



**THE  
IMPACT  
PROGRAMME**

# URBAN SANITATION MARKET OVERVIEW

---

## INDIA

**ATHENA**  
INFONOMICS



## ACKNOWLEDGEMENTS

This market research report was prepared by the team at Athena Infonomics, and our Kenyan partners Open Capital Advisors (OCA), under the aegis of the IMPACT Programme. IMPACT Programme works with a range of organizations that create and catalyse positive change in the impact investment sector. We gratefully acknowledge Mr. Tom Adlam (IMPACT Programme), Ms. Shruti Goel (The Palladium Group) and Mr. Matt Ripley (The Good Economy) for their guidance and counsel.

We would like to thank the National Faecal Sludge and Septage Management (NFSSM) Alliance, currently comprising of 30 national and international organizations, for their contributions and references that helped conduct consultations for the primary research of the report.

We would especially like to thank the following key informants for sharing their valuable insights and knowledge: Mr. Sanjay Banka (Banka BioLoo), Mr. Chandrashekar Shankar (Vision Earth Care), Mr. Mohammed Dawood (Earth Recycler Private limited), Mr. Ajeet Oak (TBF Environmental Solutions Pvt. Ltd.), Mr. N Sampath Kumar (Tide Technocrats Private Limited), Mr. Snehit (Blue Water Company), Mr. Rakesh Kasba (Jalodbust), Mr. Mayank Midha (GARV Toilets), Mr. Dhawal Patil (Saniverse), Mr. Andrews Jacobs (CDD Society), Mr. Manoj Garg (Sarvo Technologies Ltd) and Ms. Mou Banerjee (Elefo Biotech). The team would also like to thank Ms. Alice Laidlaw (International Financial Corporation), Mr. Sai Pramodh (Caspian Fund), Mr. Mohit Jain (Acuite Ratings), Mr. Venugopal Gupta (Toilet Board Coalition), Ms. Binali Suhandani (AVPN), Mr. Vineet Menon, Ms. Shubhra Batra and Ms. Arundhati Das (Intellectap/Aavishkar group), Mr. Manas Rath and Mr. John Mathai (Take-a-Stake Fund), Mr. Amit Bhatia and Ms. Neha Gupta (Impact Future Project – Aspire Impact) for sharing their understanding from the perspective of an investor/investment enabler in the sanitation space. These insights have acted as the cornerstone for the structure of this report and helped the team validate its findings and hypothesis.

These institutions along with a few others will form a key part of our endeavour in the coming phases of our platform development. The list of stakeholders consulted through the course of this market research and for further engagement in the upcoming phases of our study is provided in [Annexure 2](#).

The team would like to acknowledge its appreciation to the authors and experts who have supplied information, published and unpublished material, opinions, and advice; that are listed as footnotes and are duly referenced. This report has drawn extensively, for its secondary research, from studies published by, including but not limited to, Water and Sanitation Programme (WSP), Centre for Policy Research (CPR), Toilet Board Coalition (TBC), Central Public Health and Environmental Engineering Organization (CPHEEO), International Water Management Institute (IWMI) and Water, Sanitation and Hygiene (WASH) Institute, India.

## EXECUTIVE SUMMARY

This report, prepared under the aegis of the IMPACT Programme, aims to build evidence around opportunities for investment in India's urban sanitation markets. The report systematically studies the potential for investments in private enterprises across the sanitation value chain. Increased investments in such high-impact businesses will help them grow in size and scale, create new quality jobs and bring more products and services. This endeavour, in line with the goals of the IMPACT Programme, would help strengthen the sanitation ecosystem, benefiting the poor and vulnerable sections. It is pertinent to note that improving support to businesses across sanitation sector's value chain also leads to cross-cutting and measurable contribution towards the achievement of the Sustainable Development Goals, SDG 6.2 in particular.

The report is the output of the first of three phases and will help enable investors to understand barriers that currently exist in deploying commercial and development investments into urban sanitation. It studies key attributes unique to sanitation business models that help or deter their access to finance. Insights and findings from this report will inform the development of our investment platform<sup>1</sup>, the second phase, and will tailor use-cases for key anchor investors. The platform will be tested and refined using real-world data from shortlisted sanitation businesses in the third phase. Ongoing engagements and consultations with businesses and investors through the three phases will inform the core functionalities integrated into the platform.

The report is organised into two main parts.

The first part of the report covers the **urban sanitation market** in India and provides an overview of infrastructure gaps within the sanitation value chain and the potential role private sanitation enterprises could play in addressing them. To understand the market's potential in India, our focus is on the three states of Tamil Nadu, Karnataka, and Odisha. The states have a conducive legislative and regulatory environment relative to other States, favourable B2G, B2B, and B2C engagement precedents, and presents a good variation in socioeconomic profiles of its population, levels of private sector maturity, and formality of business operations.

The study specifically focuses on private sector business models led by Small and Medium Enterprises (SMEs) and startups in Faecal Sludge Management – namely a. Containment, b. Emptying & Transportation, and c. Treatment & Reuse segments of the value chain. The choice of these segments reflects a high prevalence of private SMEs and Start-ups, substantial private sector contribution to safely managed sanitation, and relatively lower access to finance compared to large

---

<sup>1</sup> The expected outcomes of the investment platform are –

- a) Enable investment decisions
- b) Enable access to innovative finance within sanitation businesses
- c) Improve visibility of the sector as an impact investment destination

enterprises. The challenges faced by these enterprises are categorised by specific requirements – working capital, asset financing, growth capital, risk capital for innovation, etc.

The findings of the report are extremely encouraging across the entire value chain. The market is estimated to reach \$90 billion by the year 2032, with just Operations & Maintenance valued at approximately 33% of the overall potential. This bodes well for private operators to step in and address gaps in Community sanitation in urban markets, given the higher prevalence of community containment utilisation in Odisha as compared to Tamil Nadu and Karnataka. The market for emptying and transport also indicates a significant reliance on private sector operators. Households regularly empty their septic tanks and on-site containment infrastructure (88.4% in Tamil Nadu, 95% in Karnataka, and 95.6% in Odisha) utilising desludging operators. While the variation among states could be explained by local factors such as the volume of septic tanks, difficulties in access roads for trucks, etc., this is highly encouraging for organised private emptying and transport across all three States. The same private operators are responsible for community and public containment infrastructure as well and this offers an additional market segment that can be catered to. Treatment plants are asset-heavy and predominantly operated through public-private partnership models in all three States. While asset ownership is often with public agencies, the PPP structures have different models for private sector participation. The core segment identified by the report is in reuse which currently stands at a negligible 0.2%, 0.8%, and 2.1% of current throughput respectively in Odisha, Karnataka, and Tamil Nadu. Exploring markets for reuse by targeting end-users that utilise resources recovered from waste, has the potential to transform sanitation costs to profits by treating waste to produce rich resources. There are however challenges around market linkages and low demand from agriculture and allied sectors. Identifying operational gaps and ensuring demand through strategic partnerships could incentivise investments and improvements in technologies used for reusing human waste.

The report identifies key business models prevalent in the three value chain segments and presents a qualitative analysis of its viability and challenges faced in meeting its specific financing needs such as working capital, viability support, asset financing, growth capital, etc.

The second part of the report covers the **urban sanitation financing landscape**. Sanitation financing outside of public spending is relatively nascent. Despite a focus on market-based mechanisms, the sector's reliance on grants and concessionary capital implicitly warrants the inclusion of viability funding by various development actors alongside commercial instruments such as equity and debt. The report categorises sanitation investors into – a. Commercial Investors; b. Impact-oriented Investors; and c. Investing for solutions.

The report then goes on to document various risks perceived by Investors in the sanitation sector and covers – a. Investment Risk; b. Regulatory Risk; c. Formality Risk.

Formality of enterprises is typically perceived as a binary attribute, i.e., SMEs are either formal or informal, and this narrative results in a generalisation of enterprises that are not informal, yet not fully formalised. This generalisation affects a large portion of SMEs in their ability to access capital. The report includes a framework for formality that could potentially help investors understand the

various 'levels' of formality that exists among sanitation enterprises and inform their investment decisions appropriately. The risks section is followed by a section on barriers to sanitation that deter a steady flow of investments into sanitation and offers potential mitigation measures to overcome these barriers.

The report concludes with four key enablers that could potentially crowd in private and development capital into sanitation enterprises. The enablers are –

- a. targeted public funding alongside private capital,
- b. building sanitation markets with 'strong value chain' linkages,
- c. steady investments in R&D and innovation to reduce operating costs and develop market-tested solutions, and,
- d. more and better information about sanitation businesses.

# CONTENTS

ACKNOWLEDGEMENTS .....	2
EXECUTIVE SUMMARY .....	3
Abbreviations .....	7
List of Figures .....	8
List of Tables .....	8
1. Context .....	10
2. Urban Sanitation Market in India .....	16
2.1. Opportunity in Urban Sanitation Market in India .....	17
2.2. Key Business Models .....	24
2.3. Business Model Viability .....	30
2.4 Challenges in accessing finance .....	32
3. Urban Sanitation Financing in India .....	34
3.1. Overview of Investors .....	35
3.2. Investor Risk Perception .....	40
3.3. Barriers to Sanitation Investments .....	43
3.4. Innovative financing structures .....	45
Conclusion .....	49
Annexure .....	51
Annexure 1 .....	52
Annexure 2 .....	58

## **Abbreviations**

B2B – Business to Business  
B2C – Business to Consumer  
B2G – Business to Government  
BOT – Build, Operate, and Transfer  
CT – Community Toilet  
DBO – Design, Build, Operate Model  
DFI – Development Finance Institution  
E&T – Emptying and Transport  
FS – Faecal Sludge  
FSM – Faecal Sludge Management  
FSTP – Faecal Sludge Treatment Plant  
IHHL – Individual Household Latrines  
MFI – Micro Finance Institution  
NBFC – Non-Banking Finance Company  
ODF – Open Defecation Free  
OSM – Off-site Sewage Management  
OSS – On-site sanitation  
O&M – Operation and Maintenance  
PPP – Public Private Partnership  
PT – Public Toilet  
SHG – Self-Help Groups  
SBM – Swachh Bharat Mission  
SME – Small and Medium Enterprise  
STP – Sewage Treatment Plant  
SWM – Solid Waste Management  
ULB – Urban Local Body  
WWTP – Wastewater Treatment Plant

## List of Figures

<b>Figure 1.1:</b> Investment Appraisal Dimensions .....	10
<b>Figure 1.2:</b> Sanitation Value Chain .....	12
<b>Figure 2.1:</b> Market Potential for urban sanitation in USD Billion .....	18
<b>Figure 2.2:</b> Percentage distribution of estimated expenditures in sanitation economy (2018-2032) .....	18
<b>Figure 2.3:</b> Percentage of Household by containment usage .....	19
<b>Figure 2.4:</b> Market Potential for urban sanitation in USD billion .....	19
<b>Figure 2.5:</b> Percentage of HH emptying from septic tank/pit/composting latrine .....	20
<b>Figure 2.6:</b> Percentage of HH emptying septic tank/pit/composting latrine by various agencies .....	21
<b>Figure 2.7:</b> Percentage distribution of households by disposal system in urban areas .....	22
<b>Figure 2.8:</b> Treatment capacity in each state .....	23

## List of Tables

<b>Table 2.1:</b> Sanitation Business Model Viability – by Value Chain Segment .....	31
<b>Table 2.2:</b> Sanitation Business – Challenges in accessing finance by financing need .....	32
<b>Table 3.1:</b> Overview of Investors .....	35
<b>Table 3.2:</b> Framework for Formality of Sanitation Businesses .....	41
<b>Table 3.3:</b> Key Regulatory Risks by Value Chain segment .....	42

SECTION

1

CONTEXT

# 1. Context

The report is a 'building block' to assist investors to understand barriers in deploying commercial and development investments in urban sanitation. It studies the key attributes unique to sanitation business models that help or deter their access to finance. Insights and findings from this report will inform the development of an investment platform for urban sanitation enterprises to facilitate the flow of capital. A short overview of the platform is offered below –

The investment platform will be built for and refined using empirical data from sanitation businesses in consultation with various investors. The investment platform will be anchored with development funders, investors, city sanitation authorities and private sanitation enterprises to help them make better-informed investment decisions considering the three dimensions of Impact, Viability and Additionality.

