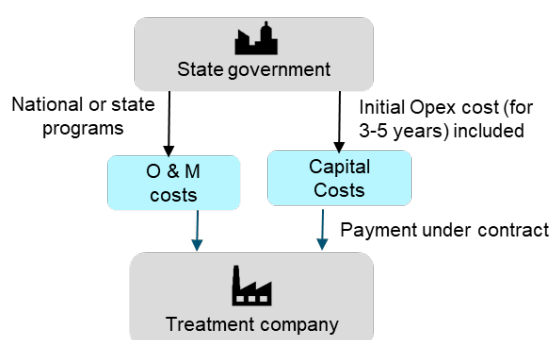
Challenges

- It requires allocation of public funds for FSSM capex which requires advocacy.
- Long term sustainability may be a challenge, if there is dependency on O&M financial support from state government
- The limited role of ULB in implementation and monitoring may challenge sustainability.
- There is a need to assess ULB financial capacity to finance opex of treatment plants.

Applicability

- It is relevant where government has some funding capacity but limited operating capacity and where private sector participation is considered important from operations perspective.

Figure 41 State funded treatment business model



Case Example of State government funded plant in Odisha

In Odisha, AMRUT program (National government program) funding was used to build FSTPs (septage management) in 9 cities. Odisha Water Supply and Sewerage Board (OWSSB) (State

level agency) carried out design, manage construction and O&M contracts for FSTPs. The role of ULB is limited to allocation of land for FSTPs. The O&M was funded for 5 years through AMRUT program. Odisha Water Supply and Sewerage Board (OWSSB) floated tender on lump-sum contract basis to invite private sector to build and operate treatment plants.

Figure 42 Treatment Plants in Bhubaneswar and Puri, Orissa



Source: Landscape documentation of Odisha prepared by CWAS, CEPT under NIUA

Treatment prototype 3 : Local Government funded for capex and opex

In the local government funded for capex and opex model, the ULB tenders out construction and O&M to private players or SHGs and the ULB pays the private operator under a contract. The opex recovery is from the ULBs own funds.

Model description

The local government through its own funds finances the treatment plant capex and opex cost. The local government tenders out the construction and O&M to a private player. Opex recovery is done from the local government own funds. The other sources of opex recovery also includes reuse revenue, though its contribution is very less, given the low development of reuse market.

Benefits

Government participation in capex funding incentivizes private participation with lower financial burden and project risks for the private player.

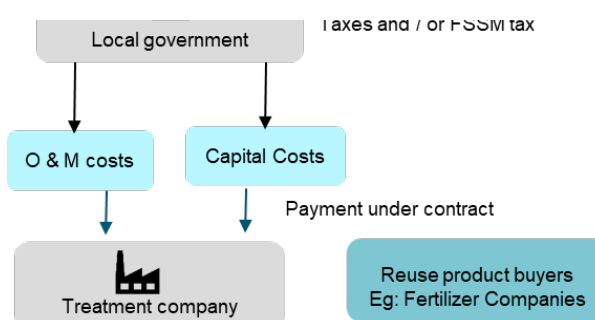
The plant operations are sustainable since implementation responsibility is with the private operator.

The implementation burden on governments is low, since the private player is responsible for operations.

Challenges

It requires allocation of public funds for FSSM capex.

Figure 43 LG funded treatment business model



There is a need to assess ULB financial capacity to finance opex of treatment plants. Since reuse markets are nascent, market creation and linkages needed.

Applicability

This model is relevant where government has funding capacity but limited operating capacity and where private sector participation is considered important from operations perspective.

Local government funded plant in Sinnar

Sinnar is the first city in India to fund an FSTP through ULB own funds (14th FC funds). The key success factor is relatively strong ULB finances, to support this model. The private operator was selected through a DBOT tender. The private operator is responsible for construction and/ or operation of treatment plant. The treatment plant O&M is funded by the ULB through sanitation tax and property tax. This model can be easily implemented in most of the small-medium cities in Maharashtra.



Figure 44: Treatment plant in Sinnar, Maharashtra

State-wide GR for setting up independent FSTP in 311 ULBs in Maharashtra

In order to ensure that faecal sludge from septic tanks in the cities without STPs or FSTPs or co-treatment options is treated, a GR was passed by the Maharashtra government to select an appropriate technology and construct a treatment plant across various cities. The capital cost of the treatment plant can be funded through 14th FC funds of the ULBs and the O&M cost can be recovered through collection of sanitation tax. The FSTPs are to be setup at Solid Waste Management site.

Capital cost for FSTP: 14th FC funds (State already directed cities to use 50% of 14th FC funds for this)

O&M cost for FSTP: Through ULB own funds.

Figure 45 FSTPs set up in Maharashtra based on state GR passed



Treatment prototype 4: Partially funded by private sector and state government and operated by private operator

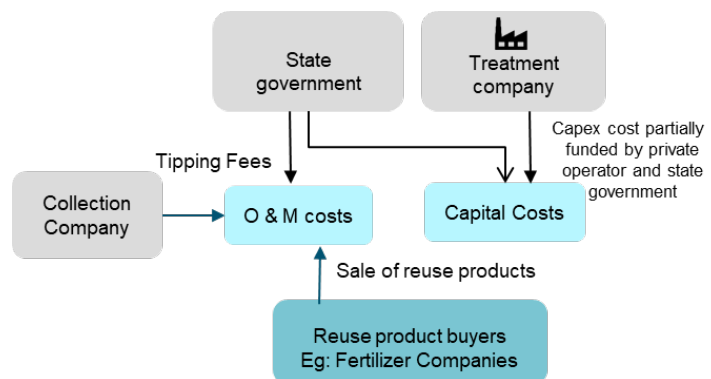
The partially funded treatment plant by private sector and state government model for the capital costs of the treatment facility is operated by a private operator or SHGs and is applicable in cities where private sector participation exists but there is a need to bridge the viability gap and justify commercial returns.

Model description

The private enterprise funds plant capex fully or partially with the rest borne by the government. Private enterprise also undertakes construction, operation and maintenance of a treatment plant. The private sector capex cost will be repaid by the government in the form of annuity payment over the O&M period.

There are emerging models where the operations and maintenance of FSTP is contracted to SHGs and the ULB is making the contractual payments. Such model is observed in Odisha state.

Figure 46 Partially funded by private sector and state government and operated by private sector



Benefits

- It reduces the capex burden for governments, since the operator bears upfront costs with subsequent recovery from the government.
- The treatment plant operations and maintenance is sustainable since implementation responsibility is with the private operator and part capex cost will be returned over the O&M period.

- The funding by the State government alleviates concerns around individual ULB financial capacity and payment risks.

Challenges

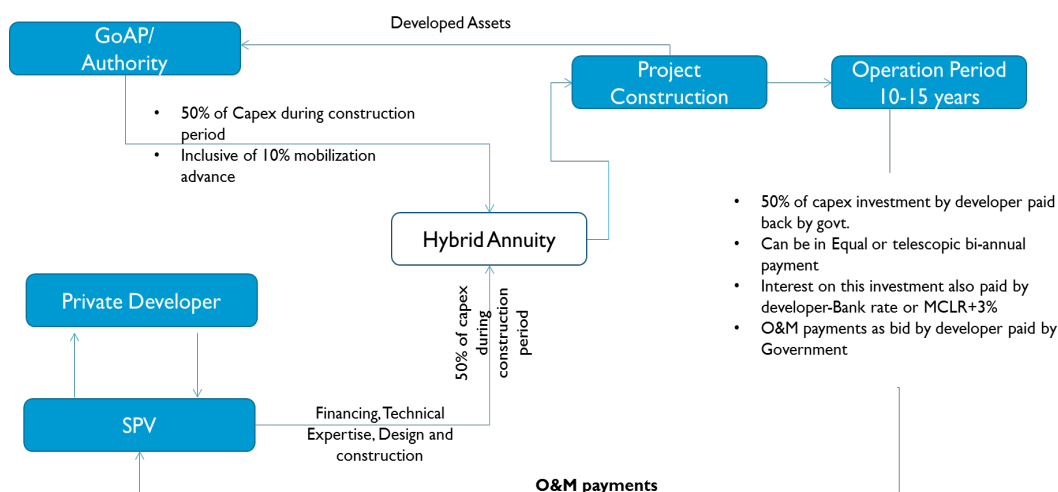
- There is a difficulty in finding medium-large players with the financial and technical capacity.
- This will discourage small players since their financial capacity will not be enough to finance the part capex cost.

Applicability: This model is relevant in scenarios where private sector participation and part funding is prioritized and government support is needed to bridge viability gap funding and justify commercial return.

Case of Andhra Pradesh and Telangana- Hybrid Annuity Model (HAM) for treatment

The HAM model is proposed through city clusters for 76 ULBs in Andhra Pradesh and 72 ULBs in Telangana. The private companies undertake construction, operation and maintenance on a DBOT basis and cost is determined through bidding process. 50% CapEx funding was done by the government and the rest 50% was done by a private company. Funding by Swachh Andhra Corporation supported through the state budget alleviates concerns around individual ULB financial capacity and payment risks. The private player clustering approach (multiple ULBs per partner) was adopted to achieve scale economies and a large contract. The private player is responsible for selling soil conditioner/bio-fertilizer/biogas and recycled wastewater. In the long term, part opex recovery is planned through user charges.

Figure 47 Hybrid annuity model for treatment: Case of Andhra Pradesh

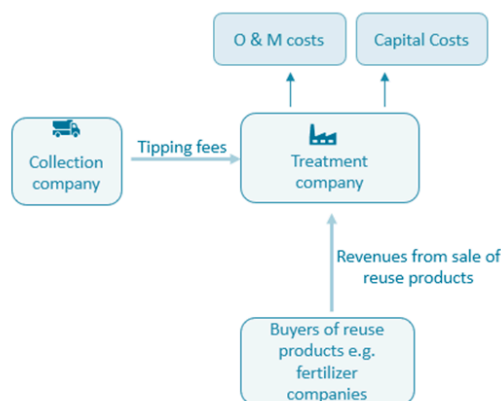


Source: Center for Water and Sanitation, CRDF, CEPT University (2018) "Hybrid Annuity Model for Sanitation" Note prepared Finance Taskforce of NFSSM Alliance under Sanitation

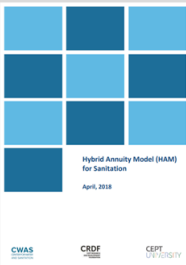
Case of Vietnam

In Vietnam, the treatment plant is owned and run by the Hoa Binh fertilizer company which has built its own Fecal Sludge treatment plant. The Fecal Sludge is separated from wastewater, and then dried into bio-solids and dried sludge. The dried sludge is sold for fertilizing crops, while the biological sludge is sold to the wastewater treatment company. The desludging operators (both government and private) pay the fertilizer company for depositing fecal sludge, at the rate of approx. USD 1.46 for each truck. Current revenue is limited due to illegal dumping of sludge by private operators. This is a relevant model to consider going forward in the focus states, especially where reuse markets are better developed

Figure 48 Treatment model of Vietnam



Source: Viet Angh, N., et.al. (2011) "Landscape Analysis and Business Model Assessment in Faecal Sludge Management: Extraction and Transportation Models in Vietnam" Hanoi University Of Civil Engineering. Hanoi. Retrieved from: <https://rb.gy/53vuba>



For more details, refer **Hybrid Annuity Model (HAM) for Sanitation**

This note, prepared under the Sanitation Finance Taskforce of NFSSM Alliance, provides a brief overview of Hybrid Annuity Model as an emerging public-private investment model in sanitation sector. It describes the emergence of HAM in the Road and Transport sector and then discusses its emerging use in the sanitation sector. It summarizes advantages and challenges in adopting this model in the sanitation especially FSSM sector.

Document Link:

<https://www.pas.org.in/Portal/document/UrbanSanitation/uploads/Hybrid%20Annuity%20Model%20for%20Sanitation%20April%202023%202018.pdf>

3.4. Treatment Business Models- Key summary

Based on understanding the various models and the experiences from various cities, states and countries the following observations were made.

Government funding is important, but philanthropic funding can be useful in initial stages.

- Since there is a limited commercial return potential, government funding would remain the dominant source of funding for treatment facilities.

- Many technologies are in an early stage and inadequate experience exists, philanthropic or CSR funding can support pilots and demonstration projects. It can also help enhance project quality through quality monitoring and zero energy systems as well as to develop these as resource centres.
- Hybrid annuity model may have the potential for bringing in private sector investment, however it is still in early/ exploring stage for sanitation treatment.

Opex funding for treatment is critical for sustainability and will need careful attention, as well attention on resource recovery for the future.

- Philanthropic organizations do provide opex support, but usually for a limited time while demonstrating the viability of pilots.
- Reuse revenues require developed markets and market linkages. As these are at relatively nascent stage, more advocacy and innovation will be needed to develop these markets. Innovative efforts developed with SWM composts ('Harit compost') will need to be assessed. Successful PPP projects for wastewater reuse such as in Nagpur for power plants, will also need to be assessed for applicability. The Government of Maharashtra's Wastewater Reuse policy requires electricity distribution centres and MIDCs falling within 50k to use the treated waste from urban areas.
- The option of tipping fees is also difficult in most cases, due to negative incentives to private operators to dump outside.

Thus, the opex costs will need to be mainly funded from local government sources. Plant selection (through tendering) can also emphasize low opex expenditure to the extent possible.

3.5. Integrated business models for conveyance and treatment:

Integrated models offer efficiencies, convenience and easier contracting with the same player responsible for operations across the value chain. An integrated contract offers interesting options for opex funding of conveyance and treatment from households – as a bundled price can be implemented efficiently. However, there is dependency on a single player (1) compounds risk of non-performance, and (2) crowds out existing smaller players, which can impact implementation as existing markets are disrupted and players displaced. Scheduled desludging may be more conducive for integrated players given that it offers predictability of operations in conveyance. This also means that opex recovery is typically from taxes and tariffs. Market information and subtle nudges along with technical assistance might be required to increase the number of players in the market who are willing and able to actively participate in both stages. Also, platforms are required to actively cultivate partnerships should be encouraged.

The integrated business models have a prototype for scheduled desludging and treatment and one for a cluster based approach. The business models are as below:

1. Integrated model for scheduled desludging and treatment

Same private firm operates both desludging and treatment service for one city.

2. Integrated model with a cluster based approach

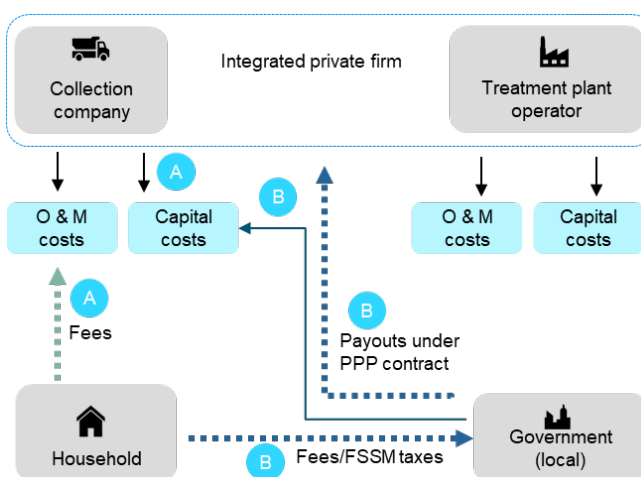
Same private firm operates both desludging and treatment service for a group of nearby cities.

Prototype 1: Integrated model with scheduled desludging and treatment

Model Description:

The integrated model with scheduled desludging and treatment is a prototype where an integrated private firm handles both the collection and transport and disposal of faecal sludge and septage. The private firm bears the capex and opex and collects a fees for desludging and receives payments from the ULB under a contract. The ULB collects FSSM taxes of fees from households. The desludging charges are collected from HHs which are the source of opex funding for conveyance and treatment. These charges are collected directly by the operator (user charges) or indirectly through the government (FSSM taxes) which then pays the operator.

Figure 49 Integrated Model for scheduled desludging and treatment



Benefits

Integrated models offer efficiencies, convenience, and easier contracting, with the same private provider.

They offer incentives for the operator to bring all collected fecal sludge to the plant for treatment.

Challenge

- The challenge is that they are dependent on a single player which compounds risk of non-performance, and b) crowds out existing smaller players

Applicability

- This model is relevant in areas where there are private players with capacity to manage both treatment and desludging operations.

Integrated Model of Scheduled Desludging and Treatment in Leh, India

The integrated model with scheduled desludging and treatment prototype has been demonstrated in Leh, India where a private company Blue Water designed, financed, built and operates the FSTP and also operates the municipality’s suction truck. LDA and Blue water Company have entered in 5 year Public Private partnership contract for scheduled desludging and treatment of faecal sludge in Leh with a population of 45,000 which has high presence of hotels and tourists.

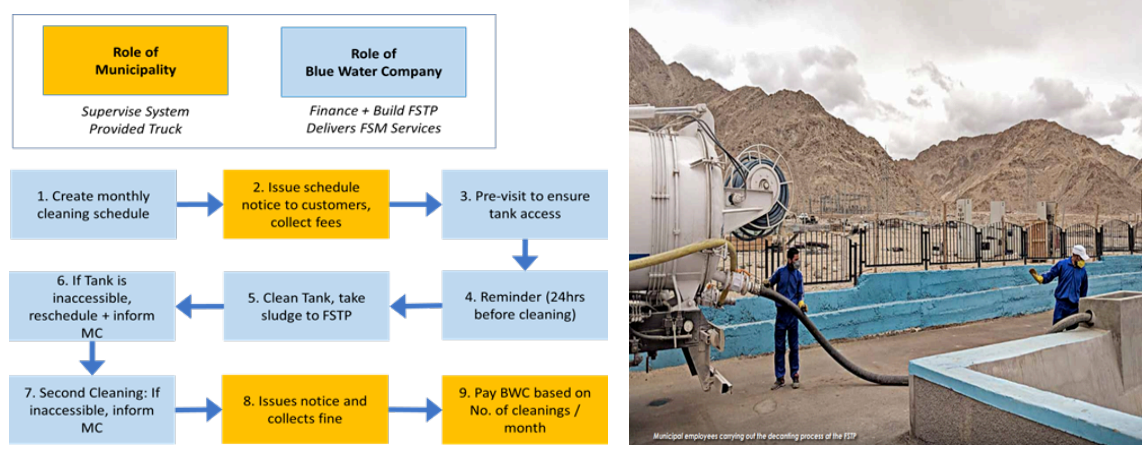
Integrated PPP contract for scheduled emptying and treatment:

Blue Water Company (BWC) will design, finance, build and operate the FSTP on the land provided by the LDA. The Municipality will give its suction truck which will be operated by BWC at its own costs. A five year contract (cleaning and treatment) has been signed between LDA and BWC. The municipality will collect user fees, with the help from BWC . 90% of fees will be paid to BWC after service is delivered. The treated water will be used for children’s park on the next plot. It offers inclusive services through cross-subsidization cost of FSM services to poorer households through higher fees from hotels and guesthouses.

Key Results:

Over 2.6 Million liters of Faecal Sludge had been collected and treated. The trips increased from 6-8 trips/month to about 80-100 trips /month. Only 25% of septic tanks are easily accessible—extra time is planned to access narrow streets and open tanks, also an off-board pump near septic tank and can push septage from 100m distance. Due to cold weather during nights, the pipes broke and septic tanks were frozen, hence the work duration was adjusted accordingly. They had to replace the LDA truck which broke down often and also added a smaller 2000 liter truck.

Figure 50 Integrated cluster based approach in Leh, India

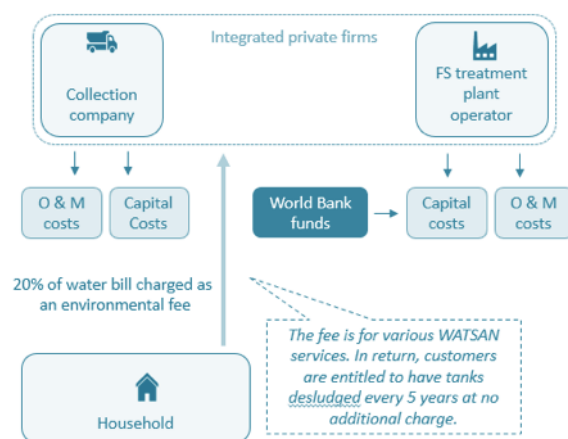


Source: Poster on Leh (Ladakh)—India’s first PPP in FSM

Case of Manila, Philippines

In Manila, Philippines, the conveyance and treatment are handled by two private entities who operate in different city zones. The Integrated model with treatment plants is also handled by the same players. Both companies operate under a concession agreement with the Metropolitan Waterworks and Sewerage System (MWSS), which was formed as a governmental organization in 1971, and privatized in 1997. They achieved the desludging mandate using a combined fleet of almost 200 desludging trucks and five mechanized faecal sludge treatment plants. The plants are operated by private players. Out of this, three plants were funded with World Bank loans, fourth by one of the private entities. The funds for treatment capex and opex are covered through tariffs charged as 20% of the water bill. Currently, scheduled desludging services are provided for some customers (MWSI estimate is 30 percent), while on demand services are available for all customers. Tariffs are set by law to allow these companies to cover capital and operating costs, with some built in profit.

Figure 51 Integrated Model for scheduled desludging and treatment in Philippines



Source: Presentations made at International Twinning Program on FSSM, Philippines, 2018

Prototype 2 :Integrated model with cluster based approach

Model description

The Integrated model with cluster-based approach prototype also involves an integrated private firm which performs both the collection and transport and disposal of faecal sludge and septage, however here the private operator has contracts or licenses with different ULBs to provide this service. The capex and opex is borne by the private operator and receives desludging charges from the households as well as payments under the contracts from the ULBs. This model is feasible in areas with nearby cities and where private operators have the capacities to handle both conveyance and treatment. The same private firm operates both desludging and treatment service for a group of nearby cities. The treatment facility and trucks are funded by the private sector fully or partially. Recovery is mainly done from desludging charges and partially from the government (PPP contract). The

charges are collected directly by the operator (user charges) or indirectly through the government (FSSM taxes) which then pays the operator.

Benefits

The cluster approach can provide efficiencies and cost recovery for treatment facilities.

Challenges

- It is a challenge to bring co-operation among cities and efficient road connections.

Applicability

- It is relevant in areas where there are private players with capacity to manage both treatment and desludging operations. Also where the nearby cities are willing to come together for a cluster approach; or where a private provider has the capacity to work with several nearby cities.

Integrated Cluster based approach in Chhattisgarh, India

The Integrated model with cluster based approach has been applied in Chhattisgarh, India where ULBs not covered by AMRUT prepared clusters within 15 kms to 20 kms and set up treatment plants as a state led initiative. The state is preparing clusters in 15 – 20 kms distance and will also fix 3 – 4 non-mechanized treatment technology for non-AMRUT towns. The State authority will roll out tender to invite single private player for both desludging and treatment. The capex and 10 years opex cost will be inbuilt in bid and will be funded by state government.

Integrated Cluster based approach in Thailand

Similarly in Thailand, this cluster based approach was taken up by a private company to provide desludging and treatment services for two municipalities and 8 sub-district organizations. Thongthawil Service Co. Ltd (TSCL) located in Rayong province provides services for septage desludging and treatment in two municipalities and 8 sub-district organizations.

Conveyance

- **Separate license for emptying and treatment** in all these municipalities under the 1992 Public Health Act.
- **15 trucks and average 10-12 trucks serve daily**, Services are provided for 365 days.
- Customers directly call TSCL for desludging services. They have a **QR code on each truck where customer can directly send an online request** for emptying services

Treatment

- Treatment plant is owned by the TSCL **private agency**.
- **Each municipality** provides an **annual license to TSCL**, and the company collects a license fee for providing treatment services.
- TSCL **charge only industrial domestic waste** for providing treatment services under Factory act. Around 40% customers are from industries.

Source: NATS group at AIT (2018) "FSM Debrief - Thailand Twinning Program" Presentation at International Twinning Program on FSM in Thailand Thongthawil service : <https://thongthawil.com>

3.6. Integrated Business Models- Summary & Key Inferences

Based on understanding the various models and the experiences from various cities, states and countries the following observations were made for integrated business models:

Preferable option from government perspective:

From the ULB perspective, a single operator for conveyance and treatment may imply ease and simplicity of reporting and monitoring.

Limited number of private player for integrated options:

Currently there are limited private players who have capacity to manage both conveyance and treatment operations. Integrated approach will require to cultivate partnerships among players in treatment and desludging to work together.


Thus, from the perspective of private providers, integrated contracts maybe be difficult as very few private enterprises are in both areas of business, and thus they have to take on work which may not be their forte, or form consortia. In this process, it may lead to crowding out of expertise of smaller independent service providers.

Opex funding could be explored:

An integrated contract offers interesting options for opex funding of treatment from households – as a bundled price can be implemented.

3.7. Notes for Trainer:

The trainer should emphasize on all the business treatment models with case studies and best practices mentioned. The trainer should also focus on highlighting integrated business models for conveyance and treatment with the cases mentioned. The trainer should highlight and discuss the challenges faced in each models. However, they should mention the applicability of each model clearly and highlight the necessary conditions.

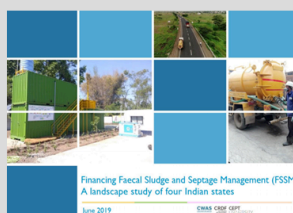


For more details, refer: Business Models for FSSM-A landscape study for four Indian states

This report is based on a study of 'Business Models for Faecal Sludge and Septage Management (FSSM) in Urban Areas' covering four states of Maharashtra, Andhra Pradesh, Odisha and Tamil Nadu. The study was funded by the Bill and Melinda Gates Foundation. This study explores private sector engagement in FSSM in both conveyance and treatment and different business models are reviewed. It identifies a number of prototypes for FSSM services. Measures for their sustainable adoption and use are also discussed

Document Link:

https://www.pas.org.in/Portal/document/UrbanSanitation/uploads/Financing_and_business_models_for_FSSM_an_executive_summary_on_the_landscape_study_of_four_Indian_states.pdf



For more details, refer: Financing Faecal Sludge and Septage Management (FSSM)-A landscape study for four Indian states

This report is based on a study of 'Financing of Faecal Sludge and Septage Management (FSSM) in Urban Areas' covering four states of Maharashtra, Andhra Pradesh, Odisha and Tamil Nadu. The study was funded by the Bill and Melinda Gates Foundation. The study has identified financing requirements and potential sources of financing for capital and operating expenditure. It also examined the important role of public finance in supporting and/or leveraging finance for provision of FSSM services. A number of innovative finance options to leverage additional resources are also discussed.

Document Link:

<https://www.pas.org.in/Portal/document/UrbanSanitation/uploads/Financing%20FSSM%20-%20landscape%20study%20of%20four%20Indian%20states.pdf>

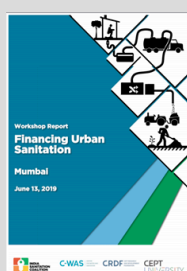


For more details, refer: Policy Brief: Financing and Business Models for Faecal Sludge and Septage Treatment for Urban India

This policy brief identifies the possible financing options and business models for setting up Faecal Sludge Treatment Plants (FSTPs) as a part of citywide FSSM services. It is based on a study carried out in four states Andhra Pradesh, Odisha, Maharashtra and Tamil Nadu. The study assessed financing requirements and potential sources of funds for both capital and operating expenditure.

Document Link:

<https://www.pas.org.in/Portal/document/UrbanSanitation/uploads/Policy%20brief%20-%20Financing%20and%20business%20models%20FSSM.pdf>



For more details, refer: Financing Urban Sanitation Workshop

A workshop on Financing urban sanitation was organized in partnership with the India Sanitation Coalition (ISC) in Mumbai on June 13, 2019. The workshop aimed to disseminate findings of the research study Financing Faecal sludge and septage management. The workshop focused on how one can leverage limited public funds with private financing to encourage private sector participation in sanitation service delivery. The workshop also explored innovative financing mechanisms, such as impact investment. It brought together government officials, practitioners, private service providers, impact investors and donor agencies.