Figure 1.1. Investment Appraisal Dimensions



The platform will also enable sanitation businesses to signal their investment potential better, thus opening additional formal sources of financing and freeing up scarce public resources with other competing priorities.

The platform accounts for the integral role played by governments in facilitating sanitation service delivery and focuses on deploying investment capital to complement public spending. This is critical to investor perceptions of higher levels of risks in sanitation investments. The platform will quantify and adjust for additionality effects arising from the existing policy environment and public spending in sanitation. Innovative partnership models and financial instruments will be integrated into the platform to help compliment public and private funding to the sector.

Thus, the expected outcomes of the investment platform are as follows –

- a) **Enable investment decisions via a support tool**
- b) **Enable access to innovative finance within sanitation businesses**
- c) **Improve visibility of the sector as an impact investment destination**

This Market Research Report is primarily intended to act as a guide for investors to understand the investment potential within urban sanitation markets in India and attempts to bridge gaps in information about the risks within the sector. The report, especially, attempts to distinguish between private service delivery and public service delivery. This distinction must be better represented to different categories of investors to help them understand the potential in private sanitation markets. Further, there are certain perceptions<sup>2</sup> regarding the sanitation sector that may not adequately represent the expansive and complex sanitation market. A few of them are –

- a. **Sanitation is typically categorised as an infrastructure sector** – this is not fully representative of the companies that make up the sanitation sector, including small service providers with different operating models, technology solutions, etc.
- b. **Sanitation is typically perceived as a public good** – this lays the onus fully on governments and municipalities for centralised planning and does not account for the high incidence of decentralised solutions in urban markets.
- c. **Sanitation typically involves beneficiaries, not customers** – this approach shifts recipients of sanitation services to a passive role and does not account for the economic value within the private sanitation market.

The frame of the study, i.e., sanitation value chain segments conducive for private service delivery, definition of sanitation enterprises and sanitation investors, for both Indian and Kenyan Reports, is outlined below –

### **Sanitation Value Chain**

The choice of below segments reflects a high prevalence of private SMEs and Startups, substantial private sector contribution to safely managed sanitation, and relatively lower levels of access to finance compared to large enterprises.

The sanitation service chain comprises five main segments – containment, emptying, transport, treatment, and reuse.

- **Containment:** This value chain segment addresses access to toilet infrastructure and the safe storage of human waste. There has been significant progress in achieving household-level toilet access through National Missions across the country and creating a more dynamic market for private sector participation in building and maintaining community/ public toilet infrastructure. Considering these developments, the focus is on private sector business models within this sub-market.

---

<sup>2</sup> World Water Council. (2018). Increasing Financial Flows for Urban Sanitation

Figure 1.2: Sanitation Value Chain



- **Emptying and Transport:** This value chain segment focuses on private service providers that empty the containment units and transport the faecal sludge to treatment units. E&T segment of the value chain is often serviced by municipalities, the private sector, or a combination of both. E&T models attempt to provide timely and affordable desludging services for users with decentralized, on-site sanitation systems, and ensure the safe transportation of the sludge to designated disposal sites.
- **Treatment and Reuse:** This is the final stage in the sanitation value chain. Its scope involves treating the wastewater and faecal and converting the same into end products that feed into various other sectors such as agriculture, industry, and energy generation. Treatment facilities for wastewater and faecal sludge are typically constructed through PPP. Business models in this stage have comprehensive risk-sharing arrangements with public agencies along with high reliance. Despite this, it is a key value chain segment to study as it has close linkages to the viability of business models operating in the rest of the sanitation value chain. This is further filtered to adjust to issues in accessing finance. The report emphasises on small-scale plants and innovative reuse businesses.

This emphasis reflects the situation in most urban markets within India, where both volumes of throughput into the treatment facility (waste generated), as well as financial wherewithal of local administrations to construct large-scale facilities, are relatively limited.

### Sanitation Enterprises – SMEs

The report exclusively focuses on formal SMEs, which range from early-stage, growth to mature-stage businesses. Details regarding the various business models, types of financing needs and potential financing sources is documented in subsequent sections. Though we acknowledge the high-impact and sub-optimally served informal sanitation market in India, we recommend a qualified inclusion of informal enterprises, which are typically not mature enough to access capital from investors without first taking steps to formalise their businesses. The report recommends providing pre-investment support to improve the formality of informal businesses to help unlock potential of these sanitation businesses and further the flow of private investments in the sector.

Technology and innovation in business models have also been documented to be a key factor in accessing capital among sanitation enterprises. Even though the use of information technology is not prevalent at scale currently, the study includes examples of a few startups and innovative businesses to capture differentiating elements within these business models.

### **Sanitation Investors – Commercial, Social-impact oriented, Solutions-focused<sup>3</sup>**

A key constraint in defining sanitation investors is the relative nascency of investor interest within the sector. The focus of this report is prominently on market-based mechanisms. However, given the nature of underlying product/service, it considers development capital deployed within sanitation that does not necessarily intend to generate at-market returns.

**Commercial Investors** seek at-market financial returns and are closest to the ground. They typically cater to most SME-financing needs. However, the overall risk perception of the sector naturally drives commercial capital towards less risky asset classes, with underlying collateral.

While the risk appetite is slightly higher for **impact-oriented investors**, deploying capital efficiently through market-based mechanisms and at low transaction costs is a key consideration. Impact-oriented investors generally seek below-market financial returns alongside generating social impact.

**Solutions-focused investors** are categorized as those institutions that exclusively focus on social impact and may not emphasise on financial returns. Besides investments in scalable solutions, these investors typically deploy grants, viability support, and guarantees, etc., to mitigate risks in sanitation investments.

This categorization of investors is adapted from GIIN<sup>4</sup>, IMP<sup>5</sup>, and Omidyar Network<sup>6</sup> classifications of impact investors and assumed to be the most representative of a relatively complex financing landscape for urban sanitation.

### **Geography**

To map a representation of complex economic, social, and political factors that influence sanitation service delivery in a country like India, the study focuses on three states – Tamil Nadu, Karnataka, and Odisha. The choice of states reflects a high prevalence of small-scale sanitation enterprises

---

<sup>3</sup> Definition of Investor Categories –  
Commercial – at-market financial returns;  
Impact-oriented – below-market financial for greater social impact;  
Solutions – negotiable market returns with key emphasis on scalable solutions with social impact

<sup>4</sup> Global Impact Investing Network. (2018). Impact Investing Guide

<sup>5</sup> Impact Management Project. Website. The Impact Classes of Investment.

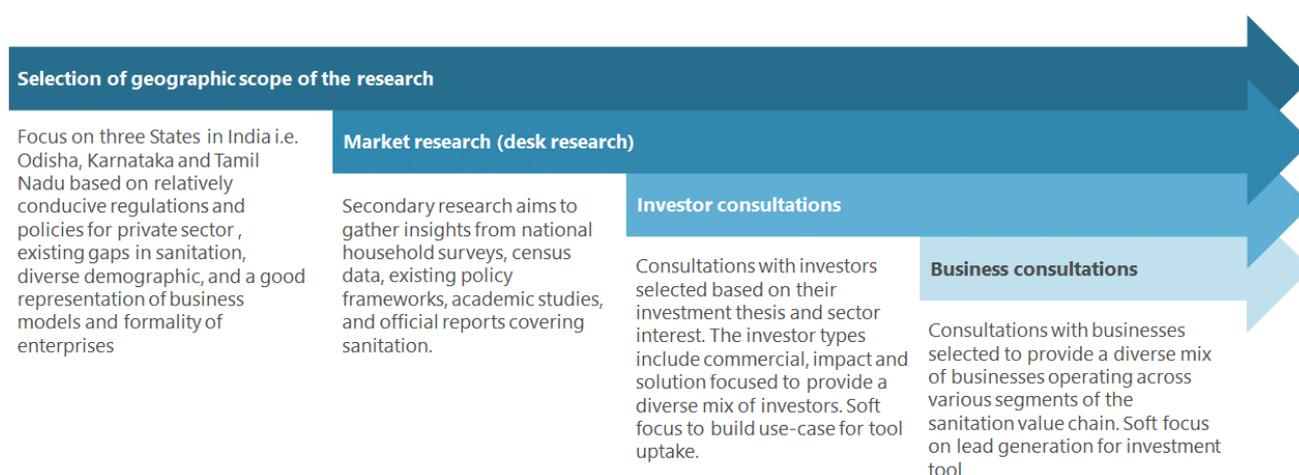
<sup>6</sup> Omidyar Network. (2020). Across the Returns Continuum.

operating across the sanitation value chain, conducive policy environments (Refer [Annexure 1](#) for Policy Memos on each State) and government focus towards delivering sanitation outcomes, and a wide and varied demographics.

Furthermore, focusing our study on the three states will enable sufficient documentation of –

- a. Overall sanitation market potential by emphasizing gaps in existing service delivery and the role that sanitation enterprises could play in filling the gap.
- b. Significance of operating environments by highlighting enabling policies and concerted attention towards integrating private service delivery
- c. Examples of key business models operational in these states

The following visualisation summarises our overall approach that informed the contents of this report –



## Structure of the report

The remainder of the report is structured as follows:

- **Section 2** evaluates the urban sanitation market in India including the market potential, private sector business models across the sanitation value chain, the levels of formality, regulation, and key trends
- **Section 3** assesses the urban financing landscape including an overview of investors, innovative financing structures, and barriers to investment
- **Conclusion** provides a summary of the key enablers that will directly address the investment barriers including but not restricted to the use of our investment tool

SECTION

# 2

URBAN SANITATION  
MARKET IN INDIA

## 2. Urban Sanitation Market in India

**There is immense potential within the urban sanitation value chain to mobilise private sector players to fill infrastructure and service gaps and meet the 2030 target for universal coverage**

India has witnessed rapid progress in improving access to toilets and subsequently contributing to the Sustainable Development Goals<sup>7</sup>. As per the National Sample Survey (NSS) 76<sup>th</sup> round conducted in 2018, a total of 79.8% of households in India have access to latrines. This is a jump of 41% as compared to the 69<sup>th</sup> round conducted in 2012. In urban areas, the findings from the survey show that 96.2% of households have access to toilets and 95.4% of households have access to improved toilets<sup>8</sup>. Government of India's initiatives such as Swachh Bharat Mission (SBM) need a special mention, especially in bringing about a drastic change in behaviour and usage of toilet in the country. This increased access to toilets has widened opportunities for the sanitation marketplace in India. At the 18<sup>th</sup> edition of the World Toilet Summit, the sanitation economy in India was estimated to be US\$62 billion by 2021.

Consequent to the visible progress being made in access to toilets, there is now a need to shift the focus to rest of the sanitation value chain. About 60% of the urban population is still dependent on sub-optimally regulated on-site sanitation systems<sup>9</sup>. Most of the septic tanks do not comply with Indian Standard (IS) code<sup>10</sup>. The existing sewerage system is characterized by fragmented pipeline networks, insufficient treatment capacity, and inefficiencies in capacity utilization<sup>11</sup>. The absence of periodic monitoring<sup>12</sup>, along with limited and infrequent operation and maintenance (O&M) leads to unsafe disposal of FS<sup>13</sup>. These shortcomings, while not ideal, present a significant opportunity and a 'sticky' market for private enterprises and investors to step in and address through market-tested solutions. The following sections explore the scale of opportunity across the value chain and highlight the role the private sector can play in fulfilling these gaps.