Document Link:

https://www.pas.org.in/Portal/document/UrbanSanitation/uploads/Financing_FSSM_13_June_workshop_report.pdf

3.8. Activity 5: FSSM business model canvas for identifying suitable service in a city

The activity introduces different scenarios for which the participant has to identify suitable FSSM business model based on learnings from Part:A of the module. It will help the participants in understanding benefits, challenges, applicability for each model as well as operational and financial roles. The activity outlines the condition of the city and puts forth two scenario on which the participants will have to reflect. The participants need to develop a business models based on the requirements and capacity of the city. Based on the two scenarios, two business model canvas will be the submission by the participants.

Delivery method: There is an example provided for the participants to understand the exercise. The trainer first needs to explain the example to the participants. Based on the scenario a sample canvas for the business model is also developed. The trainer can then discuss the actual exercise and explain condition of the city to the participants with different scenarios. The exercise can be carried out in the activity book itself where the blank canvas is provided. The participants need to draw arrows as per the flow of funds they want the business model to follow. They can eliminate/add the stakeholders provided in the canvas.

The possible solutions for the two scenarios are available in annex 5.

3.9. Bibliography- session three

- AMRUT (2017-18) “Andhra Pradesh State SAAP”
- AMRUT (2017-18) “Odisha state SAAP”
- Blue Water Company, Poster on Leh (Ladakh)—India’s first PPP in FSM
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- BMGF, “FSM Innovation: City-wide Faecal Sludge Management Programs in the Philippines”
- BMGF, “FSM Innovation: Dakar: Organising the Faecal Sludge Market”
- BMGF, “FSM Innovation: Sanitation and Sewerage Management: The Malaysian Experience”
- BORDA, “Faecal Sludge Treatment Plant (FSTP), Leh (presentation)
- CEPT (2018) “Financing FSSM Services – Draft presentation at Technical Support Units Round Table”
- NATS group at AIT (2018) "FSM Debrief - Thailand Twinning Program" Presentation at International Twinning Program on FSM in Thailand, Thongthawil service : <https://thongthawil.com>
- NFSSM Alliance, “FSM for Leh”
- Presentations made at International Twinning Program on FSSM, Philippines, 2018

Session 4: Public Private Partnerships and contract management

Session 4. Public Private Partnerships and contract management

4.1. Session objectives

This session focuses on how city governments can involve private sector in FSSM. It highlights the key factors to be analysed in the selection process of private player and the methodology behind the assessment. The session further describes the process of developing balanced contracts, projects structures etc. and ways of addressing risks and payment delays. The objectives of the session are:

- Understand the benefits and roles of private sector in FSSM
- Understand needs, interests and concerns from both ULB and Private sector perspective
- Learn about processes for engaging private sector and understand key challenges and risks encountered in the procurement process and how to mitigate them
- Learn about considerations for building successful contracts

4.2. Session Plan

Duration: 90 minutes

Table 8 Plan for fourth session

Activity	Time Duration	Material Method
Presentation on assessment of private sector, potential roles, contract structures and tendering process and performance based contracts	45 mins	Power point presentation
Three part exercise on procurement process and building contracts	45 mins	Templates and quiz style

4.3. Why are private partnerships needed / beneficial?

City governments generally have the mandate to ensure provision of sanitation services as per the 74th amendment under which, eighteen functions are listed for the Urban Local Bodies –

1. Urban planning, including town planning;
2. Regulation of land-use and construction of buildings;

3. Planning for economic and social development;
4. Roads and bridges;
5. Water supply for domestic, industrial and commercial purposes;
6. **Public health, sanitation, conservancy and solid waste management;**
7. Fire services;
8. Urban forestry, protection of the environment and promotion of ecological aspects;
9. Safeguarding the interests of weaker sections of society, including the handicapped & mentally retarded;
10. Slum improvement and upgradation;
11. Urban poverty alleviation;
12. Provision of urban amenities and facilities, such as parks, gardens, playgrounds;
13. Promotion of cultural, educational and aesthetic aspects;
14. Burials and burial grounds; cremations, cremation grounds and electric crematoriums;
15. Cattle pounds; prevention of cruelty to animals;
16. Vital statistics, including registration of births and deaths;
17. Public amenities, including street lighting, parking lots, bus stops and public conveniences; and
18. Regulation of slaughter houses and tanneries.

Following this, ULBs are also responsible for implementing FSSM including operations and maintenance of FSSM infrastructure. Typical challenges include improper onsite systems that do not conform to standards, inadequate capacity to service these systems and unsafe disposal in absence of treatment facilities. ULBs, especially those in small and medium towns, are often unsuited to face these challenges with limited funds, human resources, technical know-how and equipment. They are also required to focus on responsibilities in other administrative sectors. On the other hand, private players are often already active in the FSSM space in these cities. In such cases partnering with the private sector is a win-win situation for all. The private sector is usually looking for new business opportunities and can offer good technical know-how, competitive prices, agility and innovation in implementation. Engaging the private sector may result in reduced burden on ULB staff who are then free to focus on quality control and monitoring. On the other hand, citizens are also getting timely services. Thus, it becomes important to encourage private sector participation in FSSM activities. For this, it is necessary to assess the current role of private sector providers as well as their potential role in citywide service provision.

4.4. Catalyzing PSP with market opportunities

Enabling environment

In the sanitation space, resources exist to guide PSP in large scale projects, but there is still a need for guidance on engaging contractors in small-scale projects based on the FSSM approach. It is not enough to provide or enable market opportunities for the private sector to participate in FSSM. In order to catalyze more private sector participation, market opportunities need to be showcased through successful examples and an enabling environment needs to be created which includes but is not limited to points like political will, legal support, increased engagement capacity of public sector, balanced contracts and project structures, resolution for payment risks and availability of financing options.

Figure 52 Multiple components to catalyse private sector participation



Source: Center for Water and Sanitation, CRDF, CEPT University “PSP Toolkit for IFSM”

Intellicap (2020) “Catalyzing private sector participation in FSSM in India: Contract Management – A Private Sector Perspective” Presentation at TSU-PMU convening

There is also a need to address typical challenges faced by private companies in participating in FSSM as demonstrated by the following bytes received from relevant companies –

Technical and experience limitations

- “Tenders don’t have provisions for participation of players who have limited experience in the region but may have relevant experience outside.”
- “Given that design specs have been pre-specified in some tenders, there need not be restrictions on prior technical expertise of the bidders such that pure civil contractors may be allowed to bid.”
- “Technology in tenders should be left variable in order to accommodate more players and bring in more cost effective solutions.”
- “We are thinking of expanding to state A and B but discouraged due to more rigid tech criteria in these states.”

Financial constraints

- “In most cases, even though we have all of the technical know-how and experience, we need to consider entering into joint ventures for FSTP projects since we don’t have the financial strength.”
- “Modifications in bidder turnover requirement will allow start-ups and SMEs to apply for FSTP tenders.”
- “High EMDs and security deposit requirements in FSTP tenders puts a strain on our working capital for the project.”
- “We have approached a few banks and NBFCs for financing but have been turned down at the first instance since the ROI is low relative to other projects. Collateral is also a problem here.”
- “Financing these FSTP projects is a big challenge. Unsecured lending interest rates are about 18%-19%. Typically only half of this is secured. This seriously affects our profitability. The only reason we are still focused on these projects is because we are currently prioritizing top line growth.”

Distrust in working with governments

- “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.”
- “Payment delays from the Government is one of the biggest discouraging factors for us to participate as well as for our ability to get lending support.”
- “Ideally, bills should be cleared in 30 days, and for late payments, interest should be paid at the rate of 8% per annum.”
- “The contract should have a clause defining a 3 month notification period in case of termination. It should also have a dispute resolution mechanism.”

Issues with project structuring

- “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. I don’t want my payment to suffer.”
- “Escalation of fuel costs is an issue. The contract should clearly account for that.”

Source: Center for Water and Sanitation, CRDF, CEPT University “PSP Toolkit for IFSM”

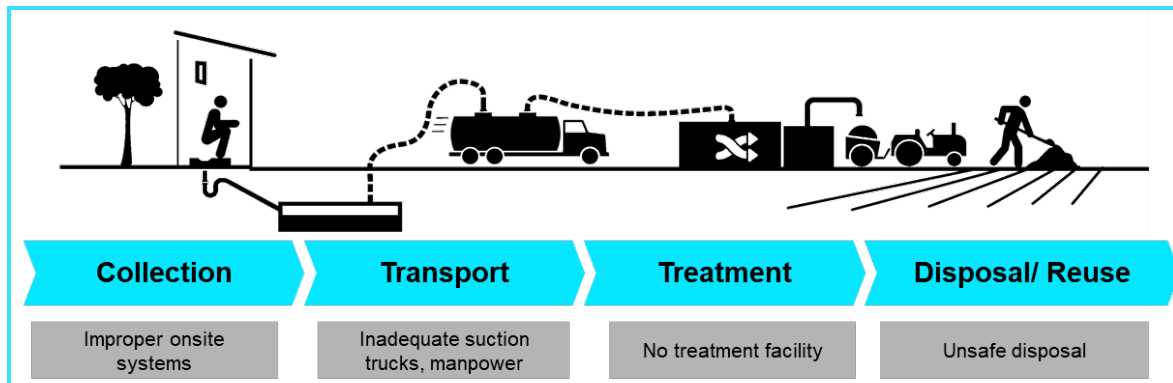
Intellicap (2020) “Catalyzing private sector participation in FSSM in India: Contract Management – A Private Sector Perspective” Presentation at TSU-PMU convening

Intellicap (2020) “Pre-read for workshop on financing mechanism”

Market opportunities for private sector across sanitation chain:

The existing gaps in the FSSM chain can turn out to be opportunities for involving private sector into the service delivery chain.: -

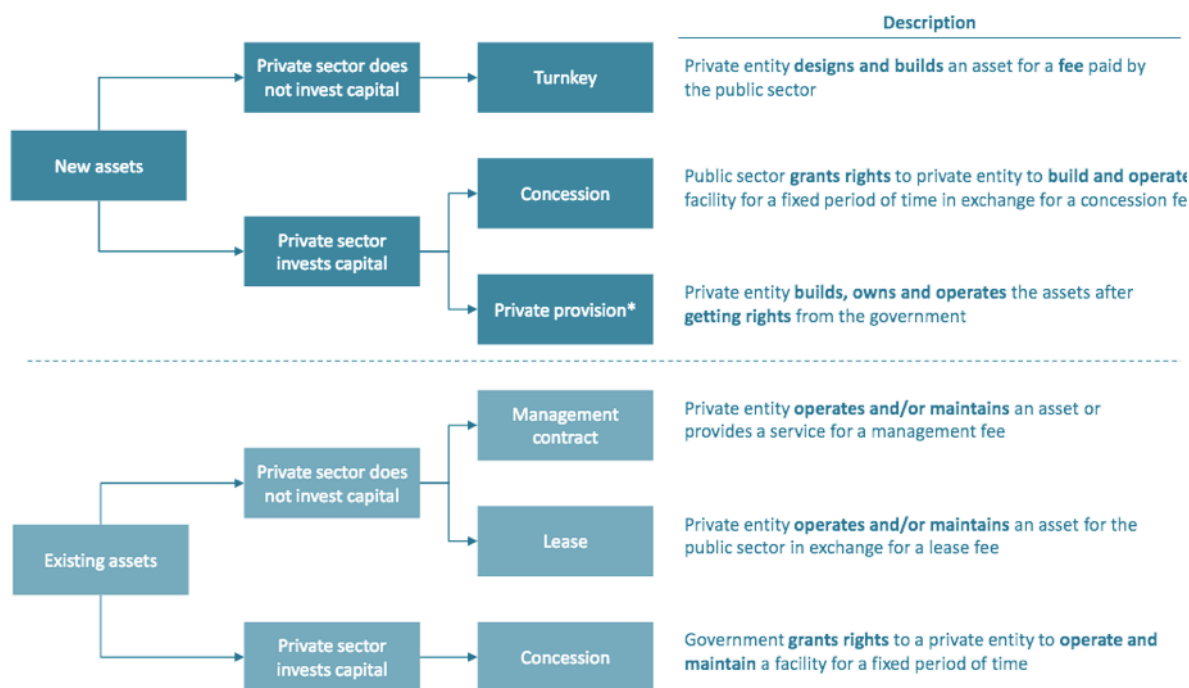
Figure 53 Market opportunities for private sector across sanitation chain



1. **Collection:** -Existing gap- Onsite systems lack access manhole covers and are not of standard size
2. Opportunity- Rehabilitation of on-site sanitation systems
3. **Transport:** -Existing gap- Inadequate suction trucks, manpower; Very few onsite systems cleaned annually
4. Opportunity- Regular emptying of to ensure that 1/3 of the onsite systems are cleaned every year
5. **Treatment:** -Existing gap- No facility for faecal sludge treatment
6. Opportunity- Construction of Faecal Sludge Treatment Facility (FSTPs)
7. **Disposal/Reuse:** -Existing gap- Septage disposed in the open without treatment
8. Opportunity- O&M of FSTP; Regular disposal/reuse of treated sludge

Depending on the choice of business model, a range of options exist for PSP. Conveyance arrangements, if centralized, may be through an on-call contract or a scheduled desludging contract. Alternatively the ULB may also choose to simply license private desludgers for carrying out independent operations. Treatment arrangements, for construction may be through a variety of contracts in various combinations for designing, building, operating, owning and transfer options. For existing FSTPs, simple O&M contracts are also an option.

Figure 54 Options for contracts with private sector



*Note: Not generally defined as a PPP in India; Similarly short-term outsourcing contracts will not be defined as PPPs as per the new 2011 Draft National Policy
 Source: PPP toolkit – Ministry of finance – India, Toolkit for PPP in Urban Water Supply in Maharashtra – ADB, Department of economic affairs

Possible options for SHGs involvement across sanitation value chain

Self-Help Groups (SHGs) are informal associations of people who choose to come together to find ways to improve their living conditions. They are usually community based groups with 10-20 member women from similar social and economic backgrounds, all voluntarily coming together to save small sums of money, on a regular basis. They pool their resources to become financially stable, taking loans from their collective savings in times of emergency or financial scarcity, important life events or to purchase assets. The group members use collective wisdom and peer pressure to ensure proper end-use of credit and timely repayment. In India, RBI regulations mandates that banks offer financial services, including collateral free loans to these groups on very low interest rates. This allows poor women to circumvent the challenges of exclusion from institutional financial services. This system is closely related to that of solidarity lending, widely used by microfinance institutions. Beyond their function as a savings and credit group, SHG's offer poor women a platform for building solidarity. They allow women to come together and act on issues related to their own lives including health, nutrition, governance and gender justice.

Opportunities exist for self help groups to get involved in FSSM activities. With varying degrees of capacity and training, SHGs may be engaged for activities that require low technical skills such as awareness generation and CT/PT O&M to activities requiring high technical skills such as conducting citywide surveys and FSTP operations.

1. **Access:** -Identify and Mobilize toilet application; Construction of IHHL; Monitoring activities; Avail Credit through bank linkages for IHHL construction; O& M of CT/PT
2. **Containment:** -Assessment of containment systems in the city; Supervision of septic tank construction as per design specifications
3. **Conveyance:** -Monitoring of operations for scheduled/demand based emptying; O&M of desludging trucks; Data collection for demand for scheduled desludging
4. **Treatment:** -Operations and Maintenance at FSTP site; Conduct exhibitory visits and manage visitors to FSTP site; Monitoring activities
5. **Reuse/Disposal:** -Disposal of treated effluents at designated location; Selling of compost; Management of a resource center/green house / urban forest at FSPT site
6. **Across** – Awareness generation / IEC

SHG engagement, however, will require extensive capacity building programs for enhancing technical and managerial skills in members. While private enterprises are experienced in working through contracts, for SHGs support may also be required to bear shocks, if any, in payment schedules and cycles of working with government bodies. Model contracts and standard operations procedures need to be provided to facilitate the process.

What does the desludging market look like for private players?

While studies have been done recently on PSP in FSTP activities in partnerships with local government bodies, not much is known about the desludging market aside from studies in individual towns. A research was conducted by Arete Advisors with CWAS-CEPT University on the private sector players across cities in Maharashtra – 62 pvt players were interviewed across all classes of cities. The first observation from this study was the stark difference in private sector desludging activity in smaller towns vs larger corporations pointing to low service capacity of smaller local governments.

1. Private sector is already active, especially in smaller towns
2. Big corporations are also seeing increasing demand for private desludgers
3. Desludging as a business is upcoming – Most entities are developing and individually owned businesses
4. Four diverse segments:

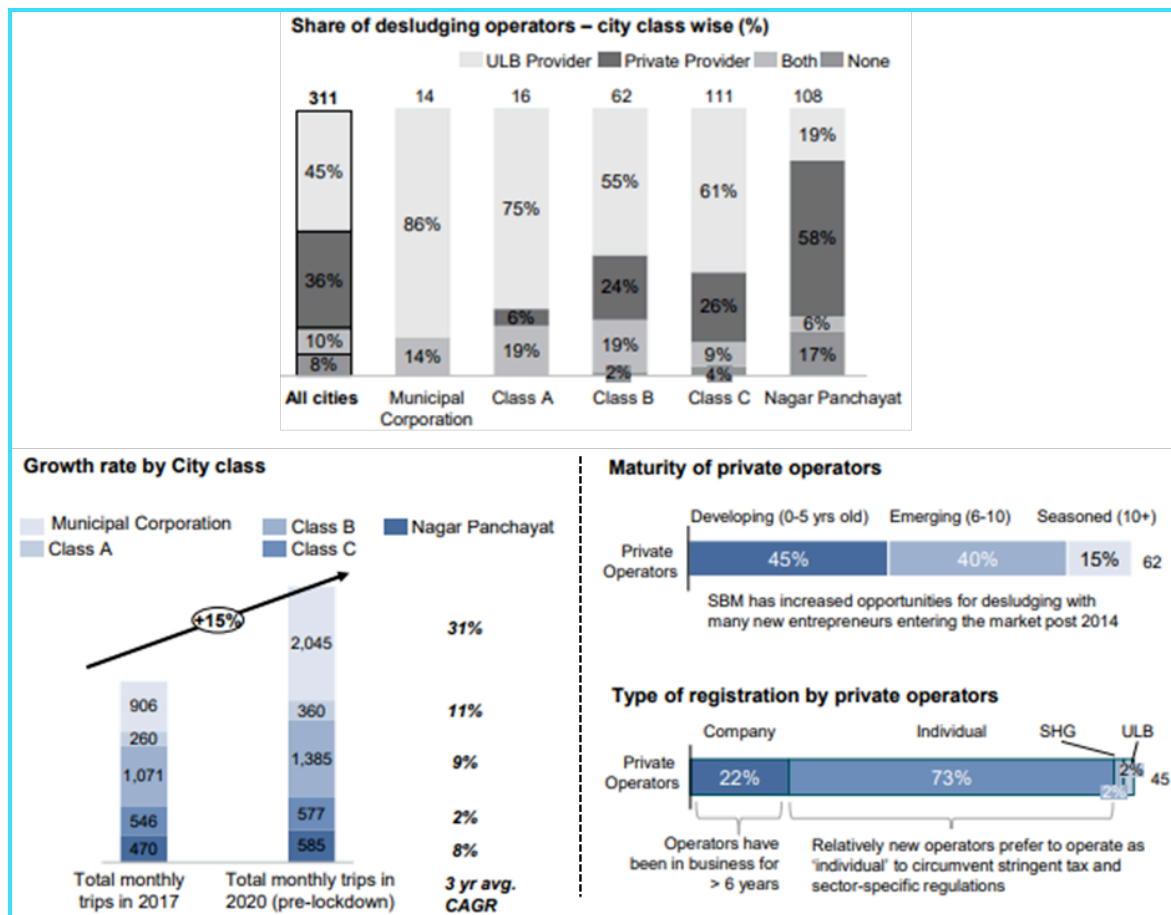
Individual- About 50% of the private operators service only the individual residential household, these emptying are less frequent and generally would have a single trip

Industries- About 35% of the operators have industrial trips greater than 25% of their total trips, price points charged to industrial customers are relatively higher than other customers

Event/ Site Toilets- In larger towns, operators have started servicing desludging demand from construction sites, events, etc. as an alternate source of income

Tender/ ULBs- ULBs have started to give out one-year contracts to private operators for desludging operations, operator bids on monthly payment to be paid by the ULB per month for emptying

Figure 55 Results of research was conducted by Arete Advisors with CWAS, CEPT University



Source: Source: Arete (2020) "Private sector assessment for scheduled desludging services in Maharashtra" CWAS, CRDF, CEPT University

What does the treatment market look like for private players?

1. Typical bidders for PPP model Faecal Sludge Treatment Plant projects: -

Sanitation enterprises which are already working in the space and have experience in FSTP construction, O&M. Examples: BankabioLoo, Tide Technocrats, Tiger Toilets

Enterprise related information	
States/ districts of operations	States – 3,4 Districts – 8,10
Number of years of operations	05-10 Years
Promoter experience	12-20
Sector of expertise	Sanitation and Allied space
Customer information	ULBs, government clients
Operational Details	
No. of employees	50-100
No. of customers	12-20
Percentage revenue from top 5 customers	70%
Financial details	
Collateral availability	Available
Turnover	15 crore

2. Typical enterprises for Turnkey / EPC projects: -

Local contractors who work with ULBs/Government to implement construction projects like road, sewer etc.

Examples: DD Builders

Enterprise related information	
States/ districts of operations	States – 01 Districts – 2,3
Number of years of operations	05-10 Years
Promoter experience	8-10 Years
Sector of expertise	Construction activities
Customer information	ULBs, Private construction companies

Operational Details	
No. of employees	30-40 100 (temporary workers)
No. of customers	12-20
Percentage revenue from top 5 customers	90%

Financial details	
Collateral availability	Limited
Turnover	5 crore

3. Typical enterprises for Faecal Sludge Treatment Plant service contracts: -

Since this model limits itself to operations, small enterprises, NGOs, Area Level Federations (SHGs) are the prominent bidders.

Examples: Hand in Hand, Tamil Nadu ; Hasirudala, Karnataka; ALFs and CLFs

Enterprise related information	
States/ districts of operations	States: 10-15 Districts: 200-250
Number of years of operations	NGOs – 15 Years
Promoter experience	NA
Sector expertise	Waste Management
Customer information	ULBs, Donors

Operational Details	
No. of employees	8000-10000 (NGOs)
No. of customers	60-70
Percentage revenue from top 5 customers	50%

Financial details	
Collateral availability	Not Available
Turnover	NA

4. Typical profiles for integrated models: -

Truck operating enterprises with approximately 20-30 trucks participate in such integrated projects. Usually these enterprises are already engaged in Sludge transportation and/or Solid Waste Management.

Although, private operators show a lower share in activities in larger corporations as compared to ULB services, they are also seeing increasing demand per month lately. Increasing demand and upcoming profile of desludging as a business is also

seen in the age profile of existing entities – more are developing (0-5 years old) and individually owned as against seasoned players (10+ years in business) and established companies.

In terms of the treatment market, typical bidders for PPP model FSTP projects are larger sanitation enterprises which are already working in the space and have experience in FSTP construction, O&M

Examples: BankabioLoo, Tide Technocrats, Tiger Toilets. Such enterprises are experienced with a diversified customer base, available financing opportunities and high turnovers of

Enterprise related information	
States/ districts of operations	01-State 02-Districts
Number of years of operations	04-05 Years
Promoter experience	~ 10 years
Entrepreneur type	Technical Entrepreneur
Customer information	ULBs and government clients

Operational Details	
No. of employees	100-200
No. of customers	04-05 clients
Capacity utilization	90%
Percentage revenue from top 5 customers	95%

Financial details	
Collateral availability	Available
Turnover	INR 40-50 Cr

upto 15 crores. For turnkey or EPC projects, typical bidders are local contractors who work with ULBs/Government to implement construction projects like road, sewer etc. Examples: DD Builders. Such enterprises, although experienced are smaller and more dependent on a few big customers. Their collateral availability is also limited and turnovers smaller at 5 crores.

For contracts limited to services only, such as O&M, typical bidders are small enterprises, NGOs, Area Level Federations (SHGs). These, if experienced, may often have a large employee base and highly diversified customers. Lastly, in the case of integrated models for conveyance and treatment, typical bidders are very large organizations which are experienced in in Sludge transportation and/or Solid Waste Management.

4.5. Enabling environment, ULB capacity and experience

Assessing legal and political environment

If market opportunity exists, the next step is to assess legal and political environment for favorability towards PSP and existing drivers that can propel such opportunities. There must be no legal limitations and policy support, political will as well as community support must exist. If there are barriers in any of these aspects, appropriate steps must be taken to address the issues for smooth contracting.

The following questions need to be explored in order to do an assessment in this aspect -

Table 9 Assessing legal and political environment

1. Are there laws or other legal restrictions that limit PSPs?	
Private contractors not allowed by existing regulations	The ULB should escalate the discussion to the state body, making a case for private contractor engagement, highlighting the service gaps, and lack of funds and manpower to complete the services in-house
Legal restrictions on some aspects of private contractor engagement	The ULB should identify which aspects of private contractor engagement are restricted by law, and if these would impact the proposed project. If the ULB expects any impact, it should prepare a case for exception to be submitted to the state body <u>before the project starts</u> , highlighting why the exception should be created, and how the ULB will manage the risk associated with it
No known legal restrictions	No action required from the ULB
Private contractor engagement enabled through specific regulations	The ULB should proactively reach out to the state bodies, and seek their buy-in in the early part of the project cycle
2. Does a policy for private sector participation in IFSM, or sanitation exist?	

No specific policy for private contractor engagement in IFSM	Through internal consultations, the ULB should clarify whether a lack of policy allows private contractor engagement in practice. If yes, the ULB should move forward with the project. If no, the ULB should escalate the discussion to the state body (as discussed above)
Policy issued by the previous government	The ULB should confirm the current government's view on the existing policy through internal consultations. If the policy is valid, the ULB should move forward with the project. If the policy is not valid, the ULB should seek clarifications from the state body on how to move forward with the project
Current govt. issued a policy/ adopted the previous regulation	No action required from the ULB
Policy issued by the government in the last 2 years	No action required from the ULB
3. Is there political will for private contractor engagement/ sanitation in the local govt?	
No political champion or support for this project	The ULB should proactively reach out to the state bodies, and seek their buy-in in the early part of the project cycle
Some lower level political support exists	The ULB should seek available political support to create a comprehensive project proposal to be submitted to the higher-level authorities. The project should clearly show how the project aligns with the government's broader agenda on sanitation, and seek to gather higher level support
A high level political champion exists	No action required from the ULB
A committed, high level political champion	No action required from the ULB
4. Is there support for private contractors in IFSM or sanitation solutions in the community?	
Local community is actively opposed to private contractors in IFSM	The ULB should conduct detailed stakeholder discussions with the local bodies to understand their opposition to the proposed project. Once their concerns have been addressed, the ULB should initiate a broader stakeholder consultation exercise (e.g. through newspapers) clearly showing how it has taken the views of the community into account. Once this consultation process is over, it can move forward with the project
Community not very engaged; has supported private contractors in IFSM in the past	The ULB should initiate a stakeholder consultation exercise through local newspapers seeking feedback on the proposed project. Once the feedback has

Local community is somewhat supportive	been taken into consideration, it can move forward with the project
Local community is well informed and supportive	No action required from the ULB
5. Will the project require land acquisition?	
Major land acquisition required	The ULB should work closely with the relevant authorities to ensure that the land acquisition process has been completed <u>before</u> the project starts
Minor land acquisition required	
No land acquisition required	No action required from the ULB

Assessing ULB experience and favourability in engaging private players

Question 1 - Has the ULB engaged the private sector for FSSM or in other sectors previously?

Analysing any previous engagement of private sector for FSSM or in any other sector based on the previous contracts

Table 10 Examples for analysing previous engagement of private sector with ULB

Type of the contract	LG responsibilities	Contractor responsibilities
Management contract for door collection of waste and cleaning of drains	Fixed monthly payment made to the contractor	<ul style="list-style-type: none"> • Door to door collection of waste and cleaning to drains • Provision of labor required • Provision, Operation and maintenance of trucks
Management contract for the O&M of vermi-compost treatment plant	Monthly payment made to contractor for operation and maintenance of compost plant constructed by the LG	<ul style="list-style-type: none"> • Provision of labor, equipment and utilities for the plant • Sale of compost, 50% of the proceeds of which, need to paid to the LG
Management contract for the O&M of community toilets	<ul style="list-style-type: none"> • Monthly payment made to contractor • Payment for utilities 	<ul style="list-style-type: none"> • O&M of community toilets along with regular cleaning and repairs
Management contract for cleaning of pre-monsoon drain	Fixed monthly payment made to the contractor	<ul style="list-style-type: none"> • Undertaking cleaning of drains • Provision of labor required

cleaning		<ul style="list-style-type: none"> • Provision of equipment required to undertake cleaning
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Source: Center for Water and Sanitation, CRDF, CEPT University (2017) “PSP Toolkit for IFSM”

Question 2 - What was the overall experience of the ULB in these engagements?

Factors to be analysed for understanding the overall experience of ULB in engagements with private sector: -

1. What are the positive factors that enabled the ULB to undertake these engagements successfully?
2. What are the key challenges the ULB faced during the process?
3. Are private parties easily and locally available?
4. Are there any private contractors the ULB uses to supply labor (monthly, daily or casual) for various services in the water and sanitation sector?
5. Are the ULB officials satisfied with the services provided by the private player? How is the standard of service provided by the private player in comparison to that of the ULB itself?
6. Has the ULB ever had to discontinue a private sector engagement model? What were the reasons?

Question 3 - What was the structure of these contracts?

Key factors in analysing the previous contracts for engaging private sector in FSSM:-

1. Medium term contracts allow for stability in services
2. Lump sum contracts are not tied to inputs and avoid incentives for private players to inflate bills. Easier to monitor with fewer disputes.
3. However, private players complain that the lump sum payments do not account for repair costs or price escalations
4. Payment should be clearly linked to monitoring and reporting requirements
5. Penalty clauses should be tied to monitored outputs or service levels and not be open ended
6. Positive performance incentives tied directly to outputs or service levels should be considered

Features	Contract 1	Contract 2	Contract 3	Contract 4	Features	Door-to-door waste collection	O&M of vermi-compost plant	Cleaning of community + public toilets	Pre-monsoon drain cleaning
Contract length	3 years	3 years	3 years	Annual					
Automatic Renewal	✗	✗	✗	✗					
Tender type	Open bid	Open bid	Open bid	Open bid					
Payment duration	Monthly	Monthly	Monthly	Monthly					
Item rate or Lump sum/fixed fee	Fixed fee	Fixed fee	Fixed fee	Item rate					
Rate per unit (INR)	1,90,000 per month	221,000 per month	1,55,000 per month	~1600-2000 per truck trip, ~350/manday	Redress of user complaints	✓	NA	✓	✗
Penalty clause for non-performance	✓	✓	✓	✓	Dispute resolution mechanism	✓	✓	✓	✓
Number of bids received last year	5	3	3	4	Mitigating payment risk	✗	✗	✗	✗
					Mitigating Termination risk	✗	✓	✓	✓

Figure 56 Parameters for assessing contracts

Question 4 - What were the terms for risk mitigation and dispute resolution in the contracts?

1. All contracts include a dispute resolution clause that “Any dispute regarding the bills will be settled at City X and in the jurisdiction of City X court.”
2. All contracts should have a termination clause in case of public and private termination.
3. Complaint redressal processes and expected service standards should be clear with responsibility
4. There should be clauses to manage delays in payments (e.g. interest paid to the private sector)

4.6. Typical Procurement process

A typical procurement process in local government would involve the following major key steps: -

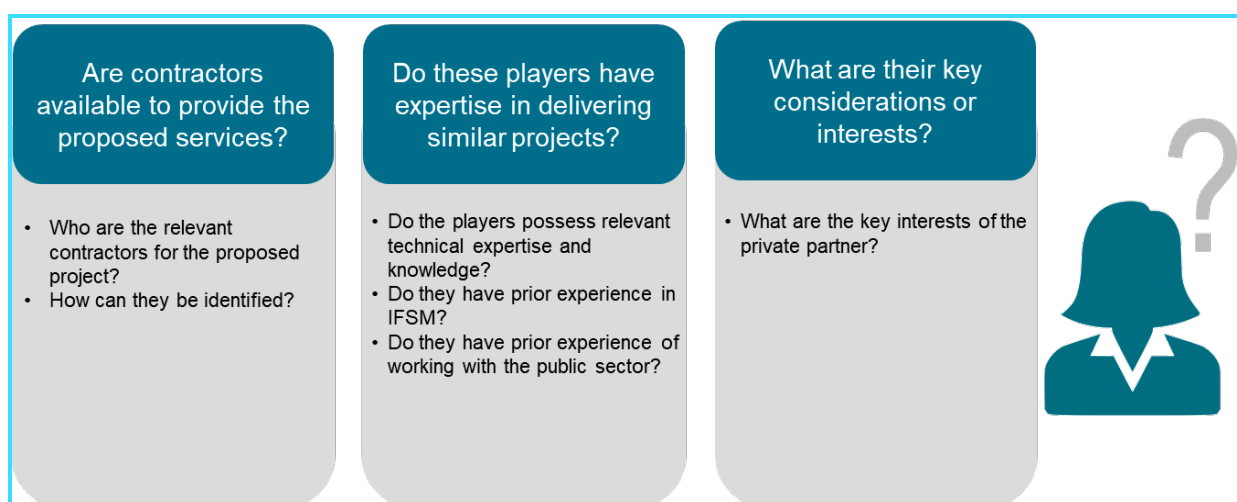
1. **Expression of Interest and market research**
2. **Draft tender document prepared and Invitation for bids**
 - a. Officials may hold initial discussions with potential private players to understand their requirements
 - b. Chief officers (CO) approves tender drafted by the Sanitary Inspector (SI)
 - c. **Bids are then solicited in local newspaper or e-tender floated if above certain financial category**
 - d. Pre bid meeting may be held to address questions and concerns of interested parties
 - e. Refloat tender if corrections needed based on pre bid meeting
3. **Receive bids from private players**

- a. Private players submit their bids including:
 - b. Business license and registration
 - c. Employee Provide fund details
 - d. Tax records
 - e. Previous work experience
 - f. Pricing quote
 - g. Tender fee/ Earnest money deposit
- 4. Evaluate bids and sanction work order**
 - a. Received bids are evaluated by the council and negotiated by the officers
 - b. Contractors meeting the minimum specified criteria and offering the lowest bid are selected
 - c. If required, Detailed Project Report is prepared by bidding agency. This then goes for technical approval by relevent authority
 - d. Administrative approval by State govt may be required for high value projects
- 5. Sanction work order**

Market assessment / Inviting Expression of Interest (Eoi) for scoping potential players

Once we have established the need and opportunities for PSP in FSSM the town/ city, the next step is to understand the availability and capability of the contractors operating in the region. A landscape study along the abovementioned questions would help provide an assessment of work profile, interests, expertise and capacity and willingness to undertake various FSSM activities.

Figure 57 Landscape assessment of Private players



In the absence of resources for conducting an in-depth independent landscape study, ULB may advertise and invite “Expression of Interest” from interested parties. Typical Eols require companies to provide information in their experience in the sector, technical fitness

in terms of available staff/physical infrastructure/financial health as well as interest in investing and/or providing required services.

Experience:

1. Years of experience in providing service in relevant sector
2. Experience in working with public sector
3. Certification / accreditation / registration with relevant agencies
4. Past experience and future intent to provide relevant services

Technical fitness:

5. Base of operations and geographical spread
6. Standard mechanisms for service provision / Expertise in types of technology
7. Details of available physical infrastructure – technology, age and number
8. Details of staff
9. Typical team structure for projects
10. Financial health – Tax returns

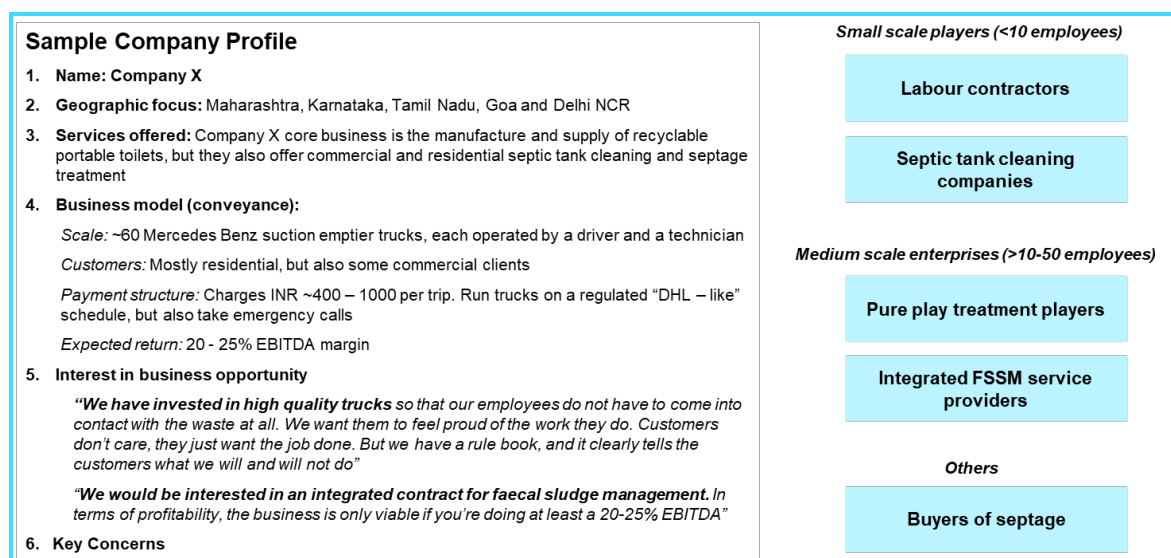
Interest:

11. Interest in working with public sector
12. Willingness to invest and expected returns

Assess work profiles, interests and capacity of interested parties

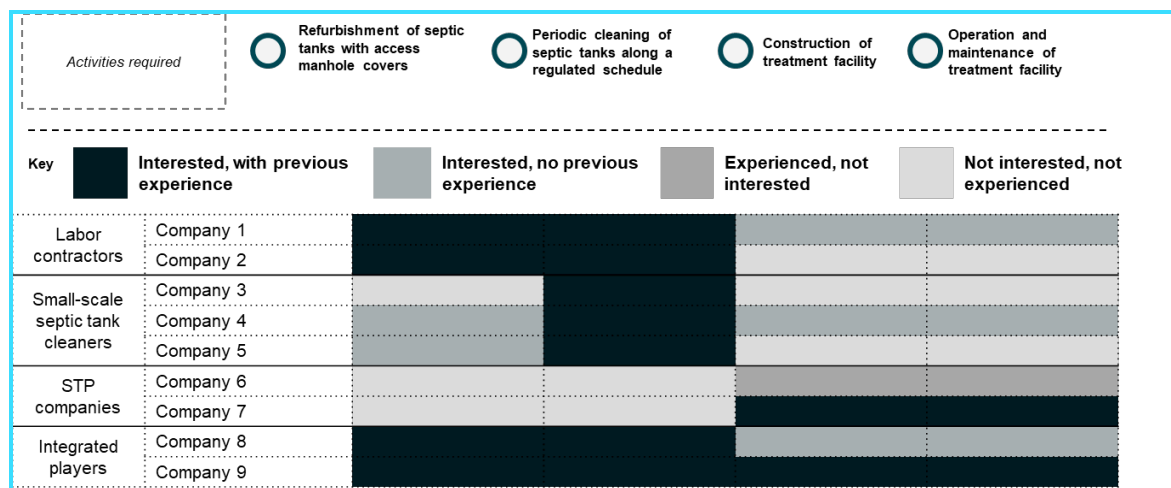
On receiving EoI, the ULB or assessing organization can create individual company profiles based on provided parameters. A sample profile is provided above. Typically, companies can be categorized into small scale players – which are interested in being labour contractors or desludging operators – or medium enterprises which are more interested in treatment or integrated FSSM services. Another category may be those that are not interested in providing services but may want to purchase treated products of septage for re-use.

Figure 58 Assessment of work profiles and scale of players



After drawing up roster of interested parties, the assessor can develop the following chart to place their willingness to engage across the value chain.

Figure 59 Assessment of willingness for engagement



Inviting bids

The next stage in a typical procurement process is generally to float a tender inviting bids with specifications on the kind of services required and related terms and conditions. This may be done through advertisements in newspapers or through the state government's e-tendering website. The draft contract and tender documents need to be approved at multiple stage and relevant officials. Once bids are received, they are evaluated by the city council and subsequently negotiated by the executive wing officials. Contractors meeting the minimum specified criteria in the technical evaluations stage and offering the lowest bid in the financial evaluation stage are selected and work order is given.

Pre-procurement challenges faced by private players

1. Bidder size (turnover) requirements and restrictions on partnerships while bidding:

Impact on private player:-

Minimum Average Turnover requirements are usually set at 25-33% of the project cost

Consortium / Joint Venture not allowed

Many new players are unable to meet the minimum criteria.

Recommendation:-While the minimum average turnover should be in line with the existing ULB norms, joint venture / consortium should be allowed.

2. Geographical presence requirements:

Impact on private player:-Many tenders ask for an office set up in the region or experience in similar projects in the region, which disqualifies many bidders.

Recommendation:-Experience in managing similar projects is critical. However the need for a regional player and an infrastructure setup for such small projects is unwarranted.

3. Fixed vs open technology for treatment:

Impact on private player:-New technology solutions are not being tested and technology startups are not eligible for these contracts.

Recommendation:-It's better to standardize output parameters rather than the technology. An open technology with due validation will allow more bidders to participate.

4. Earnest Money Deposit:

Impact on private player:-The EMD amount of 1% of the project cost is an added financial burden on the private sector player.

Recommendation:-Need to adopt the GOI guideline of exempting MSMEs from EMD.

No-procurement case: License to carry out independent desludging operations

In case the ULB is not opting for centralized contracts for desludging services, it should certify and license septage transporters in order to monitor their operations and ensure safe disposal at designated sites. This is relevant for Conveyance prototype 1: Fully private model described in the previous sessions.

A typical licence includes the following points -

1. Permission to run desludging operations
2. Private player owns trucks
3. Private player is collecting charges independently
4. Private player to ensure safe disposal at designated site
5. Permit to be renewed periodically
6. Can be cancelled if violating and Acts, Rules and Regulations

4.7. Activity 6A – Procurement plan

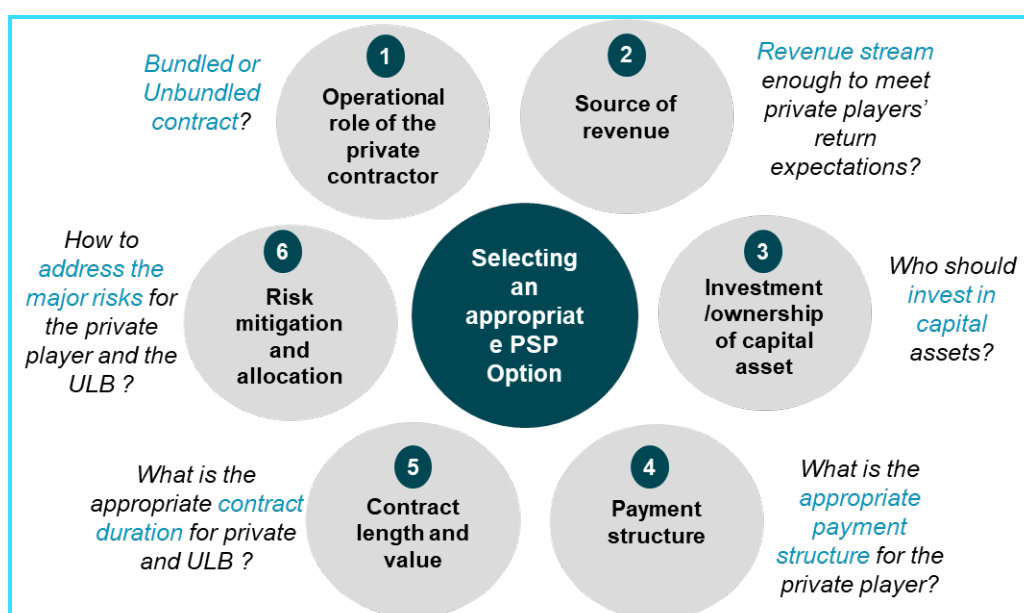
At this stage, participants must refer to the activity workbook for activity 6A. This activity tests the understanding of participants on the procurement process explained above and also demonstrates the practical steps to be undertaken by the ULB for each stage of the process. During the activity, trainers must take care to connect with each participant and clear any questions they may have on terminology or the relevance of specific processes.

4.8. Developing a balanced contract - Six step processes

For designing contracts, there are six decision areas processes involved in structuring and assessing a PSP option for septage management.

1. **Operational role of Private Sector – appropriate bundling of contracts:** Should the local government put out an integrated FSM contract for the entire service chain, or unbundle the contract for specific activities
 2. **Return expectations and source of revenue:** What are the likely revenue requirements to meet private players’ return expectations? What could be the potential sources for these revenues – taxes or user charges?
 3. **Investment and ownership of capital assets:** Should the capital investments in the vacuum truck and sludge treatment facility be borne by the private players or by the local government?
 4. **Payment structure:** What is the appropriate payment structure? E.g. should it be a fee per unit, or a lump sum contract or a monthly fee?
 5. **Contract length and value:** What is the appropriate contract duration and value which compensates private players for the risks they undertake, while providing the local government with the flexibility to switch providers?
 6. **Risk mitigation and allocation:** What are the major identified risks for the private sector and the city government that need to be mitigated? If it is difficult to mitigate some risks how should these be allocated?
7. Once these key questions are addressed, it will be possible to develop an appropriate structure of engagement with the private sector as well as develop the necessary contracts and bid documents. Based on these, a further round of detailed consultations should be done with both the local government as well as a few key private players to get their feedback.

Figure 60 Six step process in structuring PSP option for FSSM

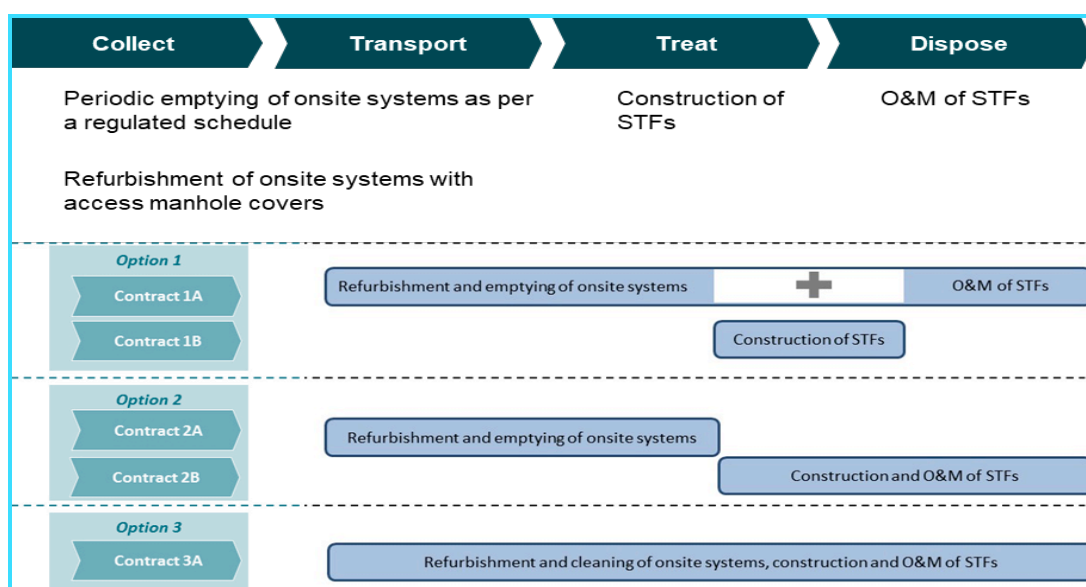


Source: Center for Water and Sanitation, CRDF, CEPT University (2017) “PSP Toolkit for IFSM”

1. Specify operational role of the private contractor –bundled or unbundled contracts?

Creating bundled contract options according to the activities would require identification of different activities under the sanitation value chain and consideration of interest and capabilities of different contractors. Bundling contracts simplifies vendor management, and ensures greater accountability. The elements of integrated faecal sludge management are highly connected and success of one element is closely tied to the success of the others. Hence, bundled contracts have tangible benefits over unbundled contracts for IFSM.

Figure 61 Examples of creating bundled contracts for FSSM



Advantages of bundled contracts:

- Ensures greater accountability: Having a single point of contact avoids the issue of players blaming each other for lapses in service
- Aligns performance incentives: Creates incentives for the private player to manage each element of the chain successfully
- Simplifies contract management: Reduces the number of transactions needed to coordinate with different players

Advantages of unbundled contracts:

- Diversifies non-performance risk: With a bundled contract, non-performance puts all activities at risk
- Takes advantage of player expertise: Contracts can be awarded to the most qualified player for each activity

Some examples of bundled contracts have already been discussed in the previous session on business models as “integrated business models”-

- HAM model in AP and Telangana – City cluster bundles for FSTP construction
- Approach in Chhatisgarh and Thailand– Private player for treatment + cluster based desludging
- Model in Leh – Bundled contract for desludging and treatment

2. Identify revenue sources

The ULB must identify appropriate sources of revenue which may be used individually or in combination. The key questions to consider while evaluating different options here are -

- Are funds available through the duration of the contract?
- Are the financing terms acceptable to the ULB?
- Is the revenue source reliable in terms of guarantee?
- Does the source have active political and community support?

The following checklist may help in making decisions –

Section 1. Identifying sources of revenue for capex

1. Does the ULB have the budgetary allocation to commission the proposed project?
Yes / No
2. Can the ULB raise funds through central or state government grant/loan? Yes / No
3. Can the ULB raise funds through any other external source for loan/grant –
 - a. Private sector grant
 - b. CSR fund
 - c. Multilateral agency
 - d. None of the above

Shortlisted sources (whichever are selected from questions 1-3): _____

Section 2. Identifying sources of revenue for opex

1. Does the ULB have the budgetary allocation to commission the proposed project?
Yes / No
4. Can the ULB raise funds through taxes from households? Yes / No
5. Can the ULB raise funds through central or state government grant/loan? Yes / No
6. External: Can the ULB raise funds through sale of septage? Yes / No
7. Can the ULB raise funds through any other external source for loan/grant e.g. private sector grant, or CSR fund, multilateral agency? Yes / No

Shortlisted sources (whichever are selected from questions 4-8): _____

Section 3: Assessing shortlisted sources

Capex: For the sources shortlisted (whichever are marked “Yes” above), consider the following questions:

Criteria	Shortlisted Source 1: _____	Shortlisted Source 2: _____	Shortlisted Source 2: _____
1. Are the financing terms acceptable to the ULB	Yes / No	Yes / No	Yes / No
2. Is the funding available for the duration of the contract?	Yes / No	Yes / No	Yes / No
3. Does that cash flow timing match the requirement (i.e. is the amount available lump sum, or in tranches)	Yes / No	Yes / No	Yes / No
4. Does the source have active political or community support	Yes / No	Yes / No	Yes / No
5. Is the revenue source reliable in terms of guarantee of disbursement	Yes/No	Yes/No	Yes/No

Opex: For the sources shortlisted (whichever are marked “Yes” above), consider the following questions:

Criteria	Shortlisted Source 1: _____	Shortlisted Source 2: _____	Shortlisted Source 2: _____
1. Are the financing terms acceptable to the ULB	Yes / No	Yes / No	Yes / No
2. Is the funding available	Yes / No	Yes / No	Yes / No

for the duration of the contract?			
3. Does that cash flow timing match the requirement (i.e. is the amount available lump sum, or in tranches)	Yes / No	Yes / No	Yes / No
4. Does the source have active political or community support	Yes / No	Yes / No	Yes / No
5. Is the revenue source reliable in terms of guarantee of disbursement	Yes/No	Yes/No	Yes/No

In this aspect, the following concepts are available and have been discussed in the sessions on business models.

Source of revenue		
ULB own sources	Government sources	Misc. sources
Treatment prototype 3: ULB funded FSTP - 14 th FC funds	Treatment prototype 2: Treatment funded through national/state programmes	Conveyance prototype 1-4: Demand desludging – user charges
Conveyance prototype 5,6: Scheduled desludging – sanitation tax, property tax, environment tax , water tax	Case of Orissa – where state government procured trucks for Municipaities	Treatment prototype 1: Donor funded treatment plants
		Tipping free, sale of treated sludge/water

Sanitation tax as a revenue source - Case of Wai and Sinnar

Currently, households clean their septic tanks once in 8-10 years and spend INR ~1000 in Wai and INR ~400 - 800 in Sinnar. Property owners currently have to pay local taxes of about Rs 2200/annum in Wai and Rs.1600/annum in Sinnar. To cover the costs of a cleaning cycle of ~3 years would require an increase in annual tax spend for a household of about 10% in Wai and 20% in Sinnar. As these are reasonable increases for a regular service and related environmental as well as personal benefits, it is expected that with appropriate awareness there will be willingness to pay additional taxes.

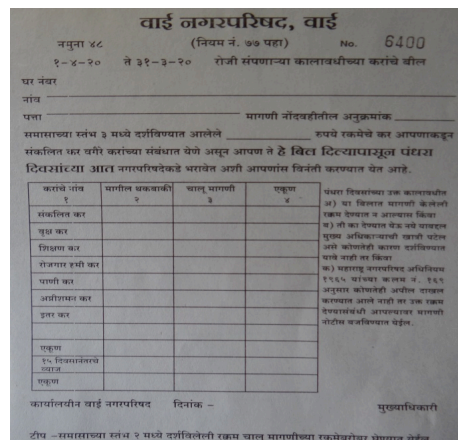


Figure 62 Sanitation Tax in Wai

The ULB can consider using its conservancy taxes to support the integrated faecal sludge management plan, and will need to compensate private players directly through a management fee.

Sale of treated septage for reuse: source of revenue

There is demand for sludge among small and medium farmers, but willingness to pay is unclear. Following are the experiences of the people/associations that have utilized septage for reuse: -

“Larger farmers who export their crops are bound by restrictions on the use of animal and human waste. Sludge can be sold mainly to small and marginal farmers, who lack access to synthetic fertilizers.” - Person X

“Faecal sludge cannot be used in organic farming due to concerns about e-coli and shigella infections. However, it is often used by small farmers as ‘son-khad’.” - Person Y, Farming association

“We make compost from solid waste. The market is extremely seasonal. Creating a continuous market for this waste is tough. People say that you are creating compost from waste so we don’t want to use it. Source is very important.” - Person Z, Entrepreneur

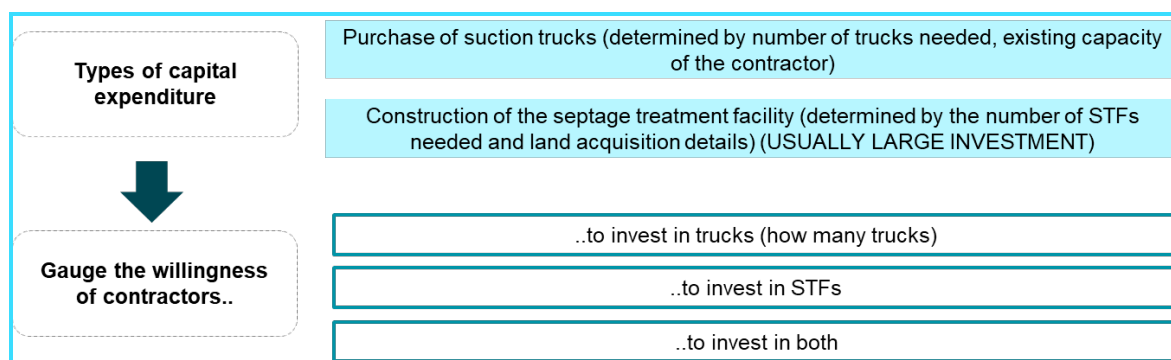
“I often have to pay farmers to dump sludge in their farms, I do not think the sale of septage is a viable revenue source.” - X Enterprises

“It (sale of septage) is possible, but will require investment in marketing and distribution, which we do not do.” - Y Enterprises

3. Decide ownership of capital assets

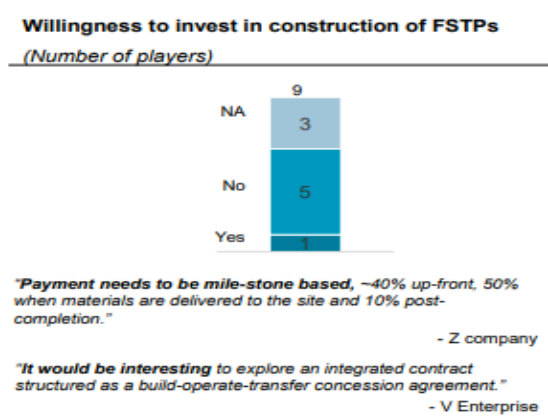
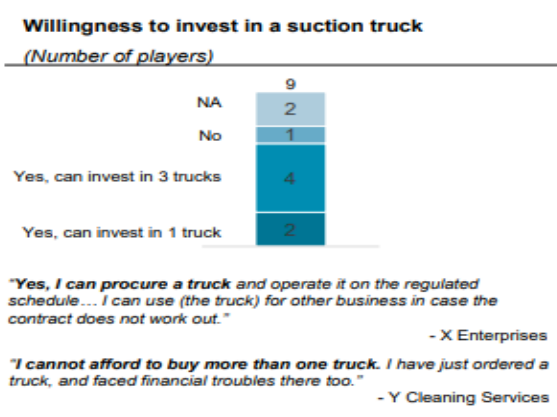
The PSP contract must clearly define who will purchase or pay for the asset and who will pay for maintenance, and if there is a transfer of asset after a specified period of time

Figure 63 Deciding ownership of capital assets



Case study on will to invest in suction trucks and STFs

Assessment of contractors revealed that contractors were willing to invest in suction trucks, but not want in the construction of STFs.