---

<sup>7</sup> United Nations Children's Fund (UNICEF) and World Health Organization. (2017). Progress on household drinking water, sanitation and hygiene 2000-2017. Special focus on inequalities.

<sup>8</sup> NSSO. (2019). NSSO report no.584: Drinking Water, Sanitation, Hygiene and Housing condition in India, NSS 76th round (July –December 2018).

<sup>9</sup> Central Public Health and Environmental Engineering Organization (CPHEEO) & Ministry of Housing and Urban Affairs. (2020). Advisory on on-site and off-site sewage management practices.

<sup>10</sup> Dasgupta, S., Agarwal, N. & Mukherjee, A. (2019). Unearthed - Facts of Onsite Sanitation in Urban India. New Delhi: Centre for Policy Research.

<sup>11</sup> Global Recycling. India's Sewage Treatment Policy: Between Dysfunctionality and Multi-Billion Dollar Opportunity.

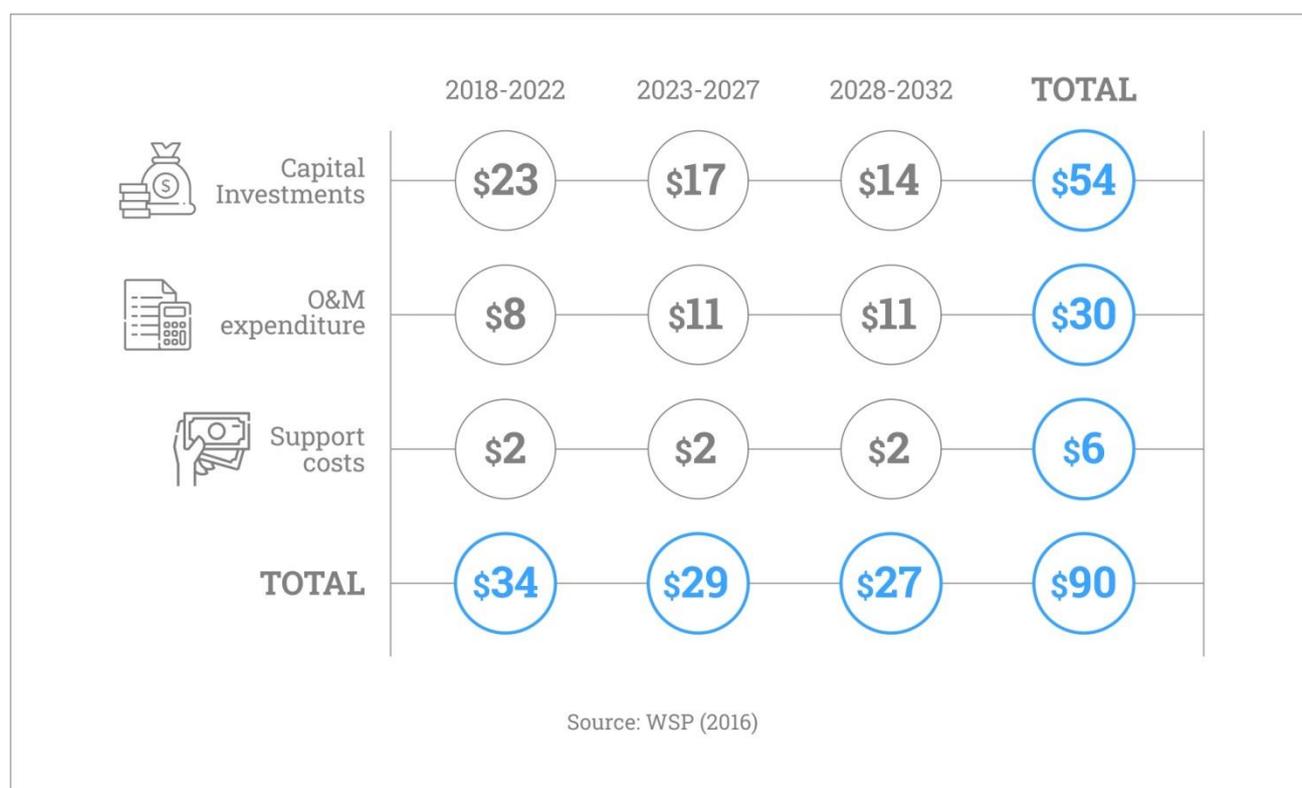
<sup>12</sup> Central Public Health and Environmental Engineering Organization (CPHEEO) & Ministry of Housing and Urban Affairs. (2020). Advisory on on-site and off-site sewage management practices.

<sup>13</sup> Central Public Health and Environmental Engineering Organization (CPHEEO) & Ministry of Housing and Urban Affairs. (2020). Advisory on on-site and off-site sewage management practices.

## 2.1. Opportunity in Urban Sanitation Market in India

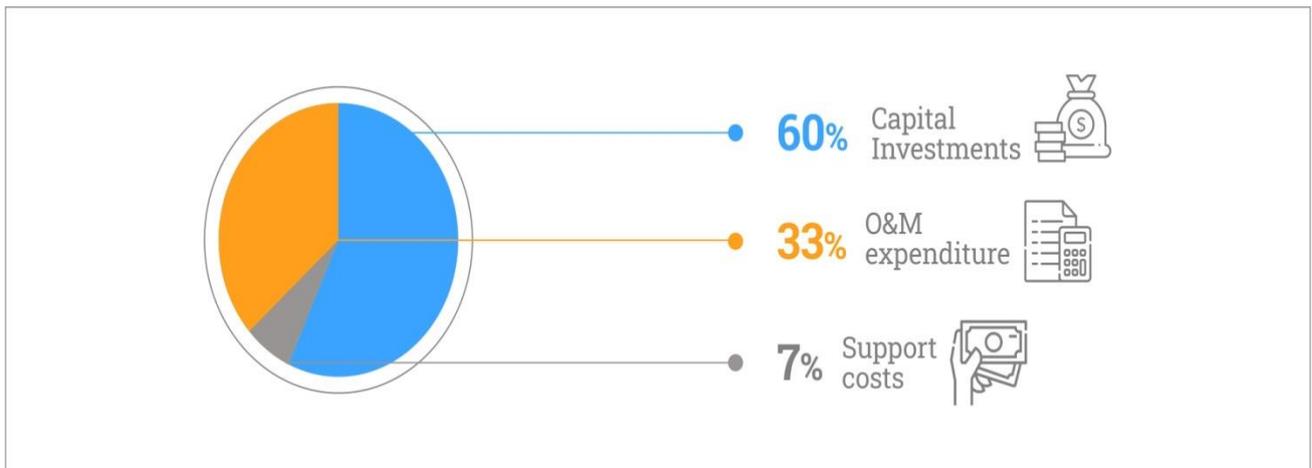
To understand the scope of opportunities in the Indian urban sanitation market for the private sector, it would be pertinent to begin by estimating the overall potential. According to a study conducted by the Water and Sanitation Program (WSP), between 2018 and 2032, there will be a significant capital investment of US\$ 54 Billion<sup>14</sup> (Figure 2.1) required for new construction and replacements separately for community sanitation (public or community facilities), wastewater collection, and treatment (sewer network and treatment plants), septage collection and treatment, and household sanitation (individual toilets including new structures, and for the migration between technology options among existing structures). The percentage distribution of estimated expenditure is represented in Figure 2.2. Demand for O&M and supporting expenditure for community sanitation, septage collection and treatment, and household investments stands at US\$ 36 Billion. This takes the opportunity presented by the Indian sanitation market to a considerable sum of US\$ 90 Billion.

Figure 2.1: Market Potential for urban sanitation in USD Billion



<sup>14</sup> Average exchange rate in 2020: 1 USD~ 74 INR

**Figure 2.2:** Percentage distribution of estimated expenditures in sanitation economy (2018-2032)



The following are some interesting value propositions that can be drawn out for private enterprises and investors, from across the sanitation value chain, by taking a focused approach of analysing the gaps in Karnataka, Tamil Nadu, and Odisha as reference.

### i. Containment

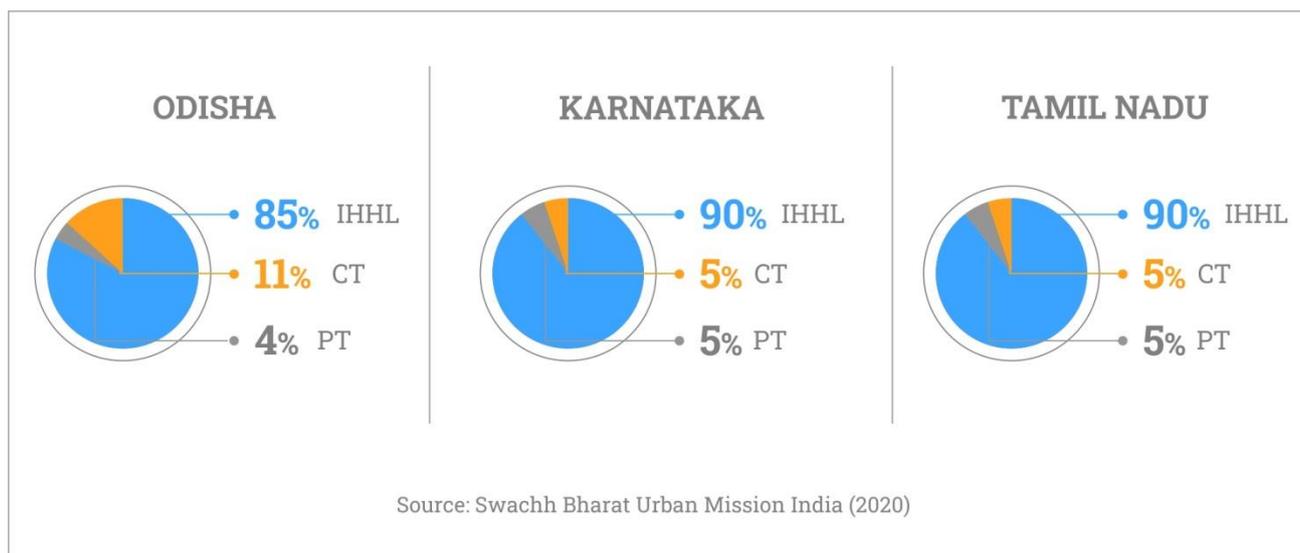
#### **Community Sanitation is a \$1.7 billion market and offers a practical solution amidst rapid urbanisation**

Under SBM, the construction of Individual Household Latrines (IHHL) and Community and Public Toilets (CT/PT) has surpassed the mission targets which shows that gaps in containment have been filled<sup>15</sup>. From Figure 2.3 we notice that there is a high dependence on CT/PT by all three states and is only likely to increase given increasing levels of urbanisation across the board. Therefore, the need for providing safe, accessible, convenient, and hygienic facilities is imminent and significant. However, unlike IHHL, where the onus of upkeep lies on individuals, community and public toilets need third-party agencies to handle the operation and maintenance activities.

---

<sup>15</sup> Swachh Bharat Urban Mission. (2020). *Dashboard*.

**Figure 2.3:** Percentage of Household by containment usage



The need for CT/PT's O&M becomes more apparent in urban areas with heavy footfall gatherings such as railway stations, slums households that lack attached toilets or sanitation connection, and in places with high population of migrant labourers. According to the WSP's study (Figure 2.4), there is a significant market of USD 1.7 Billion that can be tapped into with equal emphasis to both infrastructure creation and ongoing periodic maintenance.

**Figure 2.4:** Market Potential for urban sanitation in USD billion



An effective policy environment can help SMEs undertake O&M functions<sup>16</sup> alongside filling infrastructure gaps. As can be seen from Figure 2.3, there is a high dependence on CT/PT in developing states like Odisha, which has revised its policy focus to include Faecal Sludge Management (FSM) / Septage management in addition to conventional underground sewerage systems.

<sup>16</sup> Dalberg Global Development advisors. (2014). A review of innovative financing options for urban sanitation

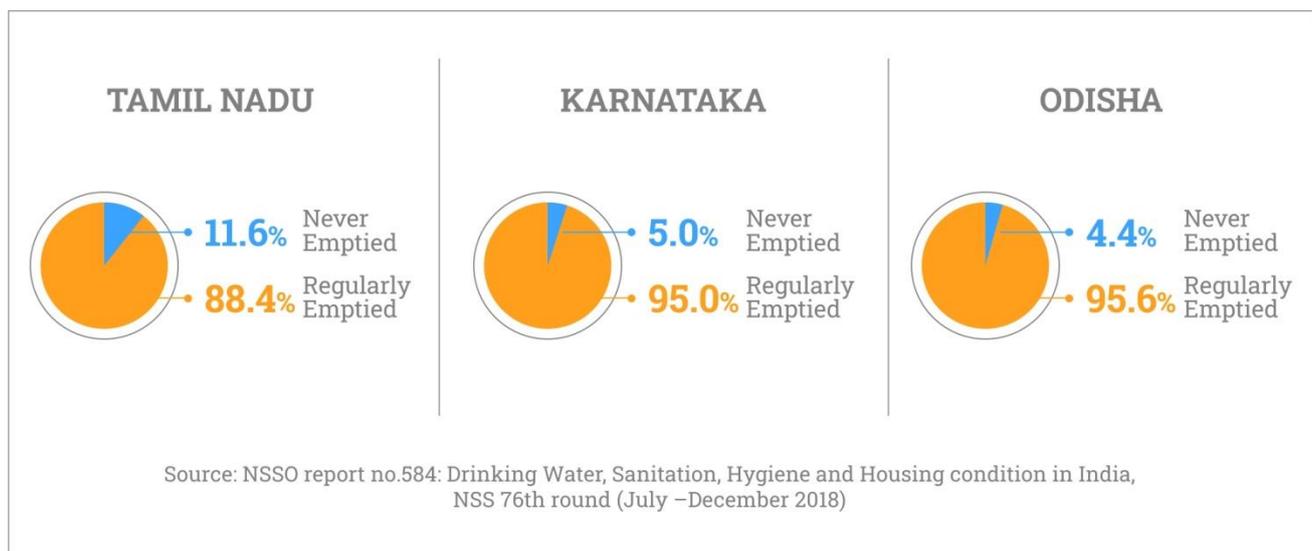
## ii. Emptying & Transport

### High frequency of emptying in both households and community infrastructure across all States offers significant opportunity for organised private emptying & transport services

E&T is a segment where it is critical for SMEs to engage with municipalities and communities in providing their services. The role of the service providers is to empty septic tanks, toilet pits or container toilets and to transport it for treatment<sup>17</sup>, therefore it has the added element of improving health and environmental safety.

Figure 2.5 presents to us the status of emptying being undertaken in households. While the data focuses only on household-level emptying and transportation, the same private operators cater to community/ public containment infrastructure as well. There appears to be a higher need to extend emptying and transportation coverage to households in the relatively developed Tamil Nadu, where more than 11% of households have never had its containment infrastructure emptied, than the developing Odisha, where only 5% of the units need to be emptied. This is understandable given the emphasis of the state government of Odisha to undertake improvements in OSS rather than setting up of expensive sewerage system. Karnataka is faring better in this regard with 95% of the containment units being emptied regularly.

**Figure 2.5:** Percentage of HH emptying from septic tank/pit/composting latrine

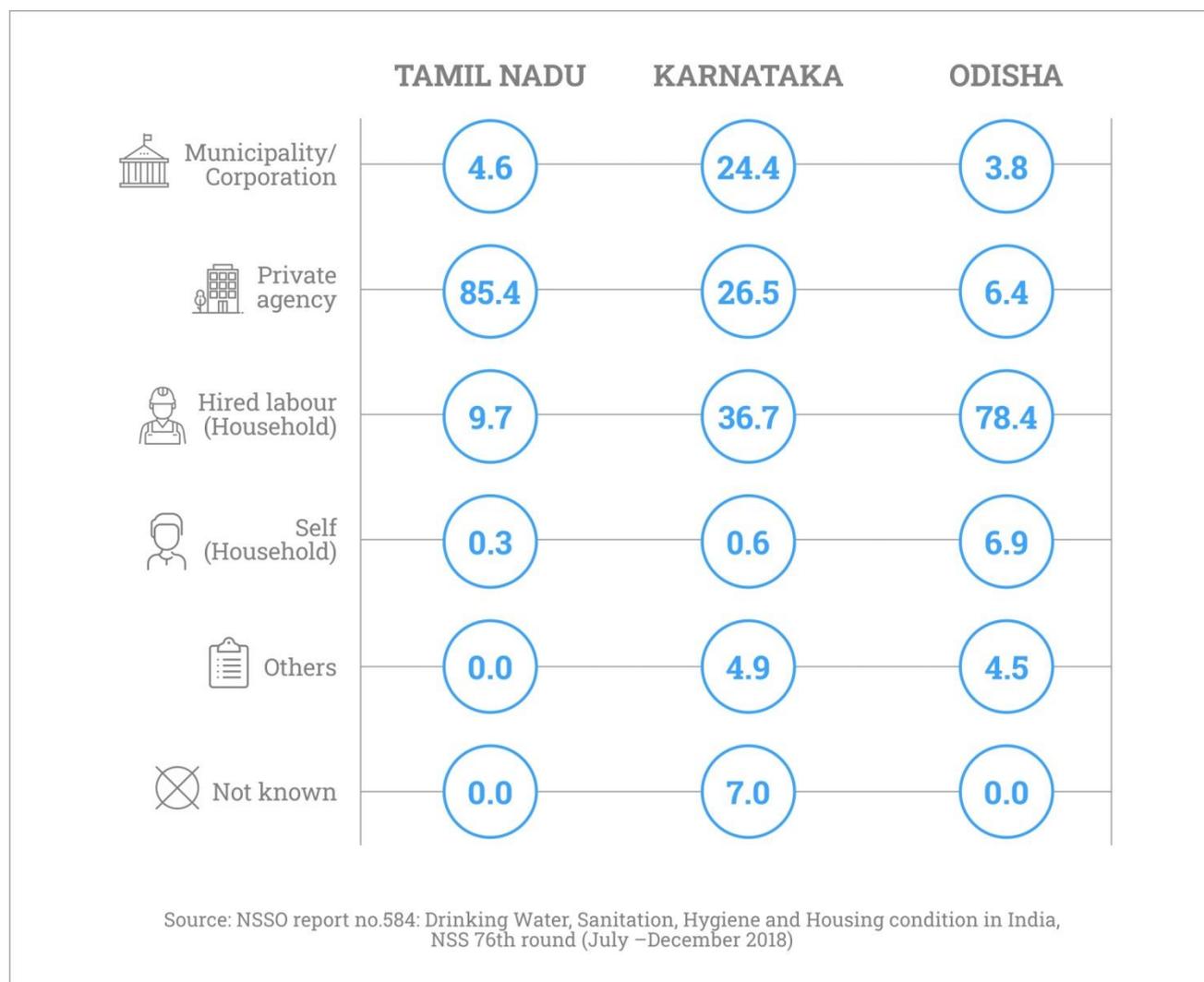


Even though municipalities in Karnataka have been highly proactive in undertaking emptying processes, the market still is fragmented. Trends show local administrations increasingly rely on private sector. For example, Karnataka government has gone beyond the State Level Normative

<sup>17</sup> The World Water Council. (2018). Increasing Financial Flows for Urban Sanitation.

(SLN) standards for SBM and advised that all municipalities ensure that the public toilets are emptied twice a year.

**Figure 2.6:** Percentage of HH emptying septic tank/pit/composting latrine by various agencies

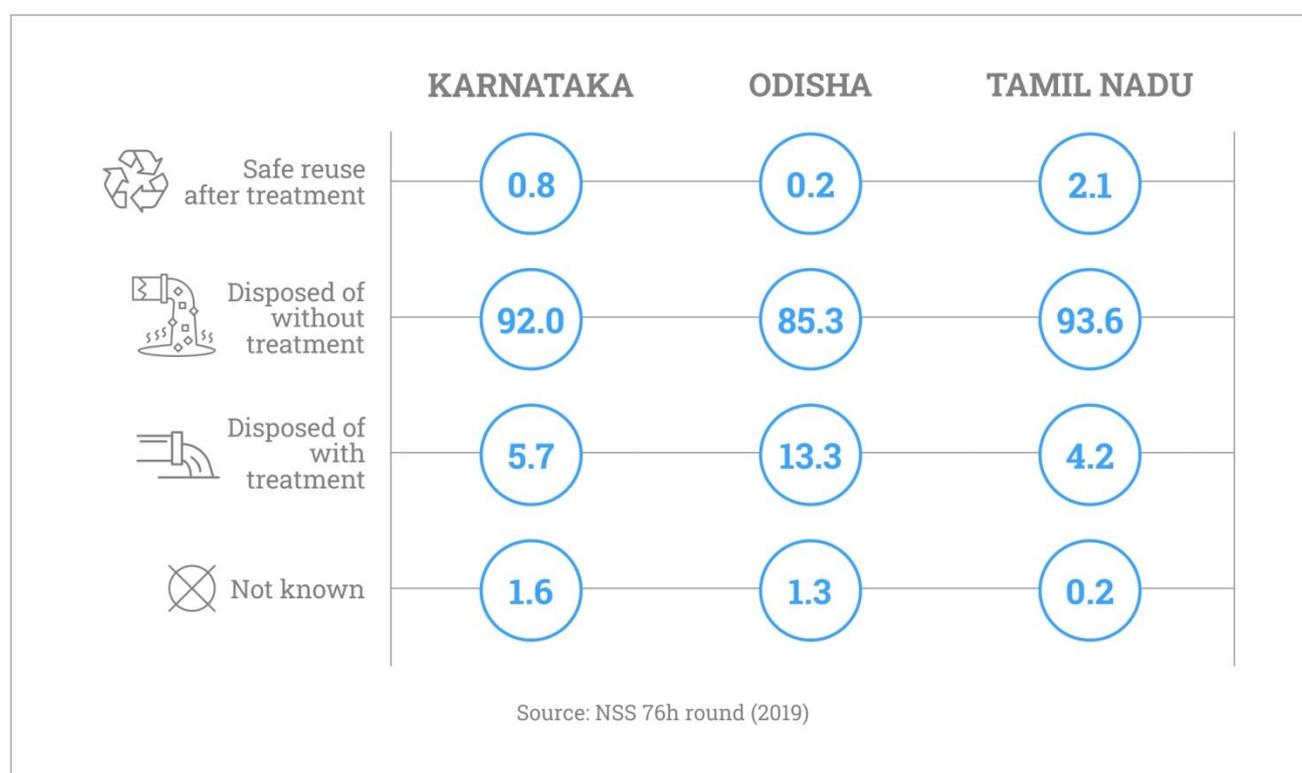


### iii. Treatment and Reuse

Reuse potential in treatment models is currently underutilised and offers additional revenue streams alongside opportunities to enhance energy and food security, and reduce emissions<sup>18</sup>

Indiscriminate discharge of untreated sewage is a major polluter of water sources in India. According to a study by Energy Alternatives India (EAI), urban areas in India produce 120,000 tonnes of faecal sludge daily<sup>19</sup>, but less than 30% of it is treated<sup>20</sup>. The treatment of wastewater is also weak because of insufficient infrastructure and a lack of technical capacity of the ULBs for O&M of STPs and WWTPs<sup>21</sup>. As observed in Figure 2.7, the treatment of wastewater is poor in all three states. The reuse segment is negligible too, as only 0.2%, 0.8%, and 2.1% of wastewater is being reused out of the total wastewater in Odisha, Karnataka, and Tamil Nadu, respectively.