Benefits to public sector

Ease of procurement: ULB procurement of the truck would require floating tender, inviting, evaluating and negotiating bids. This is likely to be time consuming, and involve transaction costs that can be avoided if the private player purchases the truck.

Aligns private sector incentives: Private sector investment in trucks incentivizes the player to use and maintain the truck well.

Allows investment in quality: ULBs are often bound to minimize cost, while the private sector can invest in quality trucks with longer lifecycles and additional features like water jets.

Benefits to private sector

Facilitates access to finance: Having a contract from the ULB can make it easier for the private player to raise capital for the truck and negotiate better financing terms.

Provides a platform for business expansion: A contract with the ULB serves as a low-risk platform for private sector players to scale by providing access to guaranteed demand to recoup investment in a truck.

In this aspect, these concepts are available and have been discussed in the sessions on business models.

Suction trucks	FSTP
Conveyance prototype 1,4,5: Suction trucks owned by private operator	Treatment prototype 1: Donor funded treatment plant handed over to ULB
Conveyance prototype 2: Suction trucks owned by government Conveyance prototype 3: Suction trucks owned by government but leased to private operator	Treatment prototype 2,3: Treatment plant funded by ULB/state/national government funds, owned by ULB
	Treatment prototype 4: Privately funded, repaid by government, transferred after O&M period
	ULB land provided for FSTP

4. Define payment structure for different activities

Payment structure for different FSSM activities can be defined based on these four key aspects: -

- Frequency of the activity
- Whether outputs are measurable
- Whether total costs are known
- Whether timelines are known

Table 11 Recommended payment structures for different scenarios

Frequency of activity	Estimate of costs involved	Timelines	Recommended payment structure
One-time	Known	Well-defined	Overall fixed fee
One-time	Unknown	Well-defined	Fixed per unit fee

One-time	Known	Unknown	Fixed per unit fee
One-time	Unknown	Unknown	Fixed per unit fee
Recurring	Known	Well-defined	Recurring fixed fee
Recurring	Unknown	Well-defined	Recurring fixed fee

The following checklist can be helpful in decision making –

Checklist	Suction trucks	Septage Treatment Plant
1. Is the private contractor willing to invest in the capital asset?	Yes No	Yes No
2. If No,		
What is the key reason for their unwillingness?	Lack of financial resources Inherent risks from ownership of asset (such lack of exit options) Others All of the above Not applicable	Lack of financial resources Inherent risks from ownership of asset (such lack of exit options) Others All of the above Not applicable
If the reason is lack of financial resources, can support from the ULB help the contractor consider capital investment?	Yes No Not applicable	Yes No Not applicable
If the reason is inherent risks, will support from the ULB (e.g. by agreeing to pay for the asset in case of early termination), help them consider capital investment?	Yes No Not applicable	Yes No Not applicable
3. Can the ULB afford to pay for the asset?	Yes No Not applicable	Yes No Not applicable
Is there an internal budget / or provision for making capital investment for IFSM or sanitation related projects?	Yes No Not applicable	Yes No Not applicable

Can the budget for this asset be approved through a special request to the relevant ministry/ institution?	Yes No Not applicable	Yes No Not applicable
Can this money be raised from a central / state government loan or grant?	Yes No Not applicable	Yes No Not applicable
Can this money be raised from external loans or grants?	Yes No Not applicable	Yes No Not applicable

Decision making:

If the private contractor is willing to make the investment, they should go ahead and incur the capex

If the private contractor is not willing to make the investment the ULB can provide minimum performance guarantee/ financial support to help cost-share the investment with the private contractor

If the cost-sharing arrangement is not viable for the contractor, the ULB should make the capex investment as part of the project

In most scenarios, the private contractor will be willing to invest in suction units, while the cost of the STPs would have to be borne by the ULB

For FSSM the following payment structures may be considered –

Table 12 Payment structure for FSSM contracting

Activity (within the contract)	Suggested Payment Structure	Rationale
Refurbishment of septic tanks	<i>Fixed fee per unit</i>	<ul style="list-style-type: none"> Refurbishment is a one-time activity in which the cost per tank is known, but the number of tanks is not - hence a fixed fee per refurbished tank should be paid
Regular cleaning of septic tanks	<i>Recurring fixed fee</i>	<p>The number of tanks to be cleaned and the schedule is typically well determined</p> <p>Hence, it is an ongoing activity for which a fixed monthly fee is paid given based on fixed schedule and regular reporting</p>
Emergency Cleaning of septic tanks	<i>Fixed fee per emptying service</i>	<ul style="list-style-type: none"> This is a one-off activity, and can be provided by the ULB itself Should be kept high as a deterrent for users to not opt out of regulated services

Construction of STPs	<i>Overall fixed fee</i>	<p>Construction of STPs is a one-time activity.</p> <p>Since the design is specified by the ULB, the costs would be well known. Hence, an overall fixed fee can be given</p>
O&M of STPs	<i>Recurring fixed fee</i>	<ul style="list-style-type: none"> O&M of STPs is an ongoing activity for which the costs and procedures are well defined, for which recurring, time based fixed fee can be paid

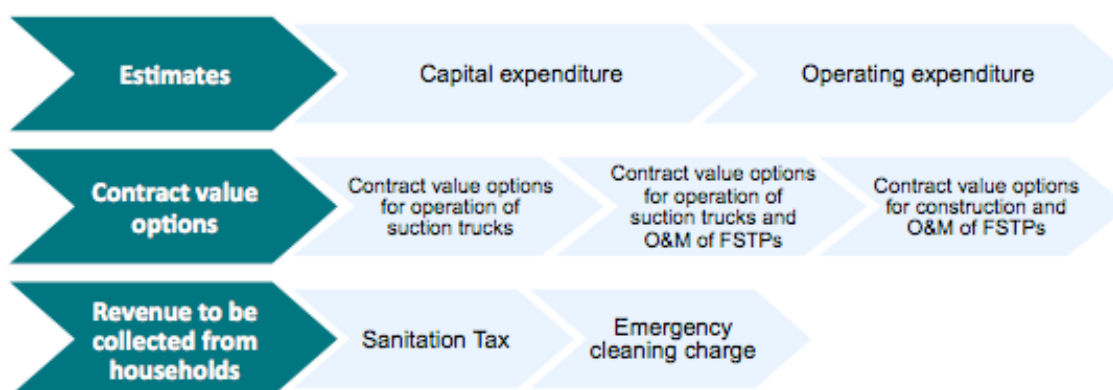
Examples from business models –

- Conveyance prototype 1-3: Fixed user charges per tank / per trip collected on spot
- Conveyance prototype 4: Lowest quotation by desludger accepted by call center. Paid on spot
- Conveyance prototype 5: Payment per tank/trip, paid monthly in bulk
- FSTP construction – Fixed fee based on DPR estimates and drawings. Payment on milestone based invoices – eg: Excavation, Foundation, Plinth, Unit wise / Floor wise, functional structure
- FSTP O&M – fixed monthly fee

5. Defining contract length and value

Value and duration of contract is determined based on frequency of activity, estimate of costs and completion timelines

Figure 64 Priority contract clauses for effective engagements



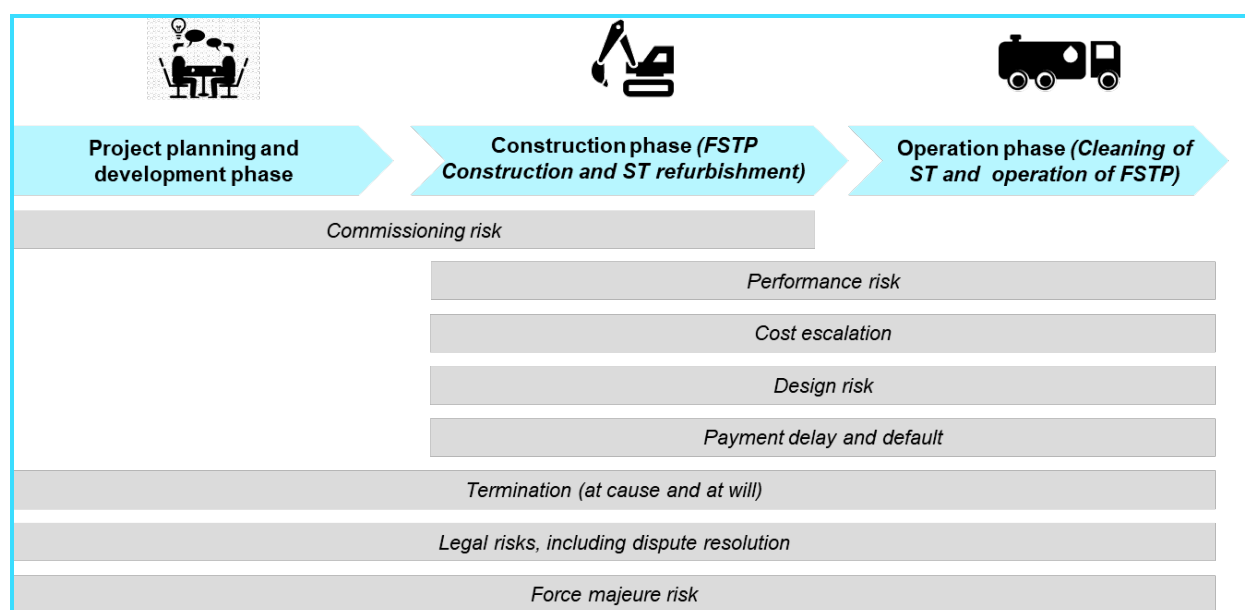
6. Addressing risks and payment delays

Good risk mitigation and allocation can attract good contractors and help reduce contract price. Current contracts are relatively simple documents, where ULBs simply list each of

their current activities and assign them to the private sector. In most cases, there is no rigorous evaluation of the risks involved with a private sector engagement. As a result, contracts are often revised several times after they have been signed, as new risks are discovered. While the nature of risks varies on a case-by-case basis, the above diagram lists some common risks that have been observed to be inadequately managed in current contracts.

Balanced contracts protect the interest of all parties including the private sector. Addressing the concerns of private enterprises at the contract stage itself results in a good contract management experience for the ULB and encourages the private sector to maintain the relationship as well as participate more in public sector projects.

Figure 65 Risks at various stages of project



Source: Adapted from ADB, “Toolkit for Public Private Partnerships in Urban Water Supply for the State of Maharashtra, India; Ministry of Finance, Government of India, “PPP Toolkit for Improving PPP decision-making processes in water and sanitation, PPIAF, Vijay Sarma, ‘Risks in PPP projects in Western India’”

Risk mitigation: Commissioning risks

Commissioning risks, typically in the case of construction projects, relate to challenges faces prior to which delay the commencement of construction phase.

Table 13 Commissioning risks

Risk	Mitigation
Delay in land acquisition - Escalation of project cost, opportunity cost; impact on the viability of the project	Land acquisition to be complete before project begins Contractor should be compensated for the delay either through credits or penalties. Right of Access should be made part of the land acquisition process. Access infrastructure can be included in the project cost if needed.
Delay in construction/	A streamlined process for approvals need to be incorporated defining

commissioning related approvals	timelines and responsibilities of both ULB and contractor Allocation of remaining risk- Penalty payments for delay time period
Change in Law risk Project uncertainty	Contractor to be secured against this
Force Majeure risk	Insurance Risk to be shared between contractor and ULB

Source: Adapted from Intellicap - Catalyzing private sector participation in FSSM in India : Contract Management – A Private Sector Perspective

Risk mitigation: Performance and meeting contract clauses

Performance risk: A key risk that needs to be managed to prevent dispute is the inability of the private sector to meet the performance standards desired by the ULB. This risk can be mitigated by clearly communicating the expected outputs desired by the ULB in the contract terms. It is important to offer private providers a detailed understanding of expectations by going beyond defining outputs to defining service levels. Next, the contract terms should communicate how these outputs will be monitored, and how the findings from the monitored output will be linked to payment

Table 14 Performance and meeting contract clauses for risk mitigation

Risk	Mitigation	Allocation of remaining risk
Private player uses manual scavenging for cleaning septic tanks or FSTPs	Requirement of safety gear for all personnel A clear description of activities that constitute manual scavenging	Contract terminated if complaints of manual scavenging are received from HH or ULB staff
Private player does not clean septic tanks as per schedule	Portion of monthly payment tied to number of HH signatures collected whose septic tanks have been cleaned Undertaking random inspections of HH whose signatures have been submitted A complaint redress mechanism to be opened by the ULB for the HH In case of demand issues - appropriate IEC to be done by the ULB	Penalties imposed if number of cleanings is lower than specified in the contract, or if discrepancies found during random sampling, or if complaints not dealt with Large or persistent breaches can lead to termination
Private player damages tanks during cleaning	As above	Work would have to be remedied within a specified days of complaint and the cost borne by the private player
Private player spills septage during transportation	A complaint redress mechanism to be opened by the ULB for the HH	Complaints of spillage and illegal dumping must be

Private player dumps septage in the open	A portion of monthly payment is tied to signatures collected from the SDB operator	addressed within a specified period, to avoid a fine If the number of complaints exceeds a specified number in a time period, the contract can be terminated
FSTP or ST does not meet specified design	Specify the design and materials to be used in consultation with town consultants Payment made in installments on the completion of construction milestones Regular reporting by the player and monitoring by the ULB	If work is found to be faulty at any stage, payment to be withheld until the corrections are made
Sludge recovered from FSTP is not sufficiently treated Inability to achieve the output parameters	Output parameters should be defined along with the estimation mechanism. Regular checks to be undertaken by the sanitation department to measure sludge properties X% of O&M payment to be conditional on the sludge meeting specified qualities	If specified standards not met, a warning to be given, followed by fines. Persistent breaches may lead to termination

Source: Adapted from Intellicap - Catalyzing private sector participation in FSSM in India : Contract Management – A Private Sector Perspective

Risk mitigation: Payment and costs

Payment delays and defaults: A common cause of dispute in public –private partnerships is delays or defaults in payment on the part of the ULB. Often this is the reason for service providers to stay away from entering into a contract with urban local bodies(ULBs). This risk can be mitigated by clearly identifying a reliable source of funding for the engagement before starting the procurement process. In addition, ULBs can ensure they meet their ongoing payment obligations by using an escrow account to ear-mark funds for the engagements. Finally, it is recommended that contracts include a mutually agreed upon mechanism to manage delays in payments, by including an interest payment or a temporary pause in services

Table 15 Performance and meeting contract clauses for risk mitigation

Risk	Mitigation	Allocation of remaining risk
ULB is unable to make timely payments towards the project	Ensuring budgetary allocation for contracts before procurement Establishment of an escrow account	ULB to pay interest for the payment, delayed by X months or more, at a

	for payment with a 3-6 month advance deposit	negotiated rate of interest
Cost of inputs increase over the course of contract	Adjustment of contract value annually for inflation Inclusion of a cost re-negotiation clause	Private player would be responsible for bearing the cost escalations within the negotiated period
Incorrect estimate of project costs – Escalation of project cost, construction period	RFP should indicate a cost as per existing estimates. However, the bidders should be encouraged and supported to undertake their own assessment of the project on of a cost re-negotiation clause For design issues, responsibility according to project structure	

Source: Adapted from Intellicap - Catalyzing private sector participation in FSSM in India : Contract Management – A Private Sector Perspective

Why are payments delayed? – Local government perspective

Private players often hesitate in working with governments citing payment delays as the primary concern. However, it is also important to look at the underlying causes that lead to such issues.

Use of public funds requires multiple checks and balances -Administrative approval protocols have multiple levels and stakeholders- on-ground inspectors, executive wing, elected wing, accounting wing. Government bodies are required to follow fixed procedures and going through each level of approval presents instances of delay.

Staffing, multiple charges and institutional issues - In smaller urban centers, staff is limited and more often than not hold charges in multiple departments. In such cases, one staff member is handling multiple contracts across multiple departments.

Availability of funds, ring-fencing - For projects being funded out of specific programmes, payments are subject to release of ring-fenced funds from state and central governments. For smaller urban centers, own funds and revenue generation is limited

Performance vetting- Mismatch on correct invoice formats, Performance assessments, adherence to contract clauses also delay timelines

Options to address risks of delayed payments by ULBs

Escrow account mechanisms : Escrow account mechanism can be used to ensure availability of funds for timely payments to a private service provider in a contract. For example, in scheduled desludging operation in Maharashtra, an escrow account is created between contractor, local government and a bank through a tripartite agreement. It is mandated to maintain a minimum three months’ payment which is called ‘Contract Fees Reserve fund’ for the private operator in the escrow account. Apart from this, it is also mentioned that

private operator will get interest payment in addition to invoice amount, if payments are delayed by more than three months.

Two-part payment (fixed and variable / performance based): One can address delayed payment by adding a two-part payment clause in tender documents, wherein payment to private operator can be done in two parts, a) one is fixed part- which is released as soon as bills are submitted by private operators and b) other is variable/ performance based- which is released only after reviewing the actual performance of private operators as per target specified. This will help private operator to get part payment on time so that they can have some working capital to continue operations. This will safeguard interest of both local governments and private operators.

Expenditure Management Committee was constituted by Government of India, headed by Dr. Bimal Jalan in 2015. One of their recommendations was “Payments delays impact the bid value as this is factored into the bid by way of an increase in interest carry cost. It is learnt that Delhi Metro Rail Corporation has instituted a system whereby 75% of all running bills are released with 7 days of submission, without a detailed check on the claim. The balance is released after the claims are scrutinized as per procedure. This system is stated to have helped both in getting more competitive bids and in speedier execution, as cash flow is a critical requirement in a project. It is recommended that this practice of releasing a specified proportion of the running milestone payments, within a week of the bill being submitted, could be instituted in other large projects as well. If required an enabling provision may be incorporated in the special conditions of contract”.

Specifying detailed bill clearance mechanisms in contracts and backed by an online bill monitoring system : One of the key reasons for the delay in payment is also the lengthy departmental procedures and clearances that government follows to clear payments. It would be helpful to clearly specify the detailed steps in the payment process, (e.g. date by which invoice should be submitted, and steps required for its clearance in the system. It must also specify the minimum /maximum number of days for each step for any bill to be approved and paid by the local government) in the tender document. This will give a clear idea to the private enterprise on the process of payment and the likely time that it could take.

A Risk Mitigation Fund for SMEs (with Philanthropy /CSR funds) : A risk mitigation fund can be set up to enable private contractor to access loans at low interest rates for meeting working capital requirements when payments are delayed. Such a fund can be set up with a combination of public allocations and grants from CSR or philanthropy funds.

Access to working capital loans at no or low interest rates can help mitigate risks of delayed payments. Appropriate arrangements can be made to ensure that once payments are made by the ULBs, loans will be directly repaid through the escrow mechanisms. The possibility of using intercept mechanisms using state grants to ULBs as security, as has been done successfully under the Tamil Nadu Urban Development Fund for its loans to ULBs.

Mobilization Advance: Mobilization advance or secured advance may also reduce private sector working capital needs. Generally, mobilization advance is given only in large and capital-intensive works. Also, urban local governments generally do not provide mobilization advance to private contractor. The mobilization advance can be provided as 10% of contract value and such advance can be deducted from running bills or in the final bill.

Trade Receivables Discounting System (TReDS) Platform : Another idea that has gained popularity in recent times is invoice discounting. Invoice discounting accelerates payment against approved bills by agreeing for a cash discount directly to the buyer or through a financier, who in turn collect the full amount. In 2015, RBI allowed setting up of the Trade Receivable e-Discounting System to help discounting and settling of invoices, which render factoring services in case of delayed payment. This is a financial arrangement wherein a seller recovers an amount of the sales bill from a financial intermediary, after paying a discount/fee, before it is due. Three TReDS exchanges — M1, RXIL and ATREDS — have been set up since then. In 2017-18, all the three exchanges put together handled transactions of Rs 300 crore. However, this is limited to only companies registered under the Companies Act 2013 and reporting a turnover of over Rs 500 crore. It would be useful to explore a similar platform for small and medium sized private players. In the Union Budget 2020-21, it was announced that “An app-based invoice financing loans product will be launched soon, which will obviate the problem of delayed payments and consequential cash flow mismatches for the MSMEs. Necessary amendments will be made to the Factor Regulation Act 2011 to enable Non Banking Financial Companies (NBFCs) to extend invoice financing to the MSMEs through TReDS thereby enhancing the economic and financial sustainability.” Such measures by Government of India may further alleviate the problem of delayed payments.

Delayed payment monitoring portal – MSME Samadhan: Government of India, through its Micro Small and Medium Enterprises Development (MSMED) Act, 2006 has added a provision related to delayed payments to Micro, Small and Medium Enterprises (MSMEs). As mandated under this act, all the states/Union Territories in India have constituted Micro and Small Enterprise Facilitation Council (MSEFC) for the settlement of disputes on delayed payments. The buyer is liable to pay a monthly compound interest to the supplier at three times the bank rate notified by the Reserve Bank of India (RBI) if the payment is not made within 45 days of the day of acceptance of the goods/service or the deemed day of acceptance. However, not many small and medium sized private players have opted for this route for the fear of losing out on future contracts. To empower micro and small enterprises to directly register cases relating to delayed payments by government bodies, the MSME ministry has also launched a delayed payment monitoring portal, ‘MSME Samadhaan’ in 2017. However, of the 39,256 applications received on the portal, only 3132 were resolved by MSEFC, according to the data available on the portal. This is possibly due the limitation imposed on claimants. Currently, only micro and small enterprises (MSEs) having Udyog

Aadhaar Number (UAN), are eligible to apply at the portal. Medium enterprises are deprived access. The expert committee on MSMEs formed by RBI recommended that “ambit of facilitation council (MSEFC) may be extended to medium enterprises also”. It was also observed by the committee that MSE borrowers lack awareness about Samadhaan portal and hence there is a need to publicize the portal amongst MSMEs. Also as the settlements of cases on the portal seems to have been low, more acceleration is required on resolving cases on faster pace. The committee also recommended that “there is a need to increase the number of MSEFCs particularly in larger states, so as to meet the time specified for resolving cases”.

Risk mitigation: Termination

Contracts should include strong termination(exit)clauses protecting both the ULB and the private sector. Most contracts that we analyzed lacked termination clauses for both at cause termination (related to non-compliance with contractual terms and obligations), and at will termination (related to factors other than those specified in the contract). Contracts need to include notice periods in case of at will termination by both the public and private player. In case the notice period is not honored, penalties can be imposed. In case of at cause termination initiated by the private player in response to ULB violations of contract terms, the private player should be compensated for its investment. In case of at cause termination initiated by the ULB, the ULB may compensate the private player for some portion of its investment, or none at all, depending on the size of investment.

Table 16 Termination scenarios

Risk	Mitigation	Allocation of remaining risk
ULB does not fulfill contract conditions	Ensuring a clear monitoring mechanism for transparent contract execution Disputes to be handled through frequent communication and by an agreed upon third party mediator	Private player compensated for investments, the cost of winding down and foregone profits
Private player does not meet service standards	As above A trial run and a defect liability period should be included	Private player compensated for some portion of capital investments performance bank guarantee ¹ seized
ULB terminates the contract for reasons unrelated to player performance	Up-front discussions with key stakeholders to create buy-in for private sector engagement Frequent communication between ULB and private player	X month notice period required Private player compensated for investments, the cost of winding down and foregone profits

		Performance bank guarantee returned
Private player terminates the contract due to reasons unrelated to ULB compliance	Frequent communication between ULB and private player	X month notice period required Private player forfeits the performance bank guarantee

Source: Adapted from ‘Improving sanitation outcomes through service level agreements’ – Castalia Partners

4.9. Summary: Key clauses in standard contracts

Contracts are complicated documents with multiple clauses which must be vetted by legal experts. However, the clauses can be loosely grouped into seven categories. The above list consists of key sections and clauses which must be included in standard contracts.

<p>Obligations before signing contract</p> <p>Bank guarantee, performance guarantee by contractor Mapping, field visits, design specifications, IEC Setting up payment accounts</p>	<p>Obligations after signing, but before work begins</p> <p>Detailed project report Work order and commencement of work within 30 days Equipment and material purchase Permissions, utility connections</p>	<p>Terms of work during contract, expected standard of service</p> <p>Visits as per schedule Use of safety gear Adequate emptying, safe transport No damage to property Construction as per design Construction milestones to be achieved Work hours / timelines / milestones Repair and maintenance</p>
<p>Payment terms</p> <p>Amount due Mechanism of payment Performance standards, milestones Procedure on delay Cost escalation</p>	<p>Penalties and incentives</p> <p>For instances when service standards are not met by the private player, as well as incentives to reward strong performance</p>	<p>Termination of contract</p> <p>At will / at cause Seizure or forfeit of bank guarantee Compensatory payments Notice period</p>
<p>Force Majeure</p> <p>Clauses to free all parties from liability or obligation when an extraordinary event or circumstance occurs which is beyond the control of the parties an event or effect that can be neither anticipated nor controlled</p>		

4.10. Activity 6B and 6C- Setting goals for drafting contracts, Options for overcoming case specific contracting challenges

At this stage, participants must refer to the activity workbook for activity 6B and 6C. This activity tests the understanding of participants on the ideal components of balanced contracts. 6B continues the scenario of activity 6A where, post discussion in the ULB, contracts have to be drawn up as per requirements. 6C on the other hand, deals with case specific scenarios where custom clauses are required as per different situations.

During the activity, trainers must take care to connect with each participant and clear any questions they may have on terminology or the relevance of specific processes.

4.11. Sample contract documents

These model tender documents for "Service contract for scheduled emptying of septic tanks" and "DBOT project for FSTP" provide customizable templates for inviting bids to provide sanitation services. The documents cover standard clauses about qualification criteria, scope of work, technical specifications, performance standards, monitoring, payments etc.

Scheduled desludging of Septic tank -

https://pas.org.in/Portal/document/UrbanSanitation/uploads/Model_bid_document_for_Emptying_CEPT.pdf

Model DBOT tender for FSTP -

https://pas.org.in/Portal/document/UrbanSanitation/uploads/Model_DBOT_tender_document_for_FSTP.pdf

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<https://cwas.org.in/Portal/document/UrbanSanitation/uploads/Addressing%20risks%20of%20Delayed%20payments%20May%202029.pdf>
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Session 5: Innovative financing for FSSM

Session 5. Innovative Financing for FSSM

5.1. Session objective

This session describes about various innovative financing mechanisms options that can be explored for urban water and sanitation. The session mentions in details innovative options like blended finance, development impact bonds, pooled funds, market borrowings and their application in FSSM sector through cases and examples.