Figure 2.7: Percentage distribution of households by disposal system in urban areas



<sup>18</sup> Rao et al. (2020). *Business Models for Faecal Sludge Management*. International Water Management Institute (IWMI).

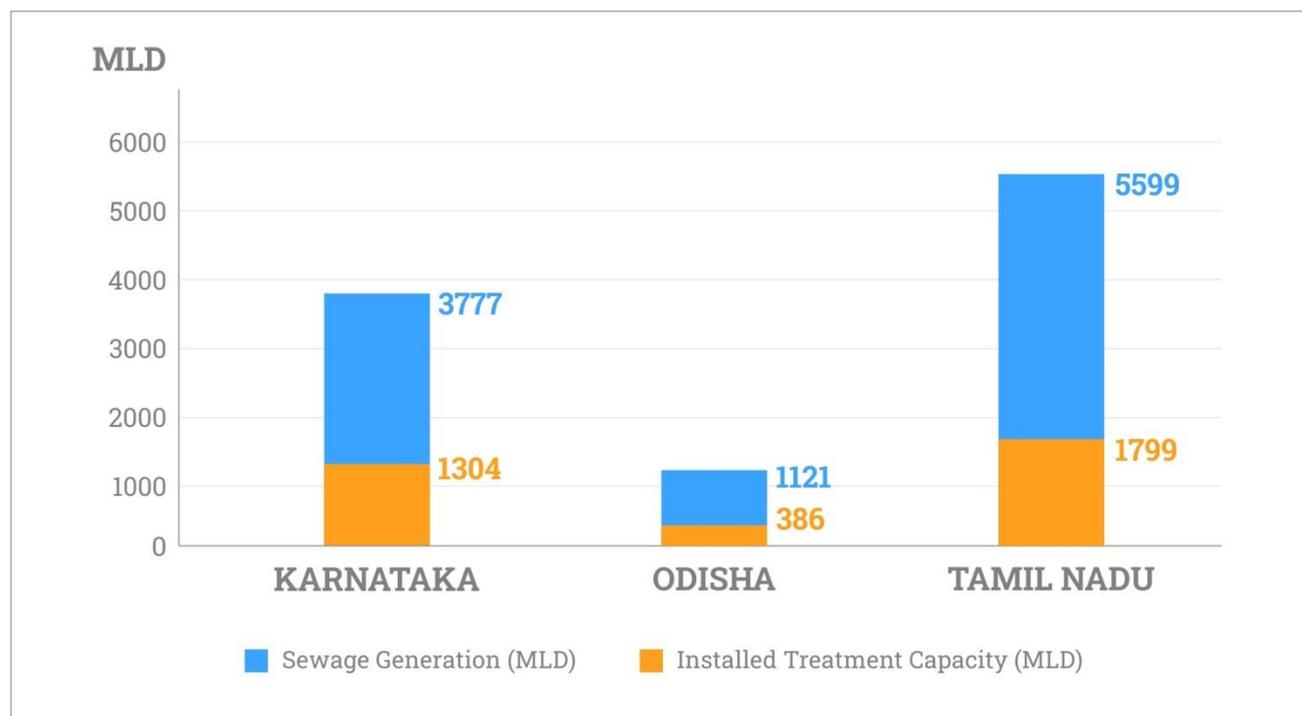
<sup>19</sup> The World Economic Forum. (2019). 120,000 tonnes of faecal sludge: why India needs a market for human waste.

<sup>20</sup> The Times of India. (2019). The hidden opportunity in wastewater reuse.

<sup>21</sup> TERI University. (2017). State of Urban Water and Sanitation in India.

Figure 2.8. further highlights the low levels of treatment capacity in the three states –

**Figure 2.8:** Treatment capacity in each state



Source: Government of India Ministry of Environment, Forest, and Climate Change Lok Sabha Unstarred Question No.2541

Public-private partnerships are a key enabler in situations where public agencies face fiscal constraints to invest in treatment infrastructure<sup>22</sup>. Exploring markets for reuse by targeting the customer segment that uses resources recovered from waste, has the potential to transform sanitation costs to profits<sup>23</sup> by treating waste to produce rich resources<sup>24</sup>. There are, however, challenges around market linkages and low demand from agriculture and allied sectors to enable higher maturity of reuse models. Identifying operational gaps and ensuring demand through strategic partnerships could incentivize investments and improvements in technologies used for reusing human waste<sup>25</sup>.

<sup>22</sup> Central Public Health and Environmental Engineering Organisation (CPHEEO) & Ministry of Housing and Urban Affairs. (2020). *Advisory on on-site and off-site sewage management practices*.

<sup>23</sup> Diener et al. (2014). A value proposition: Resource recovery from faecal sludge—Can it be the driver for improved sanitation? Resources, Conservation and Recycling.

<sup>24</sup> Central Public Health and Environmental Engineering Organisation (CPHEEO) & Ministry of Housing and Urban Affairs. (2020). *Advisory on on-site and off-site sewage management practices*.

<sup>25</sup> Central Public Health and Environmental Engineering Organisation (CPHEEO) & Ministry of Housing and Urban Affairs. (2020). *Advisory on on-site and off-site sewage management practices*.

## 2.2. Key Business Models

Before looking at key business models<sup>26</sup>, it is important to understand certain characteristics that are unique to the private enterprises operating within the sector –

- 1. Grants and concessionary capital are currently integral to the viability of sanitation business models**

This can either come in the form of philanthropic support, CSR, public spending, etc. or through efficient risk-sharing mechanisms with government bodies to bring down costs and improve demand for sanitation services

- 2. For any enterprise in the business of sanitation, the government is its first customer**

Although business models can operate on B2C and B2B service delivery models, there is typically some form of government involvement in either enabling service delivery through policies and regulations or licensing mechanisms. Most business models also rely on PPP contracts to either construct and/ or operate sanitation infrastructure or enter PPP service contracts with the local administration to deliver their service.

- 3. Sanitation business models are inherently asset-intensive**

Sanitation enterprises, small to large, typically hold a high portion of assets on their balance sheet. Financing these assets and options available to various enterprises varies along the value chain.

---

<sup>26</sup> Internal Analysis, Stakeholder Consultations and Secondary Data Sources including –  
CDD Society. (2019). Faecal sludge management: Devanahalli, Bengaluru: First-of-its-kind town-scale faecal sludge treatment plant in India. Bangalore, India  
CDD Society. (2019). Faecal sludge management: Dhanekal, Odisha  
TNUSSP (2017). Desludging Operators in Trichy – An Overview  
Rao et al. (2020). Business Models for Faecal Sludge Management. International Water Management Institute (IWMI).

# 01 | CONTAINMENT

## Non-Residential w/ Recovery

In this model, community and public toilet complexes are constructed to provide toilet access and treat waste at the source. The land for the complexes is provided by the municipality and construction costs are covered by grants from donors and funds from the government. Operating costs are financed from user fees. Toilet complexes are connected to bio-digesters that treat the waste to produce biogas.

### Example Business-

Sulabh builds and operates public toilets linked to bio-digesters. Land and construction costs are typically provided by the municipality and Sulabh operates the toilets for a concession period. The operating costs are recovered through user fees and biogas produced is used for lighting within the toilets or given to nearby households or businesses. Sulabh uses profits generated from profitable toilet complexes to cross-subsidize O&M of community toilets in slums.

Banka BioLoo, founded in 2012, operates a containment and onsite treatment model. Their costs include manufacturing and setting up the toilet and bio-digester tank system. They are paid by their clients (Indian Railways, Government of Andhra Pradesh, Shapoorji Pallonji) through an economic payer model for providing services to the public. Their initial capital was in the form of equity from family and friends. They went public in early 2018 through an IPO in which other investors participated. They also have debt on their balance sheet, in the form of credit lines from banks. Most recently, they have taken a \$1 million loan from Water Equity.

## Business Model Variations

- **Franchising** - The franchisor develops a sanitation system and process, which they sell to franchisees. In return for a licensing fee, the franchisor constructs shared toilet spaces (community/public) for the franchisee. The franchisees are responsible for daily operations, including payment collection, cleaning, and generating user demand for the toilets constructed
- **Subscription** - The subscription business model is where customers pay a fixed recurring price to have access to a toilet. Latrines are provided for in-home or community use, and latrine users pay a recurring usage fee. In return, users have unlimited access during the agreed-upon usage period (e.g., weekly or monthly). The toilet is not owned by the user; it remains the property of the company. The onus of servicing the facility lies with the company. Some ventures provide in-home access, while others provide community access
- **Pay-per-use** - The pay per use model is applicable to both community and public toilets. The user is charged a fixed price every time he/she uses the toilet facility. The expected revenue from the facility should keep the facility in good condition and recover the cost of creating the facility from the users over time

## 02 | EMPTYING AND TRANSPORT

### Private Emptying & Transport

In this model, private operators step in and assist in the provision of emptying and transporting components of the service chain. Operators ensure timely and high-quality emptying services for OSS for a fixed tariff. FS removed is transported and disposed-off at treatment plants or disposal sites. These models however have a higher incidence of government engagement to prevent illegal and unsafe disposal of sludge.

#### Example Business-

Tiruchirappalli City Municipal Corporation (TCC) is the ULB responsible for providing sanitation services in the city of Trichy. The city is serviced by nearly 30 private desludging operators and two vacuum trucks owned by the ULB that predominantly serve the CT/PTs. For disposal of FS and septage collected by operators, TCC has made provisions for co-treatment of FS and septage with sewage by setting up decanting arrangements. The FS and septage collected are disposed of in four sewage pumping stations across the city and treated at the STP at Panjappur. In 2013, TCC introduced a licensing system to regulate private desludging operators in the ensure disposal at designated disposal points. For operating within TCC limits, private operators would pay an annual license fee of INR 2,000 every year and a tipping fee of Rs. 30 for each disposal at designated points.

In Odisha, the Odisha Water Supply & Sewerage Board (OWSSB) is the agency responsible for implementing the sanitation policy in Odisha and procures desludging trucks and allots them to the selected municipalities. In 16 municipalities desludging operations are contracted to private entities. These municipalities and service providers enter a 7-year service contract which mandates the private entity to provide service for 28 days per month and carry out a minimum number of daily trips. The private entity is required to maintain the truck and is penalized if it does not meet the performance targets. The operators are required to install a Global Positioning System (GPS) device on all the trucks, adhere to guidelines on desludging, and have the vehicle inspected and certified quarterly. In most cases, the municipality collects desludging fees and makes monthly payments to the private operator based on the number of trips completed. Alternately, the private operator directly collects desludging fees from the customers.