Following the adoption of a National Policy on Faecal Sludge and Septage Management (FSSM) there is greater attention on FSSM in India. Many state governments have also developed their own FSSM policy and have implemented FSSM plans on ground. It is thus significant to discuss on the financing of the FSSM services. Along with the traditional sources of funding, innovative options are also needs to be identified to leverage public and private resources and increase sector efficiency. Thus, this session focuses on the following:

- Understand different innovative financing options like Blended finance, Development Impact Bond, Pooled funds, market borrowings, etc. and how this can be used in FSSM sector.
- Case studies/videos to explain different innovative financing options.

5.2. Session Plan

Duration: 60 minutes

Table 17 Plan for fifth session

Activity	Time Duration	Material Method
Presentation on innovative financing options	30 mins	Power point presentation
Case study movie and quiz	15 mins	Video and quiz

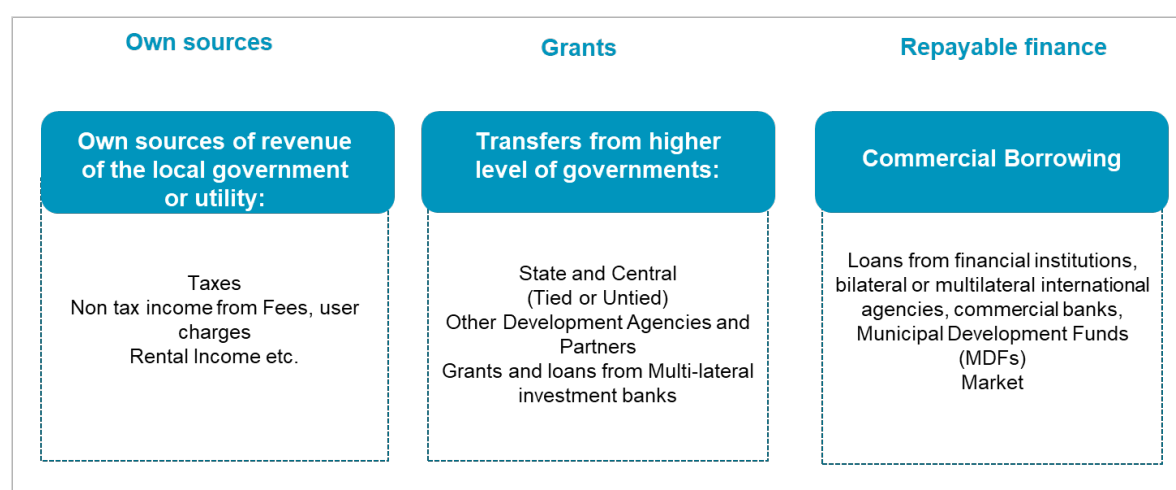
5.3. What is innovative financing?

“Innovative financing for development refers to initiatives that aim to raise new funds for development or optimise the use of traditional funding sources.” (OECD, 2015). Innovative financing are non-traditional mechanisms to raise funds for development through various novel mechanisms such as blended financing, taxes, public-private partnerships and market-based financial transactions.

5.4. Need for innovative financing options:

Urban infrastructure has been generally financed through public funds. With the aim to achieve the Sustainable Development Goals, financing for development needs to be scaled up dramatically. There is a big gap between the finance for infrastructure against the allocated funds available. “Water and sanitation have historically been financed by the public sector, however, public sources of finance alone will not be sufficient to achieve SDG 6.” (OECD, 2019). Most of the operational expenses are managed through own revenue sources of the ULBs. Innovative financing has the potential to bridge this gap by attracting private sector to support the development objectives.

Figure 66 Different sources of funding



There are three key objectives to explore innovative financing mechanisms.

1. Public funds can be used to **leverage additional private sector** or commercial funds. Besides additional resources, this would **help in bringing great efficiencies of private sector operations**, or scrutiny from commercial lenders.
2. Emphasis on innovative models is also to **provide incentives for improved performance and effectiveness** by using **performance linked approaches**, particularly for public-private partnership (PPP) models
3. **Emerging interest globally on impact investing for funding** activities which can have considerable social and environmental impacts. Innovative financing mechanisms will help leverage this new and potentially large funding source to demonstrate more effective models and over time **help mobilize additional resources**.

5.5. New sources of financing in the urban sector:

The scope of innovative finance is diverse and broad. There are some emerging financiers who are willing to invest in innovative solutions for development. The two kinds of emerging sources of funders in the WASH sector are as below:

1. Philanthropic Foundations / Donors/ Individuals/ Private Foundations and CSR:

Looking to improve effectiveness of their grants/ funding, or because of CSR requirements as in India

2. Social impact Investors:

Looking beyond financial returns to social/ environment impacts, patient capital.

There have been novel ideas on financing and on improving the utilization of the funds. To fill the financing gap for WASH infrastructure, the sector is looking into innovative solutions. Some of the mechanisms under these are: Multilateral and bilateral agencies using Output based Aid (OBA) and Program for results (P4R); Government programs using OBA / Results based funding (RBF) approaches; Blended finance to leverage private and commercial finance and Impact bonds as pay for outcome model, etc. The table below explains various mechanisms and sources of funding for urban sanitation and also defines its potential for the first aspect of sanitation chain of user interface.

Table 18 Assessing Potential Sources and funding mechanisms for urban sanitation

Source or financing mechanism	Reach to target urban households without on-premises toilets	Current or potential interest in urban sanitation	Favourability of loan terms and ease of collateral terms
Microfinance (microfinance institutions or self-help groups)	High reach	Emerged in recent years; however, efforts needed to focus on urban areas	Favourable collateral terms but very high rate of interest
Housing finance institutions	Limited to only a few HFIs	Specific sanitation products not used, but can be introduced as part of housing improvement products; marked focus on urban areas	Potentially low-cost loans but stringent requirements for collateral a deterrent
Commercial banks	High, especially with the new financial inclusion policies	No focus on sanitation so far, but possible with the enabling policy for priority-sector lending (PSL)	
Funds for corporate social responsibility and local benefactors	Potential is high but limited experience in urban areas	Interest in sanitation and sanitation included in CSR; however, efforts needed to focus on urban areas	Not applicable (funds available as grants)
Social impact bonds or mutual funds	Potential is high, but agencies are few; new compact with urban local governments needed	Potential interest high due to strong evidence of health impacts, concerns for dignity and security of women, improved education outcomes	Potentially favourable but stringent requirements for capability of service agency and verification of outcome
Crowdfunding		Special section for sanitation exists on current portals. However, efforts will be needed to focus on urban sanitation	Most funds are likely to be grants or donations; for debt, credible local partners necessary

Source: Mehta and Mehta (2014)

In this session, the innovative financing mechanisms have been grouped under major three heads of results based financing and annuity based models for leveraging PPP; municipal

bonds, pooled bonds and municipal borrowing; and corporate social responsibility and philanthropic funding. Further the section explains each of these heads in detail.

Figure 67 Options for innovative financing mechanism:



5.6. Results Based Financing and Annuity Based Models for leveraging PPP:

Results based financing:

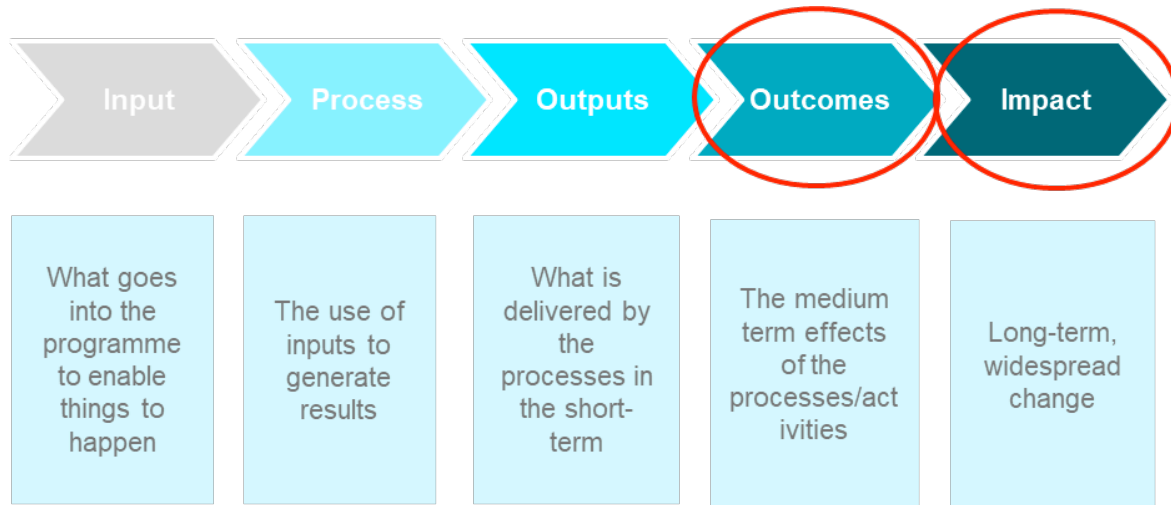
Results-based approaches have been a focus of recent discussions in international development. Public funds or those from donors or social impact investors are made available not as “inputs” but only on delivery of “outputs or agreed performance”, generally for innovative approaches. It is also referred as Payment by Results (PbR) particularly by DFID, UK.

Need for results-based financing:

- Government funding is often insufficiently focused on results and performance and more on outputs and fund utilization.
- Inadequate performance evaluation allows ineffective programs to persist.
- The proof-of-concept process for social innovations is slow.
- Innovation is risky and public officials are wary of failure
- BUT – Performance-based funding requires upfront investments and the ability to absorb risk.

Different methods such as (RBA, RBF, COD, OBA, P4R etc.) reflect a combination of financier, recipient and results for payment. Some are linked to outputs (OBA) or some to outcomes (COD, SIB, DIB, P4R, etc.). Extent of financing /funding linked to results can also vary.

Figure 68 DFID's strategy for payment by results



Source: Based on DFID (2014), "Sharpening incentives to perform: DFID's strategy for Payment by Results", p. 6.

Emerging options to leverage PPP are outcome based financing, blended finance and impact bonds as options. Under the results-based financing, following three mechanisms are explained further:

- a) Output Based Performance Aid Model
- b) Annuity Based Models for leveraging PPP
- c) Development Impact Bonds

a). Output Based Aid – OBA Approach

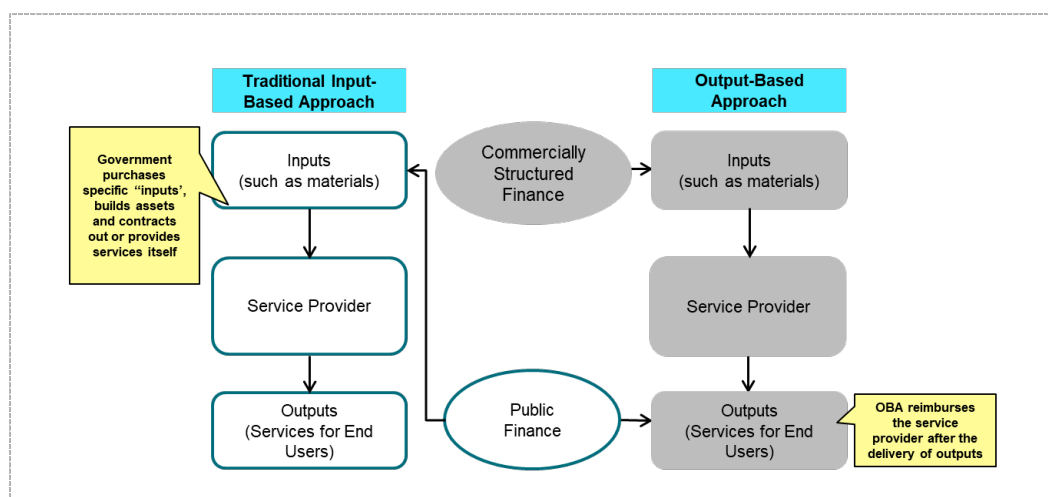
"Governments in developing countries and members of the development aid community are acutely aware of the need to find more effective ways to improve basic living conditions for the poor. Traditional approaches to delivering public support have not always led to the results intended." (The world bank, 2010). Results-based financing instruments are now identified as one the significant mechanism of the aid-delivery. As per The World Bank report on Output based Aid, these mechanisms follows that a principal entity provides a financial or in-kind reward, conditional on the recipient of that reward undertaking a set of predetermined actions or achieving a predetermined performance goal.

This approach increases the effectiveness of the scarce public resources for the provision of basic services. They specify the performance in terms of outcomes instead of focusing on the inputs. "Output-based aid goes beyond contracting by mobilising commercial financing of service provision, while differing from private infrastructure schemes by complementing user fees with targeted subsidy payments." (The world bank, 2010). However, there is no standardization of this approach. The benefits will be based on the design of the entire scheme developed.

Brook and Smith, 2001 in “Contracting for Public Services: Output Based Aid and its Applications” have provided key policy pointers which should be kept in mind while developing an output-based approach:

- The definition of the service to be delivered involves trade-offs between quality and price, and must take into account budgetary constraints and sustainability of subsidies.
- There needs to be clear definition of intended results. Correctly identifying indicators for these is critical.
- Sound contract design, attention to facilitating competition, transparent project procurement, regulatory independence and accountability and sound strategies for allocating and mitigating risk are all critical.
- Where there are concerns about market failure or low supply response, competitive bidding for time-bound monopolies is recommended.
- The form, level and structure of subsidy payment to service providers are crucial in determining their incentives. Linking pay to performance provides strong incentives, but increases the risk of providers reducing quality to cut costs.
- The key issue in designing effective administration is determining the scheme’s scope. Broad schemes (for example rural infrastructure) promise lower administration costs than narrow ones (defined by a sector, for example rural electrification), but they are cumbersome to implement.

Figure 69 Output Based Approach vs Traditional Input Based Approach

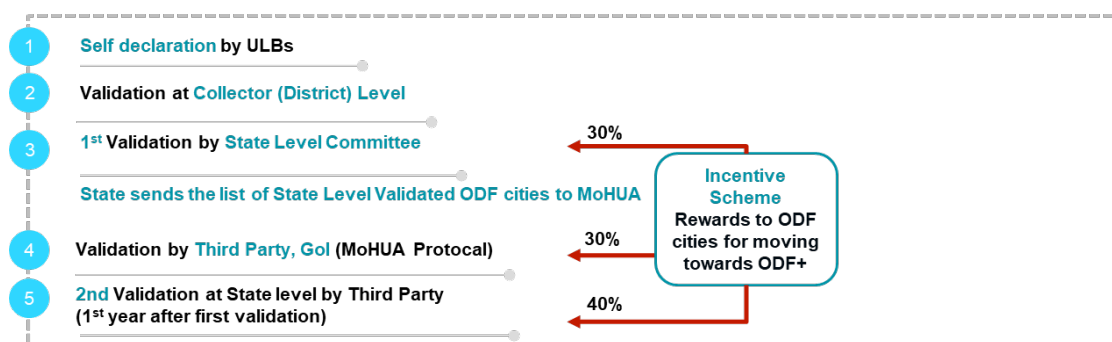


Source: Based on - Brook, Penelope and Murray P. 2001. “Output-Based Aid: Precedents, Promises, and Challenges.” In *Contracting for Public Services: Output-Based Aid and Its Applications*, ed. Penelope J. Brook and Suzanne M. Smith, 3–11. Washington, DC: World Bank.

Incentive scheme for ODF cities by the Government of Maharashtra

Incentive scheme and rewards were introduced in the state of Maharashtra for ODF cities that were moving towards ODF+. The process included self-declaration of ODF status by ULBs. This was monitored and validated by the Collector at district level. First validation was done by the State Level Committee where 30% of performance grants were released if successful. The state shared the list of State level validated ODF cities to MoHUA. Third party validation was undertaken by the Gol under the MoHUA protocol which released another 30% of the grants. Second validation was undertaken at State level by third party in which 40% of grants were released if successful. In this way, funds were utilised for ODF cities to sustain their ODF title and move towards achieving ODF+ and ODF++ status.

Figure 70 ODF incentive scheme by Govt. of Maharashtra



	ODF Cities (Rs.)	Swachh Cities (Rs.)	Linked to Sustainability and ODF+
A Class	2 Cr.	2 Cr.	30% released on first State validation, if positive
B Class	1.5 Cr.	1.5 Cr.	30% released on national validation, if positive
C Class	1 Cr.	1 Cr.	40% released on 2nd State validation after a year, if positive

JNNURM-A reform linked program:

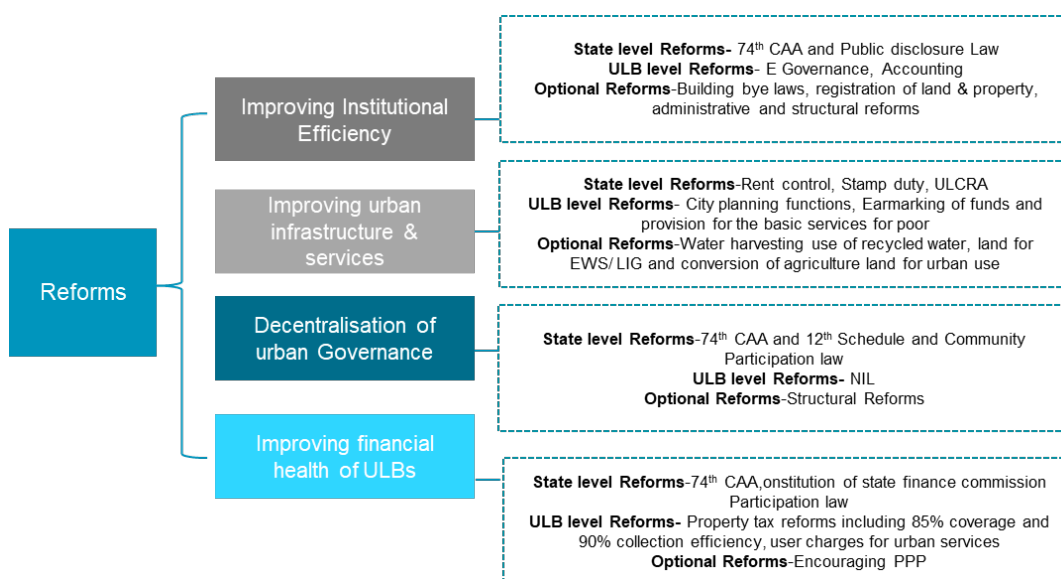


Figure 71 JNNURM - a reform linked program

JNNuRM program by MOHUA (MoUD) was a reform linked program which adopted output based

approach. It mainly focussed on improving institutional efficiency, urban infrastructure and services, decentralisation of urban governance and improving financial health of ULBs. Improvements and reforms were made at state level and ULB level and few structural reforms were also introduced.

Scale and effectiveness of Result Based Financing-Output Based Aid in WASH sector:

Though output-based aids are effective, these are largely practiced at small scales. Many of them are designed as pilots. Hence, there is a need to scale up to assess sustainability at scale. In India, 60 million HHs were benefited with this approach of result based aid through the Swachh Bharat Mission.

b) Annuity Based Models for leveraging PPP

While many city and states have become ODF, there are significant infrastructure gaps in transport and treatment of waste in our cities. The government faces the challenge of mobilizing adequate financial resources. Participation of private players in the WASH sector through Public Private Partnership route brings in additional capital and imparts efficiency in project development and its operations. While the private sector is actively involved in emptying and transport of waste, there is an absence of private sector involvement in funding the treatment infrastructure. For desludging while the models under demand based desludging are common in Indian cities, scheduled desludging was introduced in two cities of Maharashtra with a performance based contract.

Under performance-based contract for scheduled desludging, ULB appoints the private enterprise to carry out scheduled emptying service in the city. Payments under these contracts are made against the number of septic tanks emptied and safe discharge at the designated treatment site. "This contract is a service level agreement which protects the interests of all parties—private sector, city governments, and citizens. It has helped the local government to receive good quality regular desludging services for all the properties. While the private service providers make investments in trucks, they get a fixed business and assurance of monthly payments against number of septic tanks emptied." (Mehta, Mehta and Yadav, 2019).

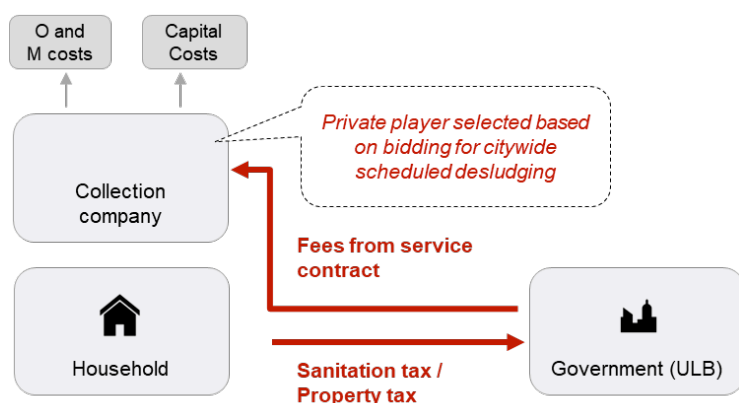
The capex cost of the truck and opex cost of the emptying service will be initially mobilized by the private enterprise which will be paid back by the local government using annuity payments. The household will pay the sanitation tax to the local government, which will ensure that adequate funds are available to recover the cost of emptying service. Thus, through performance-based contracts, customers were assured of a high quality service with low pricing through sanitation tax due to economies of scale. To mitigate the risk of late payments, an escrow account mechanism—a tripartite agreement between the local government, private sector, and a local bank is introduced. The local government is required

to keep 3 months of contract payment as a reserve fund to safeguard against risk of payment.

Performance Linked Annuity Model for scheduled desludging in Wai and Sinnar Municipal Councils

Wai and Sinnar in Maharashtra have **contracted a private company to provide citywide services**, and with **performance linked payment** – based on number of septic tanks emptied. Each household pays a small fixed amount as sanitation tax, and **Sanitation tax + property tax** used to pay private company.

Figure 72 Performance Linked Annuity Model for Sanitation Tax in Wai and Sinnar



As no permit will be given to another private operator, there will be an assured market for the contracted player.

It also ensures that the households will be willing to empty their septic tanks as no user charge is paid at the time of emptying.

Results of scheduled desludging using annuity model in Wai and Sinnar:

“In Wai, over the year, 1,500 properties received desludging services and over 4.8 million liters of septage was delivered and treated at the fecal sludge treatment plant. Nearly 95% of the households and property owners have welcomed scheduled desludging service. In Sinnar, in 5 months of operations, 686 properties received desludging services and over 2.85 million liters of septage was delivered and treated at the fecal sludge treatment plant. The acceptance rate in Sinnar was 80%. The few who did not accept the service in both cities were the ones whose tanks had been desludged recently.” (Mehta, Mehta and Yadav, 2019)

Hybrid Annuity Model (HAM) model for treatment facilities:

In financial terminology hybrid annuity means that the government makes payment in a fixed amount for a considerable period and then in a variable amount in the remaining period. This hybrid type of payment method is called HAM in the technical parlance. Hybrid

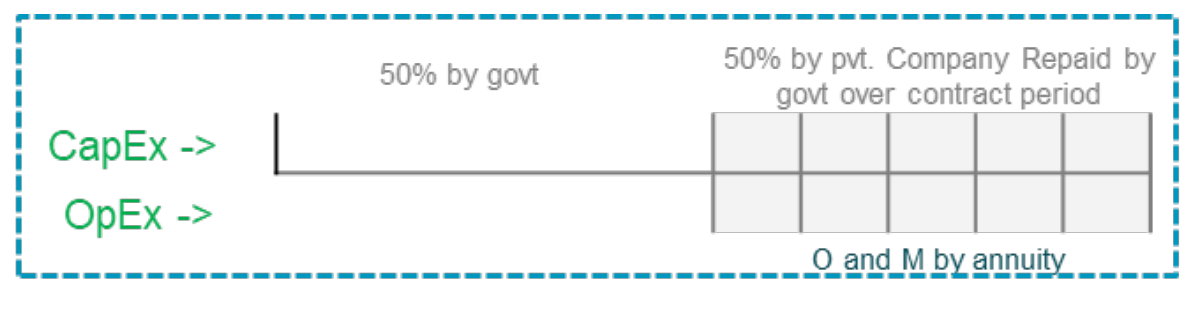
Annuity Model (HAM) has been introduced by the Government to revive PPP. In this framework, **the Government pays 40% of the capital cost of the project upfront** during the **construction period** and **60% of the payment is paid as annuities** along with interest over the operation period.

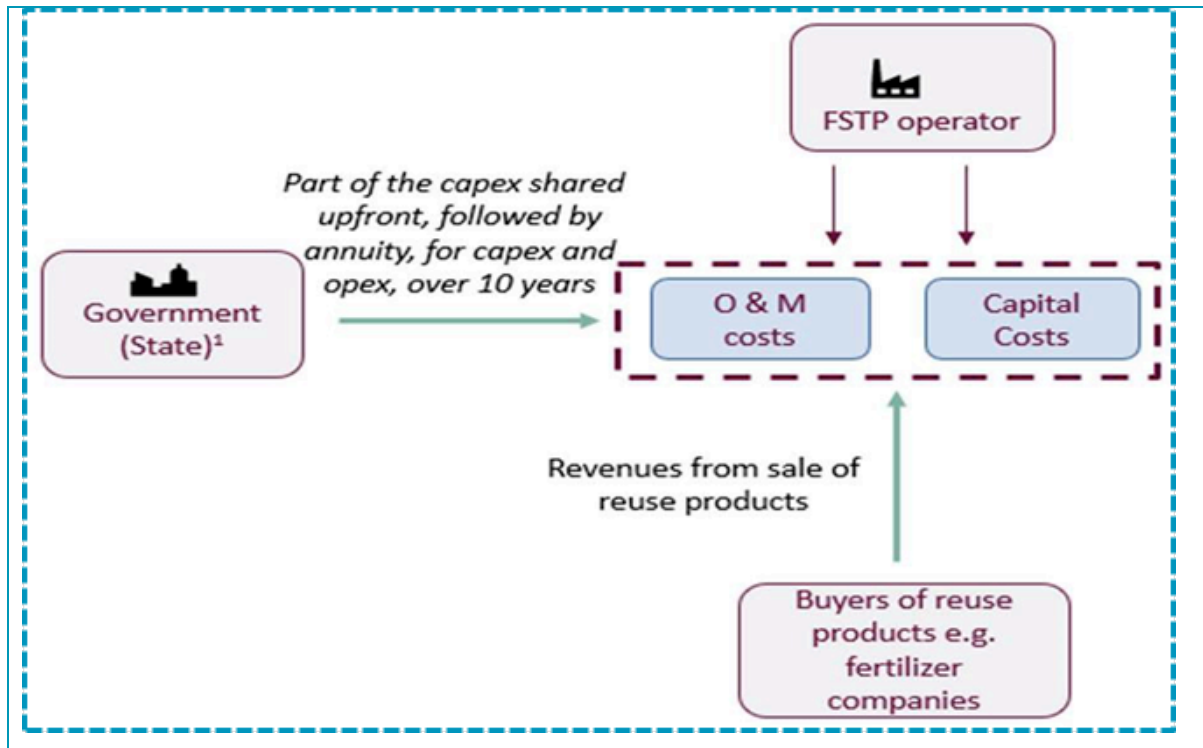
- The use of hybrid annuity model for FSTPs, provides opportunities to leverage public resources to bring in private sector funding for treatment. This also helps to reduce the initial public investments, though the private sector must be repaid through annuities using public funds.
- However, unlike roads, where there is a clear revenue stream of tolls from users that is used for annuity payments by governments, in FSTP, there are no clear revenue streams. So government will have to budget for this payment. The bidders are likely to add their cost of debt and returns on equity and this may raise the total cost of project as compared to an EPC contract.
- The advantage of this model is that since the annuity payment is linked to the performance, it will also help to improve efficiency and effectiveness in operations.
- However, given the higher cost of debt for private sector and their high return expectations on equity, the total investment requirement is likely to increase.