### Business Model Variations

- **Licensed Emptying & Transport** - In this model, informal service providers are formalized by the municipality or similar agencies through operation licenses. The private service providers are required to pay fixed license fees and renew the license periodically. They may also be required to fulfil certain conditions like having a valid driving license, vehicle fitness certification, GPS installation, or use of PPE for safe handling to be eligible to receive the license. Under the system, the municipality or parastatal agency responsible for the provision of sanitation can regulate desludging tariffs, ensure compliance with desludging standards and protocols by licensed operators and can monitor the operators through customer feedback. Desludging

## KEY BUSINESS MODELS BY VALUE CHAIN SEGMENT

vehicles are owned and operated by private entities and operational costs are covered through the desludging fees. On the downside, licensing can become a barrier to entry for small or new entrepreneurs into the sector, if not designed effectively

- **Transfer Stations** - Transport costs increase with distance from treatment facilities and traffic density. Transfer Station model optimises desludging operations for emptying and transport providers by operating transfer stations where FS collected can be disposed of for a fee. The entity operating the treatment plant can operate the transfer station. The transfer stations can either be fixed underground holding tanks or mobile desludging trucks or tanker trailers
- **Scheduled Desludging** - Under scheduled desludging, containment infrastructure is desludged according to a fixed plan developed by local authorities in consultation with the users. Municipality contracts private service providers for scheduled desludging and transport FS to designated disposal or treatment sites. The business model is implemented through a PPP where the municipality enters a performance-based service contract with the private entity for desludging operations. The private service providers are compensated either based on OSS desludged and the number of trips made to the disposal site or based on the quantity of FS disposed of at the disposal site.

### Add-on to E&T Business Models

- **Call Centres** - In this model, a call centre connects OSS users with private desludging operators. For a fixed annual fee or a percentage of desludging fees, private operators register with the call centre. Payment made by OSS users to the call centre or to the desludging operator directly is shared between the two. Requests for desludging are allocated to the operators registered with the call centre either by a price bidding process, on a rotational basis or based on the proximity to the location of the customer.

GPS tagging will enable identification of the closest operators to the customer if operators are allocated based on proximity. E&T service providers benefit from stable demand and the absence of marketing expenses. Call centres can be owned and operated either by public or private entities closely engaging with municipalities.

## 03 | TREATMENT & REUSE

### Faecal Sludge Treatment Plants

Treatment facilities of varying scales including treatment facilities smaller cities and towns are typically constructed through PPP contracts. For business models that combine treatment and energy recovery, recovery infrastructure is typically housed within the treatment facility and energy generated can be used to operate the facility or can be converted and sold externally with the required infrastructure. There is however an input dependence on organic solid waste for the process.

For business models that combine treatment and nutrient recovery, recovery infrastructure can either be at the same site as the treatment facility or at a different site, in which case the dewatered faecal sludge is transported to the nearest composting site.

#### Example Business-

The CDD Society, an NGO, in collaboration with Bremen Overseas Research and Development Association (BORDA) developed a town scale FSTP and a co-composting unit in Devanahalli, Karnataka. CDD Society along with BORDA designed the plant and supervised its construction. The Bill and Melinda Gates Foundation (BMGF) partially supported the capital and O&M costs for 2.5 years. Land and approvals for construction were provided by Devanahalli Town Municipal Council (DTMC). After the commissioning of the FSTP, the CDD Society was responsible for FSTP operations for about two years, post which, the DTMC awarded an O&M contract to the consortium of Kam-Avida Enviro Engineers Private Limited, the CDD Society, and Cube Bio Energy Private Limited. In June 2019, the FSTP operations were handed over to the DTMC on the expiry of the contract. The DTMC is also responsible for operating its desludging vehicle on a fee for service basis, issuing licenses to private desludging operators, and ensuring FS was disposed of at the FSTP. The co-compost produced is sold to farmers and the payment is collected by CDD Society and transferred to the DTMC after covering incidental costs for maintenance. The treated water is used for landscaping within the FSTP.

One of Odisha's first FSTPs was constructed by Practical Action and CDD Society in coordination with the Dhanekanal Municipality and Government of Odisha in Dhenakal. The town, with around 9000 households was heavily dependent on OSS without proper disposal and treatment mechanisms. Dhenakal FSTP was piloted under Project Nirmal and funded by BMGF and Arghyam. The FSTP to use natural treatment systems for FSM. The operation and maintenance of desludging, transport, and FSTP are integrated and tendered to one service provider, Blue Water Company, and funded by the Dhanekal municipality. Treated FS is sold to local farmers as a soil conditioner and the revenue generated is received by the municipality. The treated water is used for landscaping within the FSTP and recharging nearby water body.

# KEY BUSINESS MODELS BY VALUE CHAIN SEGMENT

## Business Model Variations

- **BOT (Build-Operate-Transfer)** - In the BOT model, the private sector designs, constructs, finances capital expenditure, operates and maintains the assets and returns the same to the ULB or the parastatal body, at the end of the predefined period. Ownership rests with the ULB in this model.
- **DBO (Design-Build-Operate)** - The DBO model allocates design, construction, and operating responsibilities to the private operator while ownership of assets rests with the public sector entity. Public Sector Partner (ULB or parastatal) generally finances the project.
- **O&M Contracts** - In this model, the private sector partner provides operation, maintenance, and management services to the ULB or parastatal. Usually, the private sector is not required to make capital investments. The asset is owned by the public sector and capital expenditure will be the responsibility of the public sector partner. The private developer might be required to pay a license fee to the utility and sources of revenue include user charges, annual operating fees, and reimbursable costs. The operation, management, and maintenance risks lie with the private operator.

## 2.3. Business Model Viability

With this understanding of sanitation business models, a qualitative analysis<sup>27</sup> of the following key dimensions integral to the financial health and bankability of sanitation enterprises was carried out.

1. **Revenue** – whether the revenue streams are adequate to service capital and operating costs
2. **Costs** – whether cost-structure is driven by fixed costs or variable costs
3. **Assets** – whether the assets are movable, liquid, depreciable and whether it can be collateralized

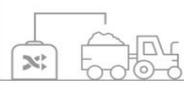
These attributes can be assessed at a value chain level given the relative homogeneity of business models within each segment of the value chain. It is important to note that the revenues, costs, assets, and capital detailed below are representative of potential options for sanitation enterprises within the value chain.

Our analysis is summarized in the table below –

---

<sup>27</sup> Key Informant Interviews with Businesses and Secondary Literature Review

**Table 2.1:** Sanitation Business Model Viability – by Value Chain Segment

Segment	Business Models Identified	Revenue	Costs	Assets
 <p><b>Containment</b></p>	<p>Non-Residential w/ Recovery</p> <p>Franchising</p> <p>Subscription</p> <p>Pay-per-use</p>	<p>User fees for toilet usage</p> <p>Sale of treated by-products</p> <p>Revenue from advertising brands within the toilet complex</p>	<p><b>Capital Costs</b> Land, construction of toilet complex and installation of energy/nutrient recovery unit</p> <p><b>Operating Costs</b> Maintenance of the toilet complex and the resource recovery unit.</p>	<p>Highly immovable assets with specific end-use</p>
 <p><b>Emptying &amp; Transportation</b></p>	<p>Licensed Emptying &amp; Transport</p> <p>Transfer Stations</p> <p>Scheduled Desludging</p>	<p>User fees for desludging services</p> <p>Government fees for desludging services in PPP contracts</p>	<p><b>Capital Costs</b> Desludging trucks and other equipment to desludge and transport faecal waste</p> <p><b>Operating Costs</b> Disposal fees paid to the treatment plant</p> <p>Fuel costs and maintenance of vehicles and other equipment.</p> <p>Licensing fees to municipality to undertake desludging services</p> <p>Call-centre registration and service fee (if applicable)</p>	<p>Light assets, highly movable, relatively liquid because of higher transferability</p>
 <p><b>Treatment &amp; Reuse</b></p>	<p>Build-Operate-Transfer</p> <p>Design-Build-Operate</p> <p>O&amp;M Contracts</p>	<p>Disposal fees collected from desludging operators</p> <p>Revenue from the sale of by-products via co-composting to enable reuse of treated water or treat dewatered FS</p>	<p><b>Capital Costs</b> Land, technology, and construction of the treatment facility.</p> <p><b>Operating Costs</b> Electricity, personnel, chemicals/consumables, equipment maintenance.</p>	<p>Highly immovable combination of assets with specialized end-use</p>

## 2.4 Challenges in accessing finance

One of the significant inhibitors to the growth of businesses in the sanitation sector is the lack of access to viable funding and investment channels. The table below summarises the categories of capital and investment needs that sanitation businesses have and general challenges in accessing that finance<sup>28</sup> -

Financing Need	Challenges
 <b>Working Capital</b>	<ul style="list-style-type: none"> <li>Public sector receivables and contracts are deemed to be high risk</li> <li>Personal guarantee requirements</li> </ul>
 <b>Viability Support</b>	<ul style="list-style-type: none"> <li>Public sector viability gap support requires selection of a private operator through a procurement process, which is often tedious and requires upfront investments by SMEs</li> <li>Very few SMEs have access to donor/CSR funds for viability support</li> </ul>
 <b>Asset Purchase</b>	<ul style="list-style-type: none"> <li>Immovable and specialized assets are harder to finance</li> <li>Purchase of used or refurbished assets are harder to finance</li> <li>Banks and financing institutions offer standard products with limited flexibility in terms</li> </ul>
 <b>Project Financing</b>	<ul style="list-style-type: none"> <li>SMEs have limited capacities to prepare and apply for project financing</li> <li>Transactions take a long time and require pre-conditions to be met by all parties, which is not always under the control of the SME</li> <li>High compliance costs</li> <li>Project financing institutions focus on large value projects due to high transaction costs</li> </ul>
 <b>Growth Capital</b>	<ul style="list-style-type: none"> <li>Very few venture capital funds focus on Sanitation SMEs</li> <li>These funds are interested in funding startups, usually technology-enabled, with potential for rapid scale-up</li> <li>Limited sources to raise follow-on funding</li> </ul>
 <b>Risk Capital for Innovation</b>	<ul style="list-style-type: none"> <li>SMEs have limited access to funding for research and development to propel innovation in technologies and business models</li> <li>Limited sources of funding for innovation. SMEs typically depend on own sources, philanthropies or CSR/industry partners.</li> </ul>

<sup>28</sup> Key Informant Interviews with Businesses and Investors; Secondary Literature Review

SECTION

# 3

URBAN SANITATION  
FINANCING IN INDIA

### 3. Urban Sanitation Financing in India

The market potential across the sanitation value chain has been credibly established by a wide range of research and literature and has been sufficiently documented in the previous section. Additionally, attributes unique to sanitation business models make it difficult for investors to enable businesses to fully realise that potential. This section will address the supply of financing in urban sanitation, with a specific emphasis on private sources of financing.

A key constraint in defining sanitation investors is the relative nascency of investor interest within the sector. According to the International Finance Corporation, only about 8% of total investment in sanitation infrastructure comes from the private sector<sup>29</sup>. Another factor is the sector's dependence on government policy and public institutional discretion at various levels of government. The government is essentially crowding out private players in the sanitation market from receiving funding for their businesses. They are not only tapping into the capital markets but are also front-end receivers of support by way of grants from international organizations. A large portion of this funding is then passed onto to the private players in the form of PPP contracts and outsourcing of project components. The financing crunch and calls for specialized services has meant that private companies in this sector are small in size and constrained in their functioning.

Therefore, investor priorities in the sanitation sector are not limited to only reduction of costs or risks but also depends on other factors like regulations, policy frameworks, competent municipalities, and co-investment opportunities<sup>30</sup>. This warrants a contextualised approach that covers the breadth of current sources of capital outlined in the section on key business models.

Investors in sanitation typically group their investments under the following asset classes –

- **Debt** – repayable financing secured by contracts or receivables; secured by assets purchased or project revenue streams
- **Equity** – seed, early-stage and growth-stage capital that meets different financing requirements based on enterprise maturity
- **Grants and other viability support** – grants (capital and operational) and other philanthropic funding specifically targeted to improve the financial viability of sanitation enterprises

---

<sup>29</sup> International Finance Corporation (IFC). (2015). Leveraging Market Opportunities to Achieve Development Impact: Entrepreneurial Solutions to Improve Access to Sanitation and Safe Water. SSAWA Program Report.

<sup>30</sup> The World Water Council. (2018). Increasing Financial Flows for Urban Sanitation.

### 3.1. Overview of Investors

Table 3.1: Overview of Investors

Investor Category	Investors	Asset Class	Value Chain Alignment
 <b>Commercial Investors</b>	Microfinance Institutions NBFCs Commercial Banks and local lending institutions	Debt & Variants	Containment Emptying & Transport Treatment & Reuse
	Angel Investors Venture Capital Private Equity	Equity & Variants	Containment
 <b>Impact-Oriented Investors</b>	Development Finance Institutions Impact Investors	Debt & Variants	Containment Emptying & Transport
		Equity & Variants	Containment
 <b>Investing for Solutions</b>	Development Finance Institutions Philanthropic Foundations CSR Incubators/ Accelerators	Grants	Overall Sanitation Value Chain

#### Commercial Investors

**Commercial investments in sanitation have been largely limited to asset financing by local financial institutions and a few early-stage investments in innovative startups**

While commercial investors typically do not have an impact focus, it is implicit given the investment is flowing into sanitation. Investments in this category have a key focus on generating financial returns and typically look at risk-adjusted and at-market returns. This could also include co-investments alongside other commercial/ impact-oriented investors, which will improve overall commercial viability of the investment and reduce investment risk.

Direct investments into businesses and commercial debt backed by an underlying asset (emptying trucks, treatment facilities etc.) is the most common instrument within this investor category. Sanitation enterprises are usually seeded with entrepreneur’s personal equity, which quickly becomes insufficient to meet growing capital expenditure or working capital requirements. This requirement is met by MFIs, NBFCs and banks. This has seen traction over the last two to three years with the new Reserve Bank of India regulations which designate loans for construction and

improvement of toilet facilities, and loans to MFIs lending for water and sanitation facilities, as social infrastructure loans under the priority sector<sup>31</sup>

Instances of early-stage equity investments are not a regular occurrence within the sanitation sector, although there are a few businesses with technology-enabled innovation in their business models that have been able to attract institutional equity investments.

**Sanitation Enterprises with a core technology offering have been successful in raising risk and growth capital**

**Fresh Rooms** is a technology-driven start-up focused on setting up public convenience utilities and smart toilets using Internet of Things (IoT). Features of its model include an app that has information regarding the location of facilities, opening hours, accessibility, parking and other features; waterless urinals to trap waste and convert it into urea; solar-powered utilities; sanitary dispensers; UV-protected antibacterial sheets; and temperature control using sensors. After setting up the first facility in 2018, the start-up received a seed funding of around Rs 3 crore from an undisclosed angel investor<sup>32</sup>

Owing to high levels of asset intensity across the value chain and limited revenue streams, sanitation enterprises typically utilise cash flows to service their capital costs. This causes a strain on their day-to-day operations and they find themselves stretched to finance their working capital. Access to working capital finance such as receivable financing or contract financing could help sanitation businesses stay the course and withstand payment or collection delays. SMEs typically obtain working capital finance from banks and financial institutions against their inventory (goods in stock) or receivables (invoices raised against customers).

**TReDS – an initiative by the Reserve Bank of India to provide access to working capital finance**

Trade Receivables Discounting System<sup>33</sup>, TReDS, is an electronic platform for facilitating the financing/ discounting of trade receivables of Micro, Small and Medium Enterprises (MSMEs) through multiple financiers. The TReDS will facilitate the discounting of both invoices as well as bills of exchange. These receivables can be due from corporates and other buyers, including Government Departments and Public Sector Undertakings (PSUs), a key stakeholder in the Indian Sanitation sector. The TReDS is governed by the regulatory framework put in place by the Reserve Bank of India under the Payment and Settlement Systems Act 2007. Platforms such as TReDS can become a boon for sanitation players and help them enhance their liquidity and cashflow.

---

<sup>31</sup> RBI. (2018). Priority Sector Lending - Targets and Classification. RBI

<sup>32</sup> The Indian Wire. (2018). IoT-based sanitation startup Fresh Rooms raises ₹3 crore in seed funding

<sup>33</sup> RBI. (2018). Guidelines for the Trade Receivables Discounting System (TReDS)

## Impact-Oriented Investors

Impact-oriented investors are driven by the capability of businesses to deliver economic, social and/or environmental impact, while earning a risk-adjusted return on their investment. Investors have a defined investment or impact thesis, or both, depending on the organisation's type. Impact-oriented investors could either directly invest in sanitation businesses or indirectly mobilise capital through thematic funds or other commercial investors if the ultimate recipient of the proceeds falls within their impact mandate.

Direct investments by impact-oriented investors typically take the form of equity and its variants, with data showing investors favour equity over debt by a multiple of three-to-one<sup>34</sup>. Limited transactions in the Sanitation market however suggest a preference for debt. One of the biggest incentives of direct impact-oriented investments in segments such as containment or emptying and transport is that cost of servicing debt is relatively lower compared to commercial investors. This enables sanitation enterprises to use their revenue streams to meet the operating costs of business better through cash flows generated through their asset. This leads to potential second and third order effects in the enterprise's ability to increase margins, invest in operational improvements, improve efficiency, and invest in overall growth.

Indirect investments are typically made when large-ticket investors such as Development Finance Institutions (DFIs) and other institutional investors allocate investments into various funds that meet their impact and investment thesis. While there have not been large volumes of impact capital dedicated towards sanitation as a sector, a general focus on improving public service delivery to vulnerable populations has facilitated a few transactions into microfinance institutions and other local lending institutions

### **WaterEquity successfully raises US\$ 50 million to provide funding options for Sanitation businesses**

In March 2019, WaterEquity officially closed<sup>35</sup> the \$50 million WaterCredit Investment Fund 3 (WCIF3), which invests in microfinance institutions, as well as small sanitation-related businesses, in India (45 percent), Cambodia (30 percent), Indonesia (20 percent), and the Philippines (5 percent). The fund offers high-net-worth investors, financial institutions, and foundations a modest target return of 3.5 percent over its seven-year term and aims to provide 4.6 million people with safe water and sanitation at the same time.

The capital structure included a \$22.5 million Equity component, \$27.5 million in Debt (via loans), and the remaining \$5 million as first-loss guarantees. Investee potential is assessed through the following parameters – Risk factors and investment rationale; Operational and financial performance; Management and governance; Capital structure and lender base; Strategy and competitive position;

---

<sup>34</sup> IIC and Bridgespan Group (2020). Giving Credit Where Due: A Case for Debt Financing in Indian Impact Enterprises

<sup>35</sup> Convergence. (2019). Water Credit Investment Fund 3 (WCIF3). Case Study.

Credit score based on a proprietary scorecard; Development impact, including with standards selected from IRIS+; Country risk score; and an ESG score, based on a proprietary scorecard

Some key insights from their implementation experience thus far include utilisation of non-governmental organisations as 'boots on the ground' for sourcing a credible pipeline. WCIF3 selected its pipeline from Water.org's top-performing microfinance partners. Further, blending different types of capital helped WCIF3 take a sustainable market-based approach to accelerating impact. WCIF3 benefited from concessional equity, zero or low-interest debt, and a first-loss guarantee. An undue focus on leveraged capital could have potentially diminished the success that WCIF3 has had in its disbursement and recovery rates.

Like commercial equity, sanitation business models do not have a high propensity to accept impact equity, given the cost structure and operating models that exist.

### **Investing for Solutions**

This category of sanitation investors is an extension of impact-oriented investors. While it is not a typical investor category, given the overall prevalence and a well-documented dependence of grants and other viability funding within the Sanitation sector, it is integral to improve operational efficiencies and foster innovation within sanitation enterprises

Incubators and Accelerators typically focus on solutions and business models that integrate technology and are inherently built-for-scale. Ideas/ early-stage enterprises receive access to technical and business resources that help them refine their business model through multiple rounds of ideation through in-house accelerator/incubator programs, investor pitches, and other networking events that culminates into grants and seed funding for successful ideas. This precludes conventional SMEs within sanitation and focuses on startups with differential business models.

CSR and grant funding in sanitation have typically focused on infrastructure creation to complement public spending and remain consistent with government focus over the last few years. However, there are instances of grants and viability funding towards scalable products/solutions targeting a broad user base relatively easily compared to traditional SME business models. This is a natural extension and represents a shift towards operational innovations that build on existing sanitation infrastructure to offer affordable sanitation services.

**CSR and grant funding have successfully mobilised technology-driven business models in sanitation**

**GARV Toilets**<sup>36</sup> has developed a self-sustaining public toilet infrastructure model that is prefabricated and portable through grants and CSR funding. Their business model integrates a robust design, leading to the higher capex, along with Internet-of-Things (IoT) sensors and RFID technology that dramatically reduces maintenance costs. Information such as usage patterns, equipment status, and maintenance requirements are captured in real-time. Furthermore, the infrastructure is designed to significantly reduce energy consumption and water usage for cleaning and flushing.

GARV has recently started rolling out integrated WASH centres to meet all water, sanitation, and hygiene needs of the end-user. GARV has delivered projects of varying scales in several states in India, as well as Bhutan and Ghana. They have also won a contract to construct toilets for Delhi Metro Rail Corporation.

**Sanitation and Health Rights in India's (SHRI)** community model was developed after consultation with multiple stakeholders including sanitation experts like Sulabh International, community members, and government officials. To solve the dual challenge of drinking water and lack of sanitation facilities, SHRI constructs community toilet blocks that are sustained by the sale of potable water. The toilet block uses a biodigester system for disposal of human waste and generates methane that powers its water treatment and filtration system. Revenues from the sale of this drinking water offset each facility's operation and maintenance costs, making this a self-sustaining model.<sup>37</sup>

This model has enabled SHRI to receive funding support from State governments, including allocation of land, and it has raised additional capital from incubators and accelerators such as Echoing Green, Global Poverty Project, MassChallenge, and Y Combinator<sup>38</sup>

---

<sup>36</sup> Key Informant Interviews with Sanitation Businesses

<sup>37</sup> Gogoi, A. (2019). Free Toilets & Drinking Water: This Trio's Innovation Has Impacted 5000+ Lives.

<sup>38</sup> Jain, A. (2016). Sanitation and Health Rights in India (SHRI).

## 3.2. Investor Risk Perception

True to the complexity of the sector, sanitation investors perceive three main categories of risks. They are

- i. Investment Risk – Risks inherent to viability of business models
- ii. Formality Risk – Risks corresponding to enterprise maturity and formality
- iii. Regulatory Risk – Risks related to the business' operating environment

### i. Investment Risk

**Servicing high capital costs with limited revenue streams results in stretched cash flows for businesses. Working capital finance becomes critical to meet current demand efficiently and create new demand successfully.**

Different financiers emphasize different types of risk. For equity investors, concerns about the potential for growth and profitability are the biggest barriers to investment in the Sanitation sector. Although equity investors may be willing to finance business models in which costs exceed revenues in early stages or which rely on illiquid assets, they need confidence in an enterprise's ability to scale and generate profits over the medium to long term to invest.

In contrast, lenders such as commercial banks or Non-Banking Financial Companies (NBFCs) are hesitant to lend to sanitation enterprises because of their high fixed costs and unpredictable revenues, which raise concerns about repayment. For both investors and lenders, risks associated with Sanitation business models are often compounded by the perceived risks of financing SMEs with relatively limited management capacity.