Hybrid Annuity Models for FSTPs in Andhra Pradesh, India

Andhra Pradesh has launched HAM for FSTP, through Public Private Partnership (the “PPP”) on Design, Build, Operate and Transfer (“DBOT Hybrid Annuity”) basis for 76 towns for which 7 packages are created. Private companies - undertake design, construction, operation and maintenance on a DBOT basis. Cost is determined by bidding. The Capex under this is initially divided as – 50% by government, 50% by private company. Annuity payments cover a) CapEx by private company repaid through annuity payments over contract period, b) and OpEx. Funding by State government alleviates concerns around individual ULB financial capacity and payment risks. The private player clustering approach (multiple ULBs per partner) has made to achieve scale of economies and a large contract. In the long term, part opex recovery is planned through user charges. The private player responsible for selling soil conditioner/bio-fertilizer/biogas and recycled wastewater.

Figure 73 Hybrid Annuity Model for FSTPs in Andhra Pradesh





Performance linked annuity models requires **strong and sustainable monitoring systems**. It requires **performance assessment** in terms of services delivery.

For **conveyance contracts**, **performance is easier to assess** as number of septic tanks emptied, though attention will have to put on ensuring that all contract clauses are followed.

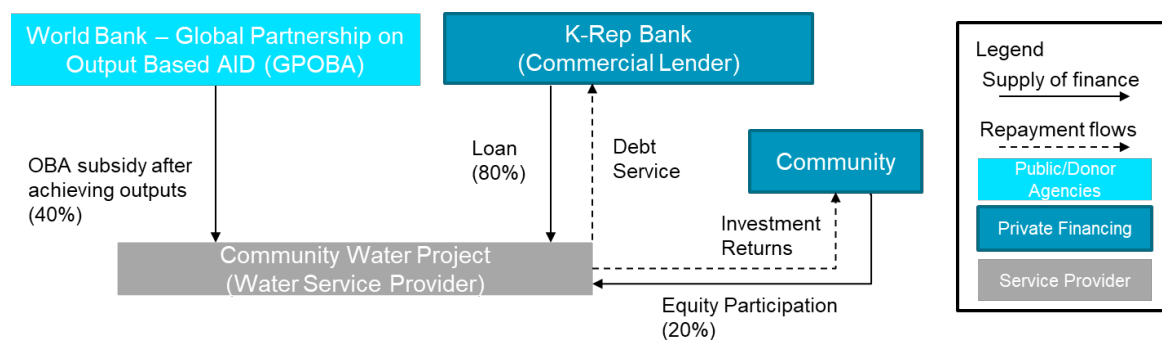
Implementation of scheduled desludging, backed by a concurrent monitoring system, will provide an opportunity to **create a database on existing septic tanks** which has otherwise been very difficult.

In the case of **HAM for treatment** in AP, monitoring systems will need to **assess treatment performance** as well as a proper assessment of actual capital costs incurred. As the project is being implemented by a state entity, appropriate mechanism for participation of local governments will need to be developed.

Blended Finance

Blended finance is defined "as the strategic use of development finance and philanthropic funds to mobilize private capital flows to emerging and frontier markets", resulting in positive results for both investors and communities. It means mobilizing of commercial finance with partial subsidies.

Scaling up Blended Financing for Water and Sanitation in Kenya: Maji ni Maisha Financial Structure:



Source: World Bank Group (2016), “Scaling up blended finance for water and sanitation in Kenya” in “Case studies in blended finance for water and sanitation”, p. 2.

Credit options for the private player: Existing schemes available to small and medium enterprises in India

Priority Sector Lending: RBI has mandated all the commercial and foreign banks to earmark at least 40% of the Adjusted Net Bank Credit for priority sector which includes water and sanitation. Interest is charged at ~12-14%.

MUDRA LOAN: MUDRA loan is provided as a refinancing support to non-farming and non-corporate micro and small enterprises. These enterprises can avail loans up to Rs. 10 Lakh under the MUDRA (Micro Units Development & Refinance Agency Ltd.) scheme.

Credit Guarantee Trust Fund for Micro & Small Enterprises (CGTMSE): The corpus of CGTMSE is contributed by Government of India and SIDBI. 75% of the loan amount to the bank is guaranteed by the Trust Fund.

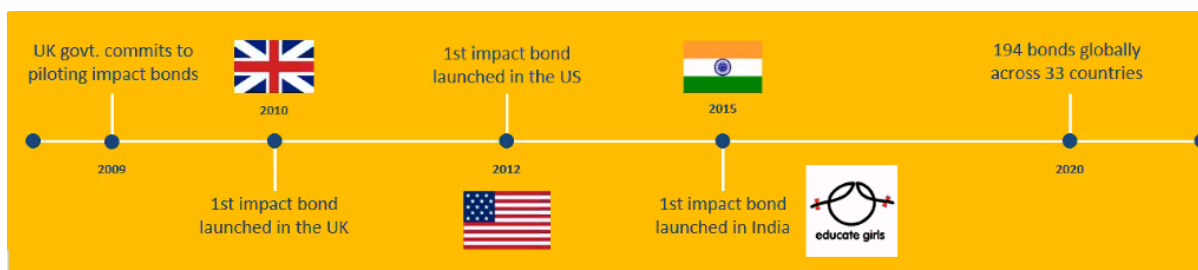
Collateral free loan up to a limit of Rs.100 lakh is available for individual MSE on payment of guarantee fee to bank by the MSE.

c) Development Impact Bonds

Impact bonds can be characterized under Results-Based Financing (RBF), focusing the allocation of money to social programs that yield effective results.

In an Impact Bond model, an investor (or group of investors) provides up-front financing for the operations of a service provider, receiving a return from the outcome payer (usually a government or donor) once results have been achieved.

Figure 74 Impact bonds are also known as pay for success contracts

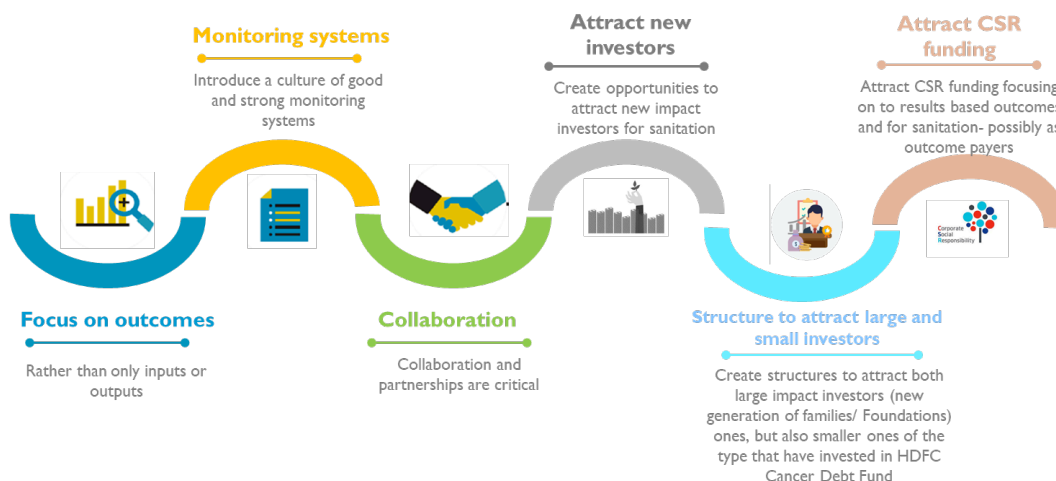


Source: Social India Finance presentation, 2020; <https://www.instiglio.org/en/impact-bonds/>

Advantages of Development Impact Bonds:

- DIBs focus on outcomes rather than input or output.
- They have better monitoring systems.
- They have better collaboration and critical partnerships.
- DIBs might attract new investors and create opportunities to attract investment in sanitation sector.
- They create structures to attract both small and large impactors.
- DIBs attract CSR (Corporate Social Responsibility) funding.

Figure 75 Advantages of Development Impact Bonds



Source: Intellicap (2019) “Catalyzing private sector participation in FSSM in India: Contract Management – A Private Sector Perspective” Presentation at TSU-PMU convening

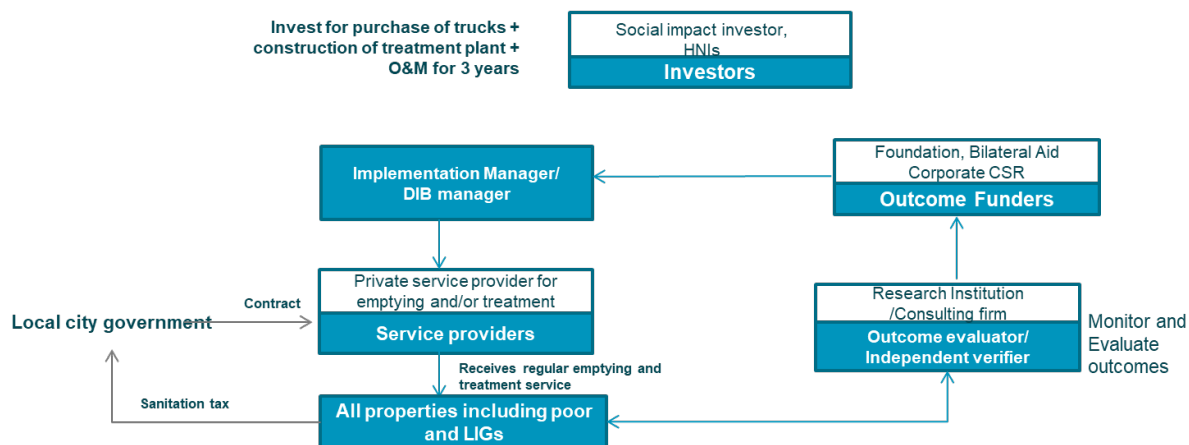
Possible options for DIBs in FSSM:

Various service models for emptying and treatment of fecal sludge and septage are possible and involve private service providers. Several different options for developing Development Impact Bonds (DIB) for FSSM is possible:

- Scheduled desludging of Faecal Sludge/septage

- Integrated collection, transport and treatment of Faecal Sludge/septage
- Integrated cluster model for scheduled desludging and treatment

Figure 76 Exploring a contract structure for a urban sanitation/ FSSM DIB



Key points from deliberations of exploring a contract structure for urban sanitation/FSSM DIB:

Role of private sector service providers: The private players should also be asked to put certain percentage of investment in the project, so that they are motivated to perform well and achieve desired outcomes.

Role of Local Governments: Since, local government is responsible for provision of sanitation services in the city, their role in the DIB will be crucial. Though at this pilot stage involving local government financially will complicate the process, they should be encouraged in monitoring activities.

Sustainability of sanitation services: While no payments are envisaged from the Local Governments in the DIB structure, it would be important to provide incentives to local governments to continue to collect sanitation tax from households. This would help to sustain and continue sanitation services after the DIB intervention period. Later, after the success of a pilot DIB project, the role of government as a full or partial outcome funder can also be explored.

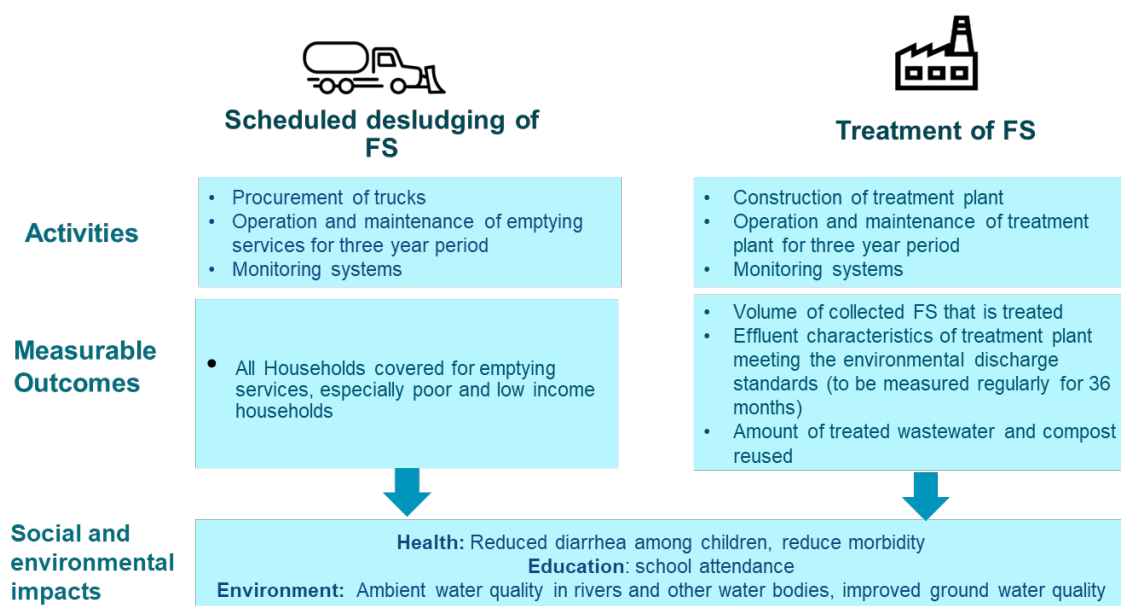
Use of CSR for outcome funding: It was pointed out it will be necessary to assess whether corporate funds under current CSR framework and rules can be used to provide ‘outcome funding’.

Measurable outcomes

For DIB, the return on payments is linked to the outcomes achieved. Investors are not only looking at neat and measurable outcomes but also social indicators and impact achieved from the intervention. It is possible to show and rigorously measure outcomes to attract potential investors.

For emptying - the impact could be in terms of full coverage with a focus on the poor and low-income communities, and for treatment it could be in terms of quality standards achieved and extent of reuse. Though direct impact with health or environment is difficult to measure, a secondary matrix could be developed to monitor health and environment impact and small outcome amount could be linked to this matrix.

Figure 77 Measurable Outcomes: Scheduled desludging and treatment of faecal sludge



Sources: CWAS, CEPT University (2019) “Exploring Development Impact Bonds for FSSM, Urban Sanitation” A Roundtable discussion

Grameen capital DIB structure

Development impact bond in form of interest rate subvention could be another form of DIB which could be explored where for-profit organizations are involved as an implementing agency.

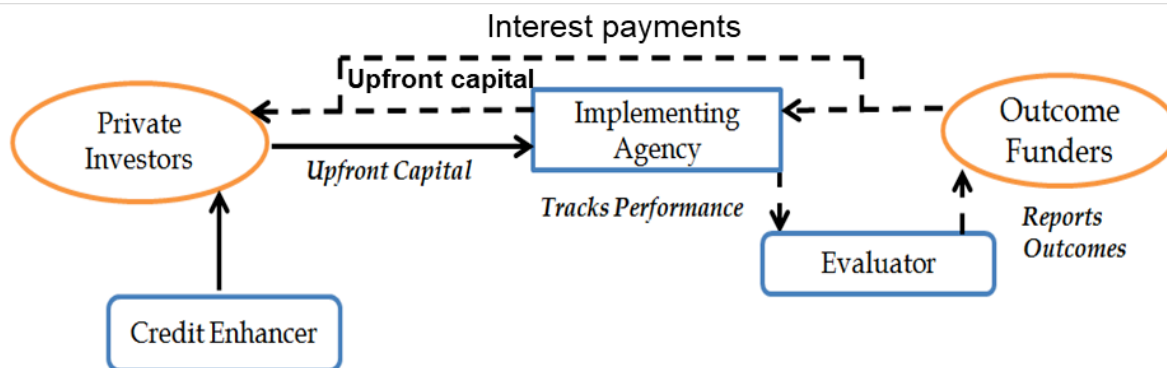
In this DIB model, **investors will provide upfront working loans to for-profit implementing agency** and thereafter approach outcome funders to either waive off or reduce their interest rate/payment.

An **independent Evaluator would track the performance of the Implementing** to quantify the impact and showcase progress of the Bond.

Outcome funders based on the feedback from the independent evaluator, would serve the financial interest of the bond in case the implementing agency is a for-profit social enterprise. The for-profit social enterprise itself would be liable to pay back the upfront capital to the Private Investors.

This may provide **access to funds for private enterprises**.

Figure 78 Interest subvention bond structure



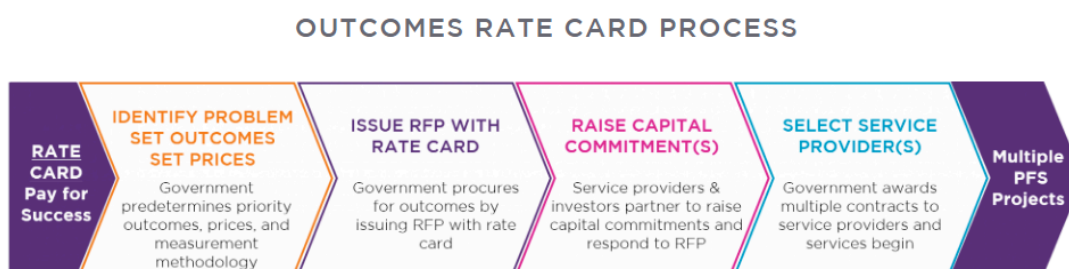
Source: Grameen capitals and based on discussions with their team

Box Item 5.6: Outcomes rate cards are being used in UK

“Outcomes rate card is a menu of outcomes that government seeks to achieve and the prices they are willing to pay for each outcome achievement.”

“They are used as a procurement and contracting tool with the ability to standardize performance-based financing, through Pay for Success, and drastically reduce the time such deals take to get to market. One rate card can result in multiple contracts with multiple providers, who must deliver against its pre-determined outcomes and prices, receiving payment only when the stated outcomes are achieved and participants’ lives are positively impacted”

Figure 79 Outcome rate card in UK



Source: <http://socialfinance.org/how-pay-for-success-works/outcomes-rate-card/>



For more details, refer Exploring Development Impact Bonds for FSSM Urban Sanitation: Round Table Discussion Report

We are exploring Development Impact Bond (DIB) as a funding mechanism for faecal sludge and septage management. In March 2019, CWAS had organized a small roundtable discussion on this with various sector partners. This presentation from the roundtable briefly explains current sanitation practices in small towns and how DIB can help attract impact investors to achieve social outcomes and lists out possible options for piloting DIB in urban areas in Maharashtra.

Document Link:

https://www.pas.org.in/Portal/document/UrbanSanitation/uploads/Development%20Impact%20Bond%20for%20financing%20FSSM_26th%20March%202019.pdf

Benefits of Results Based Financing

- **Better quality of services** because incentives are placed on quality and timely delivery.
- **Reduced corruption**, due to increased transparency in the results-payment link.
- Change in culture, **from budget-driven to results-oriented.**
- **Closer supervision** as this is a necessary condition to issue payments.
- **Sustainability**, particularly if the **indicators are tracked throughout the project life.**
- **Increased autonomy for the implementing agency** as to “how” to deliver the results.

Challenges of Results Based Financing

- High transaction costs
- Requires Pre-Financing
- Higher costs of monitoring and supervision
- Risk of unintended distortions caused by ill-defined incentives

5.7. Corporate Social Responsibility and Philanthropic Funding

CSR and Philanthropic funding for sanitation:

While both public finance and possible commercial resources are important, FSSM financing can also come through other emerging innovative mechanisms including CSR and philanthropy funding. The CSR and philanthropy funds will largely be as grants and project support and the social impact funds can be either as grants or loans, depending on the specific mechanisms used. For both corporates and philanthropists, while sanitation has gradually emerged as an important area, there is little understanding of FSSM and the need to look beyond toilets to making cities ODF+ by ensuring safely managed sanitation.

Philanthropy has helped to fund a few pilot FSTPs such as those in Devanhalli in Karnataka, Wai in Maharashtra, Trichi in Tamil Nadu, Warangal in Telangana and Narsapur in AP. These have showcased new technologies and made it possible to make these concepts popular. However, it can be argued that this is not a sustainable source beyond initial demonstration of technologies.

Mobilizing CSR funds for FSSM

There is a possibility of mobilizing corporate funding using CSR for large companies as the Companies Act, 2013 mandates that large companies spend 2% of their three-year average annual profit towards CSR. Mobilizing of CSR funds to support FSSM for different activities that would help the quality and effectiveness of investments.

Box Item 5.7: Mobilization of CSR Funds in Sinnar for sustaining ODF sustainability

CEPT university has mobilized CSR funding from HSBC for Sinnar, a small city in Maharashtra. This supports activities related to ODF sustainability and for making the city ODF+. CSR funds can also be mobilized for other such activities such as guarantee funds to back up escrow accounts being used for annuity models. This arrangement would give private players greater comfort and would help in reducing bid prices.

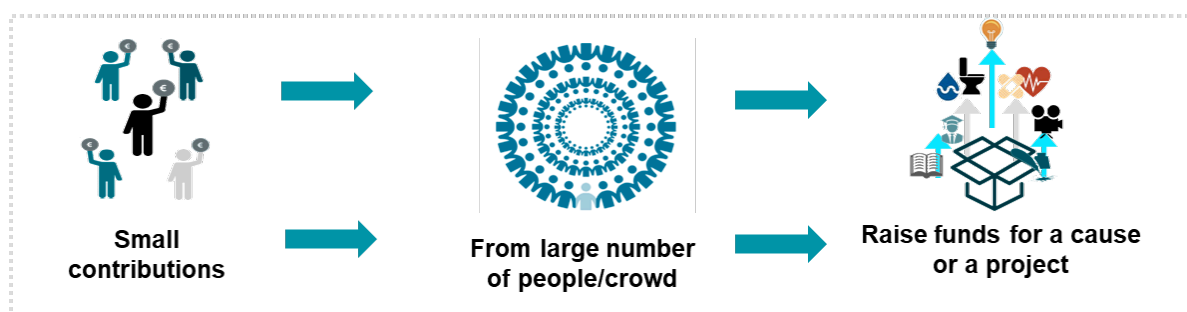


Figure 80 Toilets constructed in Sinnar through HSBC CSR support

Crowdfunding

Crowdfunding platforms help connect a large number of individuals to contribute small amounts to support a cause or fund projects.

Figure 81 Crowdfunding process



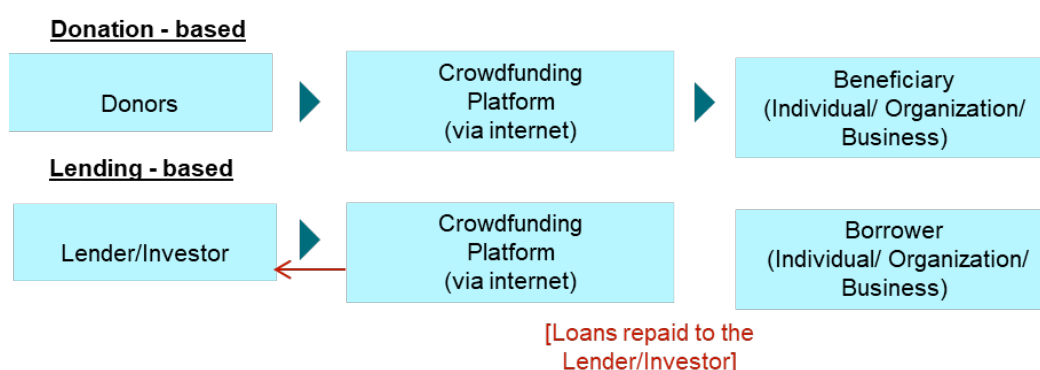
Types of Crowdfunding:

Crowdfunding are of two types: Donation based and Lending based.

Donation based: Donation-based crowdfunding is the collective effort of individuals where donors come together to create an online community around a common cause to help fund services and programs to combat a variety of issues including healthcare and community development.

Lending based: In lending based crowdfunding, the investors collect money through the internet on a crowdfunding platform and the borrower repays back to the lender after a certain period of time.

Figure 82 Types of Crowdfunding



Box Item 5.8: Crowdfunding for School Sanitation, Sinnar, Maharashtra

Crowdfunding was successfully implemented in Sinnar city of Maharashtra for construction, refurbishment and operation and maintenance of toilets in a school. The campaign was organized by Center for Water and Sanitation, CEPT University via an online crowdfunding platform called Milaap. There was a huge support from individuals and approximately, 6700 USD (~ INR 4,28,000) was raised in two months.

Campaign Organizer – Center for Water and Sanitation, CEPT University

Beneficiary – Students of Zila Parishad School, Sinnar, Maharashtra

Purpose – Construction, refurbishment and operation and maintenance of toilets.

Funds Raised – Rs 4,28,000 (USD 6700) in 2 months

Figure 83 Crowdfunding campaign for school sanitation in Sinnar, Maharashtra



Source: <https://milaap.org/fundraisers/support-school-toilets>

Crowdfunding for Sanitation

Overview
CEPT University With support from Dalberg Global Development Advisors

CEPT UNIVERSITY

For more details, refer: Crowdfunding for Sanitation

Financing of sanitation is one of the key areas that requires more attention. Crowdfunding is a new and innovative instrument for mobilising finances for sanitation. This presentation highlights various crowdfunding platforms that are available in India and abroad that can potentially fund sanitation. It details out steps that are required to be followed while designing a crowdfunding campaign.

Document Link:

<https://www.pas.org.in/Portal/document/UrbanSanitation/uploads/Crowdfunding%20for%20Sanitation.pdf>

5.8. Municipal Bonds, Pooled Funds & Municipal Borrowing

Municipal Bonds

Though the idea of municipal bonds in India was introduced more than 20 years ago, despite the initial flurry of bonds, **ULBs have not used this route**. Recent issuance of municipal bonds by a few ULBs such as Pune, Hyderabad and Indore have raised interest in this. However, so far it is generally the large ULBs, mainly municipal corporations that have

raised funds via this route, and for FSSM they are not likely to require funds for treatment as they can use co-treatment. Also, the costs of preparing for such debt mobilization are high and the smaller ULBs may find it difficult to use this route.

Various examples of Municipal bonds are: Pune Bond, Indore Bond and Hyderabad Bond

- **Pune Bond:** First Municipal Corporation to successfully raise Rs.200 crores on the BSE BOND platform. PMC Bonds received overwhelming response with 6 times of oversubscription.
- **Indore Bond:** First Municipal Bond to be listed on Debt Market platform of NSE. IMC Bonds received overwhelming response with an oversubscription of 1.26 times.

GHMC Bond: GHMC has become the second ULB to raise Rs.200 crores on the BSE BOND platform. GHMC Bonds received overwhelming response with 2 times of oversubscription.

Figure 84 Examples of Municipal Bonds: Pune, Indore and GHMC

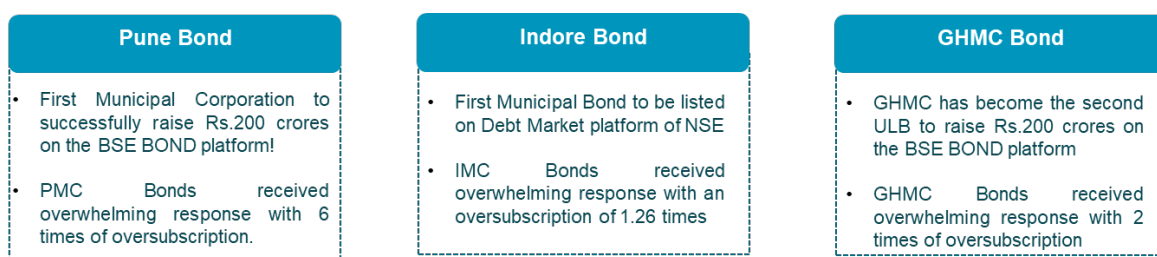


Table 19 Details of Municipal Bonds: Pune, Indore and GHMC

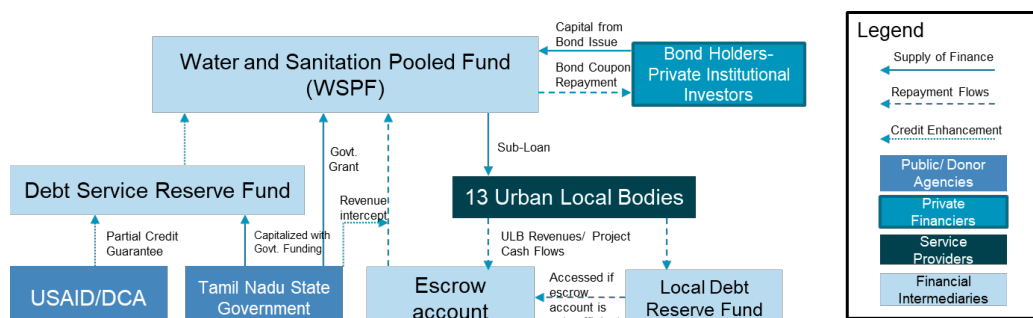
City	Type	Bond size	Guarantee	Interest rate	Tenure periods	Credit Rating	Escrow	Purpose	Remarks
PMC	Unsecured Redeemable Listed Taxable Non Convertible Debentures	200 Cr.	No	7.59%	10 year	AA+	Revenues of the PMC	24 x 7 Water supply	Credit rating Agencies: India Ratings and Care Payment of Interest : Half yearly
IMC	Secured, Non convertible, Redeemable bonds in the	100 Cr. with Green Shoe	No	9.25%	7 Years	AA	Revenues of the IMC	Water supply	Credit rating Agencies: Brickwork, SMERA Payment of Interest : Half yearly
GHMC	Unsecured Listed Taxable Non-Convertible Redeemable Bonds	200 Cr.	No	8.90%	10 years	AA	-	Strategic road development programme.	Credit rating Agencies: India Rating, CARE Payment of Interest: Half yearly

Source: Pune’s Path Breaking success in municipal bond: www.pmc.gov.in, <https://www.financialexpress.com/market/rs-2264-cr-pune-municipal-bond-issue-without-maharashtra-government-backing-munibonds-face-testing-times/716782> , : https://www.nseindia.com/content/press/PR_cc_05072018.pdf , Draft Information Memorandum on IMC Bond, <https://www.bseindia.com/markets/marketinfo/DispMediaRels.aspx?page=9de1ef1d-8c50-4dbc-9efe-7ef2eb8f036c>, <https://www.bseindia.com/markets/MarketInfo/DispNoticesNCirculars.aspx?Noticeid=%7BCB94CDB2-F97E-4430-950C-1CA3435E9995%7Dandnoticeno=20180221-26anddt=02/21/2018andicount=26andtotcount=32andflag=0>

Water and Sanitation Pooled Fund – Tamil Nadu

- The pooled bond mechanism has been successfully used by the TNUDF over the past 15 years for mobilizing market resources for water and sanitation investments by smaller ULBs in Tamil Nadu.
- The WSPF is one of a two innovative pooled funds in Tamil Nadu, the other one being TNUDF.
- The fund has become a model and has inspired other such structures, such as the Karnataka Water and Sanitation Pooled Fund Trust.
- This approach allows small and medium sized ULBs with poor credit ratings to access debt markets. Potential to crowd-in otherwise risk-averse private capital.
- However, this will require supporting TNUDF which has experience in this route, to consider FSSM projects within this. There is also a need for some regulatory clarity as TNUDF has not been to use this route under the new SEBI regulations for municipal bonds.
- The **WSPF issues bonds to commercial investors**, with these bonds guaranteed by state government funds in an escrow account and a partial credit guarantee from USAID, in addition to an intricate web of credit enhancements. Money is lent out to small and medium sized ULBs.

Figure 85 Water and Sanitation Pooled Fund - Tamil Nadu



Source: Based on World Bank Group (2016), “Pooled Municipal bond issuance in Tamil Nadu, India in “Case studies in blended finance for water and sanitation”, p. 2

Municipal Development Funds

Municipal Development Funds (MDFs) can provide a much needed link between civic infrastructure financing needs and domestic capital markets. MDFs usually start as an intergovernmental approach to municipal credit supply, structured as para-statal organizations, but then evolve to become financial intermediaries focusing on municipal credit. ULBs can also borrow from the State level Municipal Funds (MDFs). Tamil Nadu,

Maharashtra and Andhra Pradesh have such funds. However, besides TNUDF, the MDFs in other states have not provided credit effectively to ULBs. For TNUDF, it would be good to explore their interest in FSSM and support development of pilots. The MUNIFRA in Maharashtra does not have a strong and effective portfolio. However, loans for those ULBs that are unable to meet their contributions for treatment facilities maybe able to approach MUINFRA for loans.

Municipal borrowing for sanitation infrastructure

For some ULBs access to additional resources maybe needed to meet the capital investments for FSSM. One option can be debt mobilization by ULBs, through borrowing from banks and government institutions or through the capital market in the form of bonds.

Following options are available for municipal borrowing:

Scheduled Commercial Banks	<ul style="list-style-type: none"> • Private sector banks • Public sector banks
Sector Specific Municipal Development funds	<ul style="list-style-type: none"> • Tamil Nadu Urban Development Fund (State Specific) • Pan India Pooled Municipal Debt Obligation Facility (PMDO)
Capital marketing	<ul style="list-style-type: none"> • Municipal Bond
Government Institutions	<ul style="list-style-type: none"> • Housing and Urban Development Corporation (HUDCO)

Municipal borrowing from banks under Priority Sector Lending (PSL)

ULBs can borrow from various banks – ranging from scheduled commercial banks, small finance banks to urban cooperative banks. Bank loans will be available for ULBs at relatively good terms though tenor will be short of up to 5 years. Most banks may not have realized

Figure 86 RBI Priority Sector Lending- Targets and classification

RBI "Priority Sector Lending- Targets & Classification"	
i.	Agriculture
ii.	Micro, Small and Medium Enterprises
iii.	Export Credit
iv.	Education
v.	Housing
vi.	Social Infrastructure
vii.	Renewable Energy
viii.	Others

that lending for FSTPs of up to Rs. 5 crores will also be covered under the priority sector lending (PSL) requirements for commercial banks. The inclusion of sanitation in the priority sector lending will make it attractive for banks to lend to ULBs for sanitation projects. However, this requires awareness generation for both banks and ULBs. It will also require rigorous assessment of municipal finances to ensure their repayment capacities. It would be useful to explore pooling of a few smaller ULBs that are

interested to borrow from banks. This will help reduce their costs and make it attractive for banks to consider a larger project. Any borrowing from banks will also require permission from the State Government as per most state Municipal legislation.

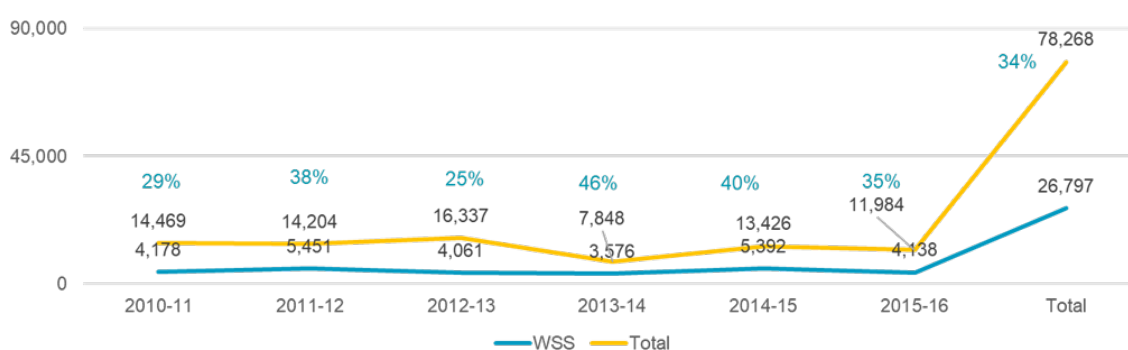
Institutional and market borrowing for capital investments

Institutional and market borrowing will require a **rigorous assessment of municipal finances**. It would be easier in states such as TN as the ULBs have credit history through the TNUDF operations, or in Maharashtra where the ULBs have high own income through sources such as property and sanitation tax, as well as various land value capture mechanism such as betterment levy, Transfer of Development Rights (TDR), etc.

Institutional borrowing from HUDCO

Housing and Urban Development Corporation (HUDCO) provides loans to public agencies and private sector for urban infrastructure. State Governments and ULBs can borrow from HUDCO to finance their FSSM related capital investments. It offers loans at competitive terms and can be a good source for ULBs for urban infrastructure as FSSM can be included in this. In 2015-16, it disbursed loans worth Rs. 8,250 crores for urban infrastructure and over the 6 years period from 2011 to 2016 it released loans worth Rs. 14000 crore per annum. Its loans provide a good option for ULBs. The interest rates are about 10.35% and the loan tenor ranges from 7 to 15 years depending on the types of projects. However, it requires a state government guarantee for lending to urban local bodies, which may become a constraint as such guarantees affects contingent liability of state governments. Also, under the new Fiscal Responsibility and Budget Management Acts of different state governments, many have a ceiling on total guarantees. 34% total HUDCO Assistance was given for Water and Sanitation sector for six years from 2010-16

Figure 87 HUDCO assistance to Water, Sewer and Solid Waste Projects, Rs. crore



Sources: Analysis done by CWAS based on HUDCO (2010-15) “Annual reports of HUDCO”

5.9. Summary of innovative financing

“To date, the WASH sector has been relatively slow compared to sectors such as climate to embrace innovative financial instruments.” Potential exists to utilize public funds to leverage innovative / blended finance to attract private and commercial funds and impact investors.

- Innovative Financing like Results Based Financing offers better quality of services, reduces corruption, has effective monitoring, is sustainable and tracks the quality of project throughout the project cycle. Various options should be explored in sanitation activities to deliver better services.
- Innovative financing may be adopted to use public and donor funds to leverage private funds and impact investment. While the experiences with PLAM in Maharashtra for scheduled emptying or with HAM for treatment in AP unfold, it is important to explore other potential options to leverage impact investment through appropriate DIB type instruments.
- There is a need to increase awareness about the investment opportunities in FSSM among potential funders, bankers and other lenders, impact investors, and corporates who can support the sector through CSR funding. The focus of this should be on innovative and viable models that will generate adequate return on investments, as well as a clear understanding of risk management possibilities.

5.10. Potential innovative financing options for FSSM

Performance Based Annuity Model

Maharashtra experience of ULB level performance based annuity model for conveyance and AP experience of HAM for treatment in small cities will provide lessons for other states.

An escrow account mechanism can be used to mitigate late payment risks of private sector.

Borrowings from Institutions/ Banks

For capital investment for treatment plant, ULB can borrow from banks under the priority sector lending.

Most banks may not have realized that lending for FSTPs of up to Rs. 5 crores will also be covered under the priority sector lending (PSL) requirements for commercial banks. This will make it attractive for banks to lend to ULBs for sanitation projects.

Development Impact Bonds

- An impact bond for FSSM can be developed for scheduled desludging of septic tanks and treatment of faecal sludge.
- Measurable outcomes in them can be: All Households covered for emptying services, especially poor and low income households for desludging of tanks and volume of collected faecal sludge that is treated, effluent characteristics of treatment plant meeting the environmental discharge standards for treatment of faecal sludge.

5.11. Activity 7: Video case study and quiz on new and emerging financing options

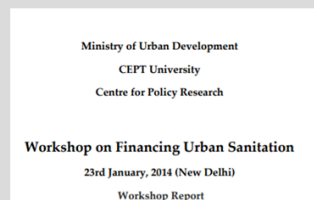
The activity involves video case study followed by a quiz. There are two videos in this activity: 1. Results based financing in urban sanitation sector; 2. Development Impact Bonds (DIB) for urban sanitation in India. The video discusses about the new emerging innovative financing mechanisms which are being explored. This will give participants an idea about the application of innovative financing mechanisms. Further the case study is followed through a self-evaluating quiz.

Delivery method: After the session on innovative financing from Part A, the trainer needs to inform the participants regarding the video which talks about the applicability of innovative financing in urban sanitation sector. After showing the videos to the participants, the trainer can conduct a short discussion, asking about the learnings and any takeaways from the video. Later, the participants are to be given the self-evaluating quiz. Trainers can go with a traditional paper-quiz method. However, this is only advisable for a small training group since it requires extra time and human resource to collect and grade each quiz. For large groups, if the audience is comfortable with digital methods, trainers can use online feedback methods such as [Mentimeter](#) which provide options for real time voting and quick on-screen results.

5.12. Notes for Trainers

The trainer should first clearly explain the need for innovative financing mechanism. They should highlight various innovative financing options like blended finance, result based approach, impact bonds, pooled funds, CSR and crowdfunding with key benefits and challenges. The trainer should also focus on discussing case studies of innovative financing through examples and videos. They should emphasise on innovative financing mechanism used in FSSM and urban sanitation sectors and should also discuss various possibilities of how they can be enhanced.

For more details, refer Workshop on Urban Financing Report



The Ministry of Urban Development, Government of India in partnership with CEPT University and Centre for Policy Research organised a "Workshop on Financing Urban Sanitation" on January 23, 2014 at New Delhi. The workshop discussed sustainable sources and mechanisms for financing urban sanitation (both to increase the total pool as well as improve funding effectiveness) including new sources like Corporate Social Responsibility funds and social impact investments. Deliberations discussed measures to strengthen the use of government funding, tap private funds through innovative Public Private Partnership arrangements and results-based funding to improve funding effectiveness.

Document Link:

<https://www.pas.org.in/Portal/document/ResourcesFiles/pdfs/Workshop%20report%20financing%20Urban%20sanitation%20Jan%202014.pdf>



For more details, refer: **Review of innovative financing option for urban sanitation**

Most assessments of sanitation finance suggest that there are large funding gaps, appropriate activities do not receive funding and there is limited effectiveness in achieving outcomes. This study provides an assessment of financing options for investments in urban sanitation, ranging from traditional grant based public financing to various new sources such as microfinance and social investments. These sources can be used both to increase total funding by leveraging limited public revenues as well as improve its outcome effectiveness. The study highlights 16 business opportunities which have potential of improving sanitation outcomes. It highlights various sources of funds for each opportunity.

Document Link:

https://www.pas.org.in/Portal/document/UrbanSanitation/uploads/Financing_Options_Urban_Sanitation.pdf

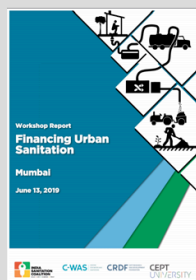


For more details, refer: **Sustainable sources and mechanisms for financing urban sanitation (Workshop Report)**

A 'Workshop on Financing Urban Sanitation' was organised by the Ministry of Urban Development, GoI, in partnership with the CEPT University and Centre for Policy Research on January 23, 2014, in New Delhi. It discussed sustainable sources and mechanisms for financing urban sanitation such as Corporate Social Responsibility funds and Social Impact Investments. Deliberations also explored measures to strengthen the use of government funding, tap private funds through innovative public-private partnership arrangements and results-based funding. The focus was on increasing the total pool of resources as well as improving funding effectiveness.

Document Link:

https://www.pas.org.in/Portal/document/UrbanSanitation/uploads/Workshop%20report%20financing%20urban%20sanitation%20Jan%202014_Report.pdf

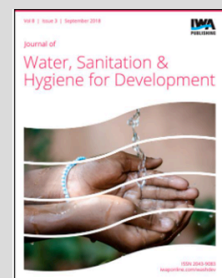


For more details, refer: **Financing Urban Sanitation Workshop**

A workshop on Financing urban sanitation was organized in partnership with the India Sanitation Coalition (ISC) in Mumbai on June 13, 2019. The workshop aimed to disseminate findings of the research study Financing Faecal sludge and septage management. The workshop focused on how one can leverage limited public funds with private financing to encourage private sector participation in sanitation service delivery. The workshop also explored innovative financing mechanisms, such as impact investment. It brought together government officials, practitioners, private service providers, impact investors and donor agencies.

Document Link:

https://www.pas.org.in/Portal/document/UrbanSanitation/uploads/Financing_FSSM_13_June_workshop_report.pdf

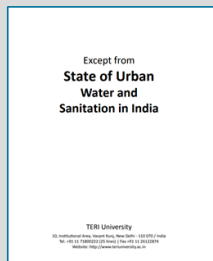


For more details, refer **Public finance at scale for rural sanitation- a case of Swachh Bharat Mission (Gramin), India**

In 2014, the Indian Government embarked on a major programme to end open defecation. The government allocated significant public funds to ensure that the goal is reached by the year 2019. The Swachh Bharat Mission (SBM) programme for rural sanitation is ambitious and probably no government has ever attempted to tackle sanitation at this scale and with such a large financial commitment. The main objectives of this paper are to assess sufficiency of financial commitments for SBM and to review efficiency and effectiveness in fund utilization against its stated objectives. In a large country like India, the programme achievements are not even. Some states are on track while others will need more attention and more funds to ensure that the goal is reached by 2019. An important challenge is to ensure sustainability of open defecation free (ODF) villages and communities. Supplementing public finance with innovative financing is needed to ensure that lack of finance does not become a constraint in achieving the ODF status and to ensure sustainability.

Document Link:

<https://iwaponline.com/washdev/article/8/3/359/39015/Public-finance-at-scale-for-rural-sanitation-a>

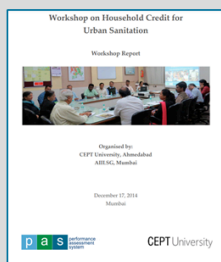


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Document Link:

<https://pas.org.in/Portal/document/UrbanSanitation/uploads/Paper%20on%20Financing%20Options%20for%20Urban%20Sanitation%20in%20India.pdf>



For more details, refer: Workshop on Household Credit for Urban Sanitation

PAS Programme has been exploring innovative options for financing sanitation. Based on the assessments done in small towns in Maharashtra for demand and availability of credit options, a workshop was organised in Mumbai by CEPT University and AILSG in December 2014. The workshop focused on need and opportunity for household level sanitation finance and discussed opportunities and constraints for a range of financial institutions to operate in sanitation field.

Document Link:

https://www.pas.org.in/Portal/document/ResourcesFiles/pdfs/Workshop%20on%20Household%20Credit%20for%20Urban%20Sanitation_presentation.pdf

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Annex-1: Answer key to activity 1

- 1) Sanitation systems in urban India are:
 - ✓ Predominantly septic tanks and pit latrines.

- 2) Which of the following are considered 'safely managed' sanitation as per JMP?
 - ✓ Household toilet connected by sewage network to STP
 - ✓ Household toilet with septic tank. Septage is emptied and taken to FSTP

- 3) FSSM is a mandatory requirement to achieve which of the following statuses?
 - ✓ ODF++

- 4) The largest source of central government funding for FSSM for a state government is from
 - ✓ AMRUT
 - ✓ Finance commission

- 5) What are the major factors that influence the costs involved in FSSM plan?
 - ✓ Population and area of the city
 - ✓ Desludging Service type adopted for the city (Demand/scheduled)
 - ✓ Trucks for desludging
 - ✓ Treatment plant (FSTP)
 - ✓ All of the above

- 6) In most India cities, septic tank emptying service is usually
Provided by both ULBs and private contractors when households request for desludging

- 7) What period does the National policy on FSSM recommend on scheduled desludging
 - ✓ Desludging septic tank regularly after every 2-3 years

- 8) The most common sources for CAPEX funding for emptying operations are
 - ✓ Private operators
 - ✓ Urban local body's own funds
 - ✓ State and Central grants

- 9) Potential sources for OPEX funding for emptying operations are
 - ✓ Sanitation taxes from users
 - ✓ Property tax from users
 - ✓ User charges

- 10) Different types of FSSM business models can be defined and categorized based on (select multiple options)
- ✓ Service type (Desludging, treatment, integrated)
 - ✓ Finance structure
 - ✓ Institutional roles
- 11) Business models for FSSM (both conveyance and treatment) should be ____
- ✓ Equitable, cover citywide sanitation, cost-effective and sustainable
- 12) The following precautions should be taken while using conveyance business models:
- ✓ Ensure use of PPE by private and ULB staff.
 - ✓ Have a good risk management plan while developing PPP/PSP contracts.
 - ✓ To ensure safe disposal of collected Faecal Sludge at a designated treatment facility
 - ✓ All of the above
- 13) What is the major source of funding for capex of FSTP?
- ✓ ULB funding
 - ✓ State/ Central Government funds
- 14) Arrange the following steps in the proper order for a typical procurement process in any ULB – (1) Draft contract approval (2) Request for proposals (3) Expression of Interest (4) Sanction work order (5) Bid evaluation and selection (6) Market Research
- ✓ 6,3,1,2,5,4
- 15) “Is the private player willing to get its own desludging trucks?” This is a typical question under which aspect of developing a FSSM contract?
- ✓ Ownership of capital assets
- 16) Risk of delayed payment is the biggest concern for private sector to engage with government bodies. Which of the following measures for addressing this are you familiar with?
- Escrow Mechanisms
 - Delayed payment monitoring portal
 - Bill Clearance Mechanisms and timeline
 - Risk Mitigation Funds
- 17) Taxes, fees and user charges are an example of which type of finance for urban infrastructure ?
- ✓ Own sources

Annex-2: Answer key to activity 2

Activity 2A : Infrastructure estimation for a city

1. Calculating the number of septic tanks to be emptied in a day

$$= \left[\frac{\text{Total number of septic tanks in the city}}{\text{Number of working days in a year} \times \text{Regular interval at which septic tank is to be emptied in years}} \right]$$

Solution: -

$$= \left[\frac{16000}{280 \times 3} \right]$$

$$= \left[\frac{16000}{280 \times 3} \right]$$

$$= 19.04 \approx \underline{19 \text{ no.}}$$

2. Calculating the number of trips per day

$$= \left[\frac{\text{The number of septic tanks to be emptied in a day} \times \text{Average size of septic tanks in KL}}{\text{Truck capacity in KL}} \right]$$

Solution: -

$$= \left[\frac{19 \times 5}{5} \right]$$

$$= \underline{19 \text{ no.}}$$

3. Calculating the number of truck required

$$= \left\lceil \frac{\text{Total number of trips per day}}{\text{Number of trips to be completed per truck per day}} \right\rceil$$

Solution: -

$$= \left\lceil \frac{19}{7} \right\rceil$$

$$= 2.71 \approx \underline{\underline{3 \text{ no.}}}$$

For operational purposes, it is assumed that each truck requires one driver and two helpers and to monitor the overall project, one Project officers/manager is appointed.

4. Calculating required capacity of FSTP (KLD)

$$= \left[\frac{\text{Total number of septic tanks to be emptied per day} \times \text{Average volume of septic tanks in KL}}{\text{}} \right]$$

Solution: -

$$= [19 \times 5]$$

$$= \underline{\underline{95 \text{ KLD}}}$$

Activity 2B : State budget estimation for FSSM services

City	Sanitation status	Total HH	HH that require desludging	No. of septic tanks to be emptied per day	No. of trucks required for scheduled desludging	No. of trucks to be procured	FSTP capacity required
City A	Fully onsite	10,000	10,000	12	2	1	60
City B	Sewered city	60,000	0	0	0	0	0

City C	Fully onsite	40,000	40,000	48	10	8	238
City D	Sewered city	150,000	0	0	0	0	0
City E	Fully onsite	11,000	11,000	13	3	2	65
City F	60% sewerer	44,000	17600	21	4	3	0
City G	Fully onsite	15,000	15,000	18	4	3	89
City H	50% sewerer	50,000	25000	30	6	5	0
City I	Sewered city	80,000	0	0	0	0	0
City J	Fully onsite (near STP city)	20,000	20,000	24	5	3	0 (Co-treatment)
Total requirement of infrastructure						25	452

State budget:

1	Budget for trucks = Infrastructure requirement of trucks * Cost of one desludging truck	25 X 20 Lakh	Rs 5 Crore
2	Budget for FSTPs = Total FSTP capacity requirement * per KLD cost (as per technology selection)	452 X 2.2 Lakh	Rs 99.4 Crore
3	Total state budget fund allocation = 1+2		Rs 104.4 Crore

Annex-3: Answer key to activity 3

- 1) Which of the following is a major challenge in implementation of PLAM model?
 - ✓ Requirement of administrative resources
- 2) State whether the statement is True or False : Outcome based financing is an important part of the PLAM model
 - ✓ True
- 3) Which of the following conditions should the desludger fulfil to get paid?
 - ✓ Forms signed by customer and FSTP operator
 - ✓ Maintaining records
 - ✓ Adhere to standards – PPE, spillage, damages, etc.
 - ✓ All of the above
- 4) For which of the following is adopting PLAM model more challenging?
 - ✓ Demand desludging
- 5) _____ months of reserve fund is advisable, that the private company can draw if there is delay in processing payment any month.
 - ✓ Three
- 6) How is risk of delayed payment mitigated in this model?
 - ✓ Escrow mechanism
 - ✓ Tripartite agreement
 - ✓ Maintaining reserve funds
 - ✓ All of the above
- 7) State whether the statement is True or False: Sanitation tax cannot be paid along with property tax
 - ✓ False
- 8) Which of the following is not an advantage of introducing sanitation tax?
 - ✓ Citizens can receive service without any fees

Annex-4: Answer key to activity 4

1. Calculating the total capital investment required in Rs. Lakhs

$$= \frac{\begin{aligned} & (\text{Average cost of truck} \times \text{Number of trucks required}) + (\text{Cost of Personal protective} \\ & \text{equipment and uniform per employee} \times (\text{Total no. of drivers} + \text{Total number of helpers})) + \\ & \text{Business establishment expenses} + (\text{Security deposit}(\%) \times \text{Average cost of truck}) + \\ & (\text{Contingencies}(\%) \times \text{Average cost of truck} \times \text{Number of Trucks Required}) + \\ & \text{Cost of Personal protective equipment and uniform per employee} \times (\text{Total no. of} \\ & \text{drivers} + \text{Total number of helpers} + \text{Business establishment expenses}) + \\ & (\text{Security deposit}(\%) \times \text{Average cost of truck}) \end{aligned}}{100000}$$

Solution: -

$$= \frac{\begin{aligned} & (17,00,000 \times 3) + 5000 \\ & \times (3 + 6) + \\ & 10000 + (3\% \times 1700000) + \\ & (10\% \times 1700000 \times 3) + \\ & (5000 \times (3 + 6)) + \\ & 10000 + \\ & (3\% \times 1700000) \end{aligned}}{100000}$$

$$= 5100000 + 45000 + 10000 + 51000 + 510000 + 45000 + 10000 + 51000$$

$$100000$$

$$= \underline{\text{Rs. 58.2 Lakhs}}$$

2. Calculating Human Resource Capital (Per Annum) in Rs. Lakhs

$$= \left[\frac{\left(\begin{array}{l} (\text{Salary for Driver (Rs/Month)} \times \text{Total number of drivers}) + \\ (\text{Salary for Cleaner (Rs/Month)} \times \text{Total number of helpers}) + \\ (\text{Salary for Project officer/manager (Rs/Month)} \times \\ \text{Total number of Project officers/managers}) \end{array} \right) \times 12}{100000} \right]$$

Solution: -

$$= \left[\frac{\left(\begin{array}{l} (10000 \times 3) + \\ (10000 \times 6) + \\ 25000 \times 1 \end{array} \right) \times 12}{100000} \right]$$

= Rs. 13.8 Lakhs

3. Calculating Office Establishment Cost (Per Annum) in Rs. Lakhs

$$= \left[\frac{\left(\begin{array}{l} (\text{Office Establishment cost (Rs per month)} \times 12) + \\ (\text{Number of Trucks Required} \times \text{Leasing value (Rs per truck per annum)}) \end{array} \right)}{100000} \right]$$

Solution: -

$$= \left[\frac{\left(\begin{array}{l} (35000 \times 12) + \\ (3 \times 0) \end{array} \right)}{100000} \right]$$

= Rs. 4.2 Lakhs

4. Calculating Maintenance Works (Per Annum) in Rs. Lakhs

$$= \left[\frac{\begin{aligned} &(\text{Routine maintenance cost per annum (\% of cost of trucks)} \\ &\times \text{Average cost of truck} \times \text{Number of Trucks Required}) + \\ &(\text{Periodic maintenance cost (\% of cost of trucks)}) \times \\ &(\text{Periodic maintenance interval}/12) \times \text{average cost of truck} \times \\ &\text{Number of Trucks Required} \end{aligned}}{100000} \right]$$

Solution: -

$$= \left[\frac{\begin{aligned} &(10\% \times 1700000 \times 3) + \\ &5\% \times \left(\frac{6}{12}\right) \times 1700000 \times 3 \end{aligned}}{100000} \right]$$

= Rs. 6.4 Lakhs

5. Calculating Health Insurance (Per Annum) in Rs. Lakhs

$$= \left[\text{Health Insurance (Rs.lakhs/Employee/year)} \times (\text{Number of drivers} \right. \\ \left. + \text{Number of helpers} + \text{Number of Project officers/managers}) \right]$$

Solution: -

$$= [0.2 \times (3 + 6 + 1)]$$

= Rs. 2.0 Lakhs

6. Calculating Office Overhead (Per Annum) in Rs. Lakhs

$$= \left[\frac{\begin{aligned} &(\text{Human Resource Capital (Per Annum)} + \text{Office Establishment (Per Annum)} + \\ &\text{Maintenance Works} + \text{Health Insurance (Per Annum)}) \times \\ &\text{Overhead (\% of total Fixed O\&M)} \end{aligned}}{\quad} \right]$$

Solution: -

$$= [(13.8 + 4.2 + 6.4 + 2.0) \times 10\%]$$

= Rs. 2.64 Lakhs

7. Calculating Fuel Cost (Per Annum) in Rs. Lakhs

$$= \left[\frac{\text{Fuel cost per trip (Rs per trip)} \times \text{Number of trips per day} \times \text{Number of working days in a year}}{100000} \right]$$

Solution: -

$$= \left[\frac{87.5 \times 19 \times 280}{100000} \right]$$

=Rs. 4.7 Lakhs

Financing Infrastructure

The section provides the financial feasibility of various scenarios depending on the contract type and method of cost recovery as per inputs.

Calculating the yearly operation and maintenance cost

For the first year, the total operation and maintenance cost would be equal to the cost calculated above in table 3. For the next four years, inflation will also be required to be taken into consideration. Consider an annual inflation rate of 7% and fill up the table given below based on the given formula: -

Operation and maintenance cost for year "X" = Operation and Maintenance Cost for the previous year * (1 + Inflation rate (in %))

Description	Unit	Year				
		1	2	3	4	5
Operation and Maintenance Cost (Per Annum)	Rs in Lakhs	=33.68	=33.68* (1+7%) =36.04	=36.04* (1+7%) =38.56	=38.56* (1+7%) =41.26	=41.26* (1+7%) =44.15

Non-operating expenses

Non-operating expenses generally comprises of the value paid as interest on the loan taken. Consider the non-operating expenses for respective year based on the table given below: -

Calculating total expenses made in a particular year

= (Operation and maintenance cost of that year + Non-operating expenses of that year)

Solution: -

Description	Unit	Year				
		1	2	3	4	5
Operation and Maintenance Cost (Per Annum)	Rs in Lakhs	33.68	36.04	38.56	41.26	44.15
Non-operating Expenses (Per Annum)	Rs in Lakhs	6.05	5.02	3.84	2.49	0.93
Total expenses	Rs in Lakhs	<u>39.73</u>	<u>41.06</u>	<u>42.40</u>	<u>43.74</u>	<u>45.07</u>

Calculating operating revenue including GST

$$= \left[\frac{\text{Total expenses made in a particular year} \times (1 + \text{Calculated operating ratio margin for NPV} = 0 (\%))}{\text{operating ratio margin for NPV} = 0 (\%)} \right]$$

Note: Consider the operating ratio margin for NPV = 0 to be 42%. This is the value at which the Net Present Value becomes 0 for a discount rate of 20%.

Fill in the values of total expenses and operating revenue based on the calculations made above in the table given below: -

Description	Unit	Year				
		1	2	3	4	5
Total expenses	Rs in Lakhs	<u>39.73</u>	<u>41.06</u>	<u>42.40</u>	<u>43.74</u>	<u>45.07</u>
Operating revenue including GST	Rs in Lakhs	=39.73*(1+42%) <u>=56.41</u>	=41.06*(1+42%) <u>=58.30</u>	=42.40*(1+42%) <u>=60.21</u>	=43.74*(1+42%) <u>=62.21</u>	=45.07*(1+42%) <u>=64.01</u>

Annual depreciation

Considering the rate of depreciation at 14%, following are the yearly values of annual depreciation. Annual depreciation is the yearly reduction of a fixed asset in a systematic manner. In this case the depreciation is related to the value of trucks.

Calculating profit before depreciation and tax for each year

$$= (\text{Operating revenue including GST for year "X"} - \text{Total Expenses for year "X"})$$

Description	Unit	Year				
		1	2	3	4	5
Operating revenue	Rs in Lakhs	56.41 - 39.73	58.30 - 41.06	60.21 - 42.40	62.21 - 43.74	64.01 - 45.07

including GST - Total expenses						
Profit before Depreciation and Tax	Rs in Lakhs	<u>16.68</u>	<u>17.24</u>	<u>17.81</u>	<u>18.37</u>	<u>18.93</u>

The value of annual depreciation will be equal to the values of annual depreciation given above in table no. 6

Calculating profit before tax for each year

$$=(\text{Profit before Depreciation and Tax for year "X"} - \text{Depreciation for the year "X"})$$

Description	Unit	Year				
		1	2	3	4	5
Profit before Depreciation and Tax - Depreciation	Rs in Lakhs	16.68 - 6.48	17.24 - 5.57	17.81 - 4.79	18.37 - 4.12	18.93 - 3.54
Profit before Tax	Rs in Lakhs	<u>10.21</u>	<u>11.67</u>	<u>13.02</u>	<u>14.25</u>	<u>15.39</u>

Calculating tax applicable for each year

The tax applicable for each year would depend upon the value of profit before tax i.e. if the value of profit before tax for the respective year is positive then the applicable tax will be equal to the value of profit before tax multiplied by the value of corporate tax. If the value of profit before tax is negative, the value of applicable tax will be equal to the value of profit before tax multiplied by the value of inflation rate.

Solution: -

Description	Unit	Year				
		1	2	3	4	5
Applicable tax	Rs in Lakhs	=10.21* 18% <u>=1.84</u>	=11.67* 18% <u>=2.10</u>	=13.02* 18% <u>=2.34</u>	=14.25* 18% <u>=2.57</u>	=15.39* 18% <u>=2.77</u>

Calculating net income for each year

$$=(\text{Profit before tax for year "X"} - \text{Applicable tax for year "X"})$$

Solution: -

Description	Unit	Year				
		1	2	3	4	5
Profit before Tax – Applicable tax	Rs in Lakhs	10.21 – 1.84 <u>=8.37</u>	11.67 – 2.10 <u>=9.57</u>	13.02 – 2.34 <u>=10.68</u>	14.25 – 2.57 <u>=11.69</u>	15.39 – 2.77 <u>=12.62</u>

Calculating potential contract value in Rs. Lakhs

$$= \sum \text{Operating revenues including GST over the years}$$

Solution: -

$$= 56.41 + 58.30 + 60.21 + 62.12 + 64.01$$

$$= \underline{\underline{\text{Rs. 301.04 Lakhs}}}$$

Calculating cost per septic tank desludging

$$= \left[\frac{\text{Potential contract values in Rs. Lakhs} \times 100000}{\text{Number of septic tank to be emptied in a day} \times \text{Number of working days in a year} \times \text{Contract cycle in years}} \right]$$

Solution: -

$$= \left[\frac{301.04 \times 100000}{19 \times 280 \times 5} \right]$$

$$= \underline{\underline{\text{Rs. 1131.73 Lakhs}}}$$

Calculating sanitation tax per property

$$= \left[\frac{\text{Potential contract values in Rs. Lakhs} \times 100000}{\text{Contract cycle in years} \times (\text{Total number of septic tanks in the city including for residential, non – residential / community, public toilet properties})} \right]$$

Solution: -

$$= \left[\frac{301.04 \times 100000}{5 \times 16000} \right]$$

$$= \underline{\underline{\text{Rs. 376.3 Lakhs}}}$$

Fill the table given below based on the calculations made above: -

Solution: -

Sr. no.	Description	Unit	Value
1	Potential contract value	Rs in Lakhs	301.0
2	Cost per septic tank desludging	Rs.	1128.9
3	Sanitation Tax per property	Rs.	376.3

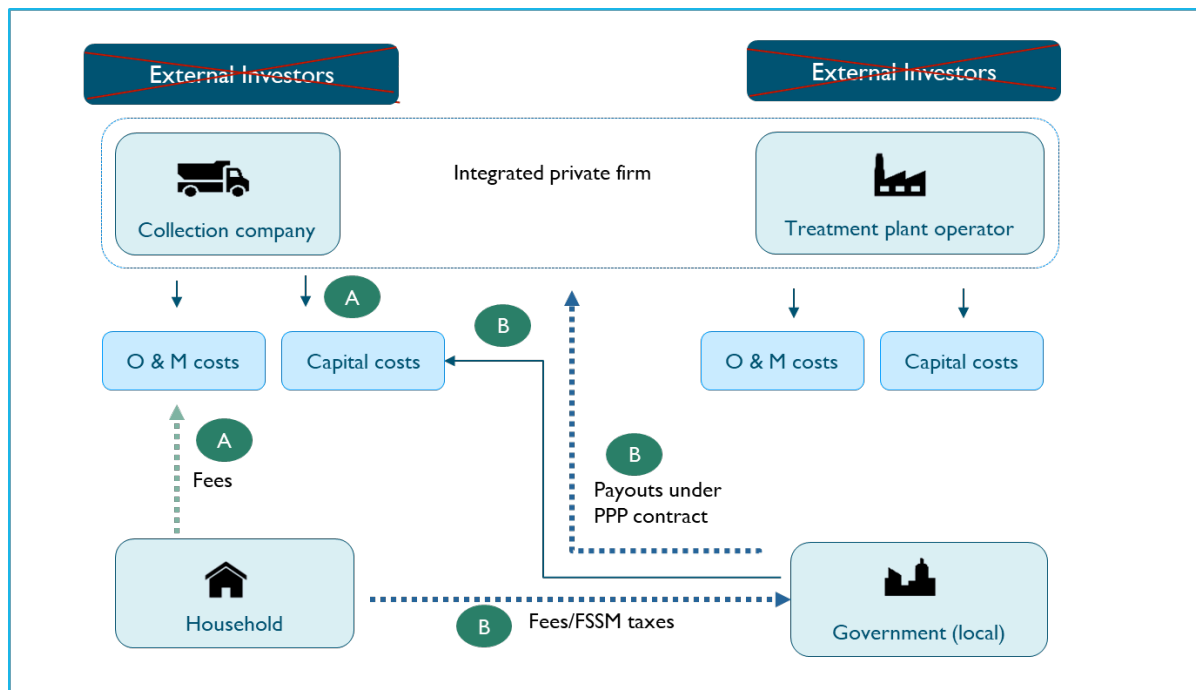
Annex-5: Answer key to activity 5

Identifying a suitable FSSM business model for a given city

Scenario I Building Model Canvas:

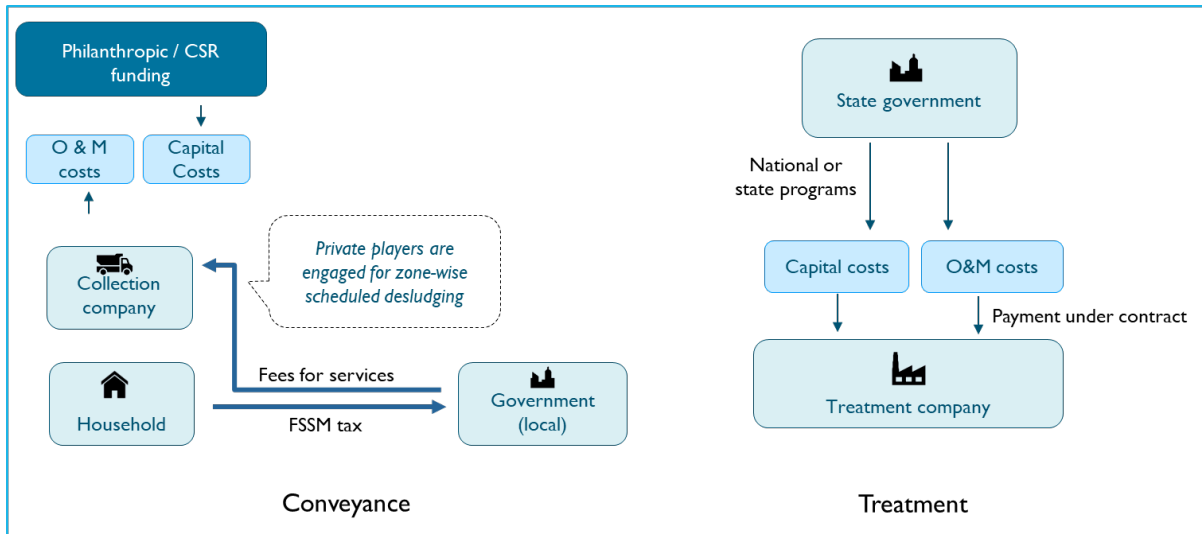
There are two ways of building business model canvas for scenario I:

Approach I: Integrated Business Model Canvas



Integrated Approach for conveyance and treatment

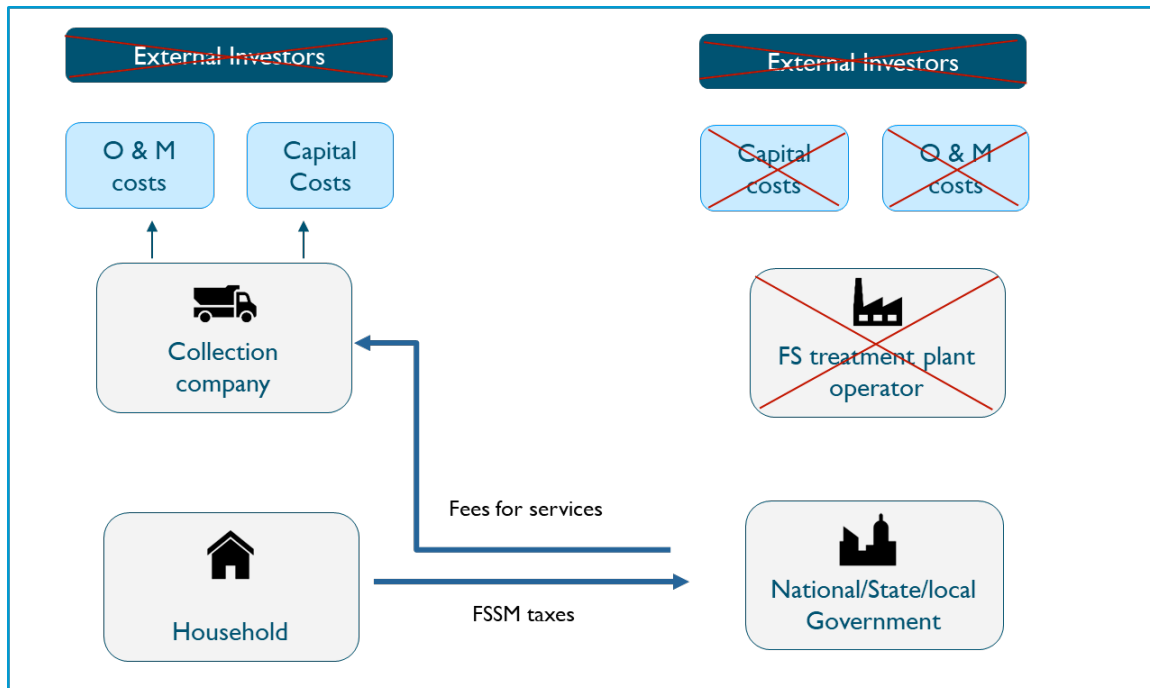
Approach II:



Business Model for conveyance where private player is involved in desludging and user charges are collected from the households. The local body can appoint a private company to construct and operate the treatment plant through national or state program.

Scenario II Building Model Canvas:

The possible business model for Scenario II can be:



Business Model for conveyance where private player is involved in desludging and user charges are collected from the households.

Annex- 6: Answer key to activity 6

Activity 6A – Procurement plan

	Market research stage	>	Project planning and contract building stage	>	Tendering stage	>	Post work order and monitoring stage
1.	Market research for available private service providers	5	Evaluating received EoIs (Expression of Interest) and inviting pre-bid meeting of interested parties	9	Inviting bids through government tender site / newspapers Bid submission along with Earnest Money deposit and tender fee 11 Evaluating received bids based on technical criteria and financial criteria and informing ULB general body about lowest bidder i.e. L1 for selection	19	Monthly performance reviews / Milestone based performance reviews
2.	Stakeholder consultations with all municipality departments, interested private companies, SHGs to understand interests	6	Citizen/stakeholder consultations about FSTP site and private sector involvement	12	Request selected FSTP bidder for Detailed Project Report 13 Apply to appropriate state authority for technical sanitation of DPR and receive technical sanction 14 Administrative sanction from state government 15 Award work order to selected company for FSTP construction and operation	20	Awareness activities for scheduled desludging
3.	Invite Expression of Interest for Scheduled emptying contract	7	Procedures for land acquisition	16	Award contracts to selected company for desludging 17 Opening ESCROW account with bank for payments 18 License other independent desludgers to operate outside contract zone and unload at FSTP only\		
4	Invite Expression of Interest for FSTP construction and 3 year operation contract – Design-Build-Operate-Transfer basis	8	Developing both contract documents in consultation with legal advisors				

Activity 6B - Goals for drafting contracts

Operational role of private sector

1. As per discussions in meeting, FSTP project will be a _____ contract
 - ✓ Bundled
2. Scheduled emptying project will be a _____ contract
 - ✓ Service

Sources of revenue and investment

3. Construction cost (capital expenditure) in FSTP project will be borne by
 - ✓ ULB
4. For scheduled emptying, trucks (capital expenditure) are to be procured by
 - ✓ Private contractor
5. Operating expenditure for FSTP (O&M) will be borne by
ULB
6. Operating expenditure for desludging will be borne by
 - ✓ ULB
7. FSTP contract will be financed through
Finance commission grant funds

Ownership of capital assets

8. After contract period, FSTP will be owned by
ULB
9. After contract period trucks will be owned by
 - ✓ Private contractor

Payment structure

10. Payment to desludger is to be
Fixed fee per septic tank, paid monthly
11. Payment for FSTP construction is to be done
 - ✓ As per % of bid amount on completion of milestones
12. Payment for FSTP operation is to be done
 - ✓ Fixed monthly amount, as agreed in contract
13. Salaries, health insurance, EPF etc of staff hired for operations are to be paid by
Private contractor
14. Work stations and amenities such as water, electricity, phone connections, machinery, safety gear etc are to be provided and maintained by
 - ✓ Private contractor

Contract length and value

15. For scheduled desludging as per discussion in ULB, appropriate length for desludging contract is
 - ✓ Three years
16. Assuming technical qualifications are satisfied, desludging contract will be awarded to
 - ✓ Lowest bid per septic tank desludging

Risk mitigation and allocation

17. Assuming technical qualifications are satisfied, FSTP contract will be awarded to
Lowest construction cost + total operating cost for contract period
18. Responsibility for getting technical and administrative sanction for FSTP lies on
ULB
19. Responsibility of land acquisition lies on
 - ✓ ULB
20. Responsibility of producing “proof of safe desludging” lies on
 - ✓ Private contractor
21. “safe desludging” constitutes
 - ✓ Extraction of complete volume of septage from septic tank barring last 2 inches
 - ✓ No damage to tank
 - ✓ No spillage at property or on the way to FSTP
 - ✓ Unloading only at FSTP
 - ✓ No human contact with septage. No manual scavenging. Use of PPE
22. Responsibility for opening Escrow account lies on
 - ✓ ULB
23. Responsibility of producing lab reports for quality testing of treated septage lies on
 - ✓ Private contractor
24. Responsibility of ensuring adherence to design, construction and treatment standards lies on
 - ✓ Private contractor
25. Getting technical sanction from appropriate state authority is a clause for mitigating _____ risk
 - ✓ Design

Activity 6C – Options for overcoming case specific contracting challenges

1. City A wants to engage private players for FSSM. However, the municipality does not have the resources to do an in-depth market research to gauge the landscape of players. What can the city do instead?
 - ✓ Invite Expression of Interest with details on experience, technical know-how and financials
2. City B wants to engage a private company to build a high capacity FSTP due to which the municipality had floated a tender with the condition that bidders be experienced companies with high turnovers. However, due to this they did not receive any bids. What change could they make when re-inviting bids?
 - ✓ Allow joint venture
3. City C has some experience in engaging private sector for sanitation services. However, in the past they have faced issues where the private company could not give satisfactory service as per expected standards. The municipality is now looking to engage private players to provide services for (1)scheduled desludging (2)FSTP construction (3)FSTP O&M. What contract clauses can address this?
 - ✓ Performance based payments - Monthly payment is done only when desludger produces proof of emptying for agreed number of tanks as per required protocol. Payment on achieving construction milestones – 30% on plinth completion, 20% on completion of certain units, etc. Treatment plant operator has to submit regular samples of treated water and solid products for testing. Quality parameters should be within allowed limits
 - ✓ Dispute resolution terms
 - ✓ Termination terms and notice period
4. City D has an active private desludger market with multiple companies running business. The city has now set up an FSTP and is ensuring that its own truck is unloading septage only at the designated site. However, private players are used to unloading in agricultural fields and vacant land. How can the city regulate them?
 - ✓ Licence all desludgers to operate independently with the condition that they can only unload at FSTP. Violations lead to cancellation of business licence
5. City E has invited bids to engage private players in FSSM operations. However, companies are hesitant to come forward due to the municipality's history with delayed payments. How can this be addressed in the contract?
 - ✓ Escrow mechanism with reserve fund
 - ✓ Late payment fee

- ✓ Dispute resolution terms
 - ✓ Termination terms and notice period
6. City F has set up a simple non-mechanical FSTP through donor funding. The partners also require that the grant project also have a component of community development. What is a good option in this scenario?
- ✓ Engaging local Self Help Groups for O&M of FSTP
7. City G wants to set up a FSTP with support of a private player and has identified a suitable land parcel for this. However, the land does not belong to the government and is also relatively close to urbanized area. In this context, what two activities should the ULB complete BEFORE signing a contract with the private player?
- ✓ Stakeholder consultation to address NIMBY and private sector engagement
 - ✓ Land acquisition
8. City H is an industrial town looking to engage private players to improve service across the sanitation service chain. It was found that due to the industries, daily sludge loads are highly variable in terms of quality and quantity leading to issues between the desludgers and treatment plant operators. What kind of FSSM contract is best suited in this context?
- ✓ Bundled contract for desludging as well as O&M of FSTP
9. City J wants to engage a private player to refurbish septic tanks across the city and desludge them for the next one year. What would be a suitable payment structure for both activities?
- ✓ Fixed fee per unit

Annex-7: Answer key to activity 7

- 1) Which of the following is/are advantages of innovative financing mechanism in FSSM?
 - ✓ There is a large scope as the financiers are now talking about outcome/results based financing
 - ✓ Sanitation sector has very bold and measurable outcomes
 - ✓ Public funds can be used to leverage additional private sector
 - ✓ All of the above

- 2) State whether the statement is True or False : Providing incentives for improved performance and effectiveness by using performance linked approaches is not advisable in FSSM financing
 - ✓ False

- 3) Fill in the blanks: Innovative financing mechanisms work effectively with _____ transactions cost and _____ investments in monitoring and supervision.
 - ✓ High, High

- 4) What can be measurable outcomes, if output based/ results based financing mechanisms are adopted for your city?
 - ✓ No. of septic tanks desludged over a defined period, especially poor and low income households
 - ✓ Amount of faecal sludge treated at the treatment plant
 - ✓ Effluent characteristics of treatment plant meeting the environmental discharge standards
 - ✓ All of the above

- 5) Which of the following stakeholders will cannot be involved in innovative financing mechanism?
 - ✓ None of the above

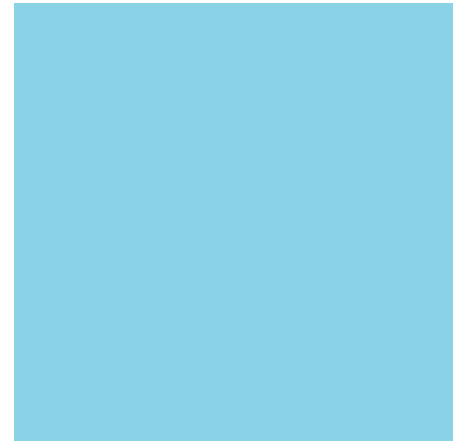
Annex-6: List of Acronyms

ALF	Area Level Federations
AMRUT	Atal Mission For Rejuvenation And Urban Transformation
BMGF	Bill and Melinda Gates Foundation
BOD	Biological Oxygen Demand
BOLT	Build-Operate-Lease-Transfer
BOO	Build-Own-Operate
BOOT	Build-Own-Operate-Transfer
BOT	Build Operate and Transfer
BSE	Bombay Stock Exchange
BWC	Blue Water Company
CapEx	Capital Expenditure
CDD	Consortium for DEWATS Dissemination
CGTMSE	Credit Guarantee Trust Fund for Micro & Small Enterprises
CLF	City Level Federation
CO	Chief officers
COD	Cash-On-Delivery Aid
CPHEEO	Central Public Health and Environmental Engineering Organisation
CSR	Corporate Social Responsibility
CT/PT	Community toilets / public toilets
DBOT	Design Build Operate Transfer
DIB	Development Impact Bond

DSCR	Debt service coverage ratio
DWASA	Dhaka Water Supply and Sewerage Authority
EBITDA	Earnings Before Interest, Taxes, Depreciation, and Amortization
EMD	Earnest Money Deposit
Eol	Expression of Interest
FRBM	Fiscal Responsibility and Budget Management Act
FSM	Faecal Sludge Management
FSSM	Faecal Sludge and Septage Management
FSTP	Faecal Sludge Treatment Plant
GHMC	Greater Hyderabad Municipal Corporation
HAM	Hybrid Annuity Model
HH	Household
HUDCO	Housing and Urban Development Corporation
IMC	Indore municipal corporation
JMP	Joint Monitoring Programme
KLD	Kilo Liters per day
KMA	Kumasi Metropolitan Assembly
KWSPFT	Karnataka Water and Sanitation Pooled Fund Trust
LBT	Local Body Tax
LG	Local Government
LPCD	Litre Per Capita Per Day
MDF	Municipal Development Funds
MoHUA	Ministry of Housing and Urban Affairs

MoUD	Ministry of Urban Development
MSMEs	Micro, Small & Medium Enterprises
MUDRA	Micro Units Development & Refinance Agency Ltd
MUINFRA	Maharashtra Urban Infrastructure Development Co. Ltd.
NFSSM Alliance	National Faecal Sludge and Septage Management Alliance
NGO	Non-Governmental Organization
NMCG	National Mission for Clean Ganga
NSE	National Stock Exchange of India
OBA	Output based Aid
ODF	Open Defecation Free
OpEx	Operational Expenditure
OWSSB	Odisha Water Supply and Sewerage Board
P4R	Program for results
PbR	Payment by Results
PLAM	Performance Linked Annuity Model
PMC	Pune Municipal Corporation
PMDO	Pan India Pooled Municipal Debt Obligation Facility
PPP	Public-private partnership
PSMBV	Program for Market structuring of faecal sludge management
PSP	Private Sector Participation
RBF	Results based funding
SBM	Swachh Bharat Mission
SDG	Sustainable Development Goal

SFD	Shit-Flow Diagram
SHG	Self-Help Group
SI	Sanitary Inspector
SMERA	Small and Medium Enterprises Rating Agency of India Limited
SOP	Standard Operating Procedure
STP	Sewage Treatment Plant
SWM	Solid Waste Management
TDR	Transfer of Development Rights
TNUDF	Tamil Nadu Urban Development Fund
TSCL	Thongthawil Service Corporation Limited
UDD	Urban Development Department
ULB	Urban Local Body
VGf	Viability Gap Funding
WASH	Water, Sanitation and Hygiene
WMC	Wai Municipal Council
WMD	Waste Management Department
WSPF	Water and Sanitation Pooled Fund
WSS	Water sanitation solid-waste
WSUP	Water & Sanitation for the Urban Poor



CENTER FOR WATER AND SANITATION

The Center for Water and Sanitation (CWAS) is a part of CEPT Research and Development Foundation (CRDF) at CEPT University. CWAS undertakes action-research, implementation support, capacity building and advocacy in the field of urban water and sanitation. Acting as a thought catalyst and facilitator, CWAS works closely with all levels of governments - national, state and local to support them in delivering water and sanitation services in an efficient, effective and equitable manner.