Key risk concerns to sanitation investors are –

- **Revenue Risk** – low diversity or predictability of revenue streams to provide consistent cash inflows
- **Cost Coverage Risk** – the limited ability to consistently pay operating costs and debt service, arising from either insufficient revenue, high costs, or both
- **Asset Security Risk** – loss of value and illiquidity of underlying assets (either business assets or others used to secure the financing) in case of default
- **Growth Risk** – limited ability to upsell in existing markets or cost-effectively reach new markets
- **Profitability Risk** – the likelihood of low profits or negative profits for investors
- **Management Risk** – the limited capacity to run the business effectively, including ensuring efficient operations, negotiating with other parties, and meeting compliance requirements

## ii. Formality Risk

**Pre-investment support to improve the formality of informal/semi-formal businesses could help unlock impact investment for sanitation businesses.**

The level of 'Formality' of an organization can act as a reliable metric to showcase a business' credibility, irrespective of the size and scale of the business. These are intangible elements that help investors ascertain if the business can identify and exploit profit opportunities while limiting, managing, and mitigating risks. These factors are as important as financial health metrics such as liquidity, solvency, profitability, etc., in determining the investment potential of a business.

The informal nature of many of the sanitation businesses deter conventional lenders such as banks and other non-banking financial institutions, and these enterprises then lean towards personal or informal sources of financing. The following are a few characteristics that investors could use to categorise sanitation business into high, medium, and low bands of formality, before providing targeted pre-investment support to make such businesses more credible and unlock the potential this 'informal' sanitation market holds.<sup>39</sup>

**Table 3.2:** Framework for Formality of Sanitation Businesses

Business Characteristics	Band of Formality
 <b>Legal Structure</b>	<ul style="list-style-type: none"> <li>• High - Registered Company or Registered Cooperative/Trust</li> <li>• Medium - Partnership Concern</li> <li>• Low - Sole Proprietorship</li> </ul>
 <b>Financial Reporting</b>	<ul style="list-style-type: none"> <li>• High - Accrual based complete financial reporting</li> <li>• Medium - Cash based complete financial reporting</li> <li>• Low - Cash based incomplete financial reporting</li> </ul>
 <b>Audited Accounts</b>	<ul style="list-style-type: none"> <li>• High - Quarterly Auditing of Accounts</li> <li>• Medium - Annual Auditing of Accounts</li> <li>• Low - No audit of Accounts</li> </ul>
 <b>Employment Structure</b>	<ul style="list-style-type: none"> <li>• High - Above 75% of the employees are skilled and permanent</li> <li>• Medium - Between 25-75% of the employees are skilled and permanent</li> <li>• Low - Below 25% of the employees are skilled and permanent</li> </ul>
 <b>Internal Controls</b>	<ul style="list-style-type: none"> <li>• High - Internal control procedures for all the organisation's functions</li> <li>• Medium - Internal control procedures for most of the organisation's functions</li> <li>• Low - Internal control procedures for none of the organisation's functions</li> </ul>

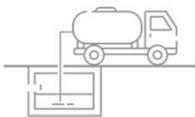
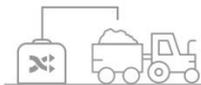
<sup>39</sup> Internal Analysis

### iii. Regulatory Risk

#### Sanitation enterprises and their operations are extremely sensitive to policy and regulatory changes

These changes often bring about significant alterations in local enterprises' cost-structure, pricing strategies, service frequency, labour costs, etc. Sanitation is a state subject in India, and this entails high levels of variability in regulations across different states. The mandate of sanitation services falls under the purview of urban local bodies, with municipality appointed sewerage boards usually requiring additional compliance. (Refer [Annexure 1](#) for Policy Memos on each State) A value-chain based approach to understanding key regulatory risks could help investors to approach factoring such risks into their investment decisions –

**Table 3.3: Key Regulatory Risks by Value Chain segment**

Value chain	Key Risks
 <p><b>Containment</b></p>	<ul style="list-style-type: none"> <li>• Absence of periodic monitoring guidelines on containment structures by owner/municipality/regulatory department, especially for Community/Public Toilets, causes high volatility in demand for construction and O&amp;M services.</li> <li>• Low tariff that is set for O&amp;M contracts of CT/PT, driven by socio-political factors, depreciating the viability of these contracts</li> </ul>
 <p><b>Emptying &amp; Transport</b></p>	<ul style="list-style-type: none"> <li>• Stringent safety requirements for Emptying (use of high-grade PPE kits) and purchase of more advanced mechanical desludging units (MDUs) can cause the costs to escalate, and low revenues and demand fluctuations causes cash flow strain on businesses</li> <li>• Lack of monitoring mechanism causes disposal of faecal sludge and septage by unregulated private desludgers in open land/ water bodies, crowding out the regulated/licensed desludgers that might charge a higher fee for safe disposal</li> </ul>
 <p><b>Treatment &amp; Reuse</b></p>	<ul style="list-style-type: none"> <li>• FSTP/WWTP/co-treatment plants are usually sanctioned via PPP models and they come with high levels of regulatory compliance, including tedious procurement rules, due-diligence, different performance standards and limitations in choice of technology</li> <li>• Public contract management and liaison costs are a major risk owing to extensive coordination with different government departments at varying levels</li> <li>• Need for multiple approvals from various government agencies causes delays in receivables causing a strain on cash flows and ability to cover capital and operating costs</li> </ul>

### 3.3. Barriers to Sanitation Investments

**Despite a few barriers to investment, 'informed' financial structuring and targeted instruments presents opportunities to reduce its effects**

The sanitation sector faces a significant imbalance in the demand for and supply of affordable capital. For the investors and lenders that determine how much capital to supply and on what terms, factors such as high fixed costs and large upfront capital expenditures that heighten sanitation enterprises' demand for capital make these enterprises appear highly risky. As a result, they are hesitant to supply capital in enough quantities to meet demand or on terms that are affordable to SMEs.

The following are the key barriers and potential mitigation measures insights from our analysis that deter the steady flow of investments into sanitation –

- **Private Sanitation Markets are not organized to reap benefits of network effects and scale**

Scale and network effects help reduce overall operating costs within the sector. Small enterprises serve a critical service delivery gap but as illustrated in the previous sections, they have limited revenue streams and are often stretched for positive cash flows to finance operations and growth.

Market-building investments focusing on end-to-end value chain will improve scale and viability and reduce operational inefficiencies along the way. These types of investments could be particularly of interest to DFIs who typically deal in large ticket sizes, compared to small business loans, and can deploy capital strategically in a manner where tested business models can be scaled in every value chain segment.

- **Sanitation Value Chain depends on Public Assets**

Treatment facilities, which are integral to the viability of sanitation enterprises focused on containment and desludging, is often owned by the government. While private enterprises operate these treatment facilities, their reliance on public procurement guidelines and operator requirements determine the economics of entire value chains in towns and cities.

Investments in end-to-end sanitation solutions and in containment and desludging could improve operational efficiency and increase throughput waste treated in these FSTPs. Governments in India run cluster FSTPs<sup>40</sup>. to consolidate waste from neighbouring towns/ cities to improve the viability

---

<sup>40</sup> Tamil Nadu Water Supply and Drainage Board (TWAD) was commissioned by Tamil Nadu Urban Sanitation Support Programme (TNUSSP) to construct a cluster FSTP in Karunguzhi to serve Karunguzhi town and Maduranthakam municipality. TWAD managed the construction and operations for the first year while IIHS provided technical support. GoTN is financing the capital and O&M cost until 2021. In November 2018, the cluster FSTP operations was handed over to the KTP. Karunguzhi Town Panchayat (KTP) provides license to private desludging operators and collects disposal fees from the operators. While KTP handles the FSTP operations, Hand in Hand, an NGO, is contracted by KTP to operate an SWM facility to produce compost from the dried sludge produced in the FSTP. The compost produced by the SWM is sold directly to farmers, and the revenue from the sale of compost is given to the KTP.

of overall treatment operations and focusing value chain investments in these regions could be ideal to address this barrier.

- **High depreciation levels in sanitation assets result in unfavourable investment terms**

Some SME business models depend on assets with high depreciation – notably desludging enterprises, whose primary assets are vehicles that depreciate quickly due to wear and tear. High depreciation means it is difficult to obtain long-term financing for the asset or at higher costs of capital and this results in difficulties in servicing its debt. New financing structures and instruments that introduce liquidity into businesses backed by receivables/ contracts will smoothen cash flows and reduce liquidity risk for Sanitation enterprises.

- **Large upfront capital costs, often on illiquid assets, limits ability of the business to scale**

Many Sanitation business models require substantial upfront capital expenditure on assets such as toilet facilities or treatment systems. Often, these assets are difficult to transfer or resell because they are immovable, highly specialized, or both. This translates to high levels of fixed costs and is often compounded by unpredictable revenue, variable demand, and intense competition. This significantly inhibits their ability to attract growth capital.

Equity Investors typically fund business models that are asset-light and/ or driven by marginal costs. Targeting businesses that have integrated technology into their business models to reduce operational costs and have financed their capital costs through grants/ concessionary capital could be ideal recipients of risk and growth capital.

- **Limited incidence of business models that have outgrown grants or concessionary capital**

This has been clearly documented in the report. However, this also provides a significant opportunity to blend development capital with private capital to scale sanitation service delivery and unlock the economic value within sanitation value chains.

This can be structured to enable sanitation enterprises to finance capital expenditure through grants and/ or concessionary capital and operating costs can be covered by revenue recovery and provision of timely credit at market-determined rates with adequate repayment terms based on contracts and receivables. The most promising business models might also be able to receive risk/ growth capital that is bound to help the sector achieve scale at a faster rate.

This could additionally help crowd in large ticket investors and emphasis should be on robust structuring and inclusiveness of investment mandates in such type of arrangements.

- **Public support is integral to private service delivery**

Governments may be more willing to cover capital expenditure or provide land for installing sanitation facilities such as public toilets if the business demonstrates it has sufficiently low costs and sustainable revenue streams to continue to provide affordable, safe and high-quality services to the public over the long term.

Emphasis on cost optimization and improvement in asset efficiency may lead to better cost coverage, potentially lead to more diverse revenue streams. Securing government support – without creating a dependence on the public sector for revenues – can then position sanitation enterprises to attract additional sources of capital.

- **Sanitation Investments carry a high degree of overall risk and there is limited data to prove otherwise**

Limited to low availability of data and evidence of private sector viability in a largely informal sector filled with small-scale and community-driven business models will not make an investor confident.

However, the nature of the underlying service offering, sector being a steady recipient of public funding, a large and growing market for sanitation enabled by rapid urbanization is an ideal investment destination for private capital. The creation of strong data ecosystems around business viability is key to fully tap the potential of urban sanitation markets and achieving universal access to safely managed sanitation

### **3.4. Innovative financing structures**

**While there has been a limited incidence of innovative financing structures, precedent transactions and possible financing structures offer potential for ‘market-building’, pooling different types of capital and financing operational improvements along the entire value chain**

Commercial investors are driven by investments that are risk-adjusted and at-market returns. This could exclude sanitation enterprises deemed risky due to irregular cash flows and high-risk. Even if loans are approved by commercial investors, these perceptions lead to applying a high-risk premium and high financing costs to the projects. Enterprises that have revenue streams dependent on government contracts typically receive stringent terms by banks owing to counterparty risks. In impact investing, even when impact investors are keen on funding sanitation projects, low IRRs often act as a hurdle for sanitation enterprises to access the funding. To address these gaps, innovative financing structures such as setting up an asset financing special purpose vehicle (SPV), pooling funds through blended finance, and using development impact bonds offer a promising way to protect struggling enterprises.

- i. **Asset Financing through Special Purpose Vehicles (SPV<sup>41</sup>)** refers to the setting up of a dedicated SPV having ownership of assets used by sanitation enterprises. The enterprises pay a fee to the SPV to carry out their operations. Assets are important in improving the creditworthiness of sanitation enterprises as they are a key factor used by investors for evaluation. These assets may be community toilets, desludging trucks, or treatment plants to name a few. Investors evaluate these assets based on the ability of these assets to generate future cash flows. Pooling stable assets as per risk will appeal to investors with different risk preferences. Using an SPV for asset financing is attractive because of the contractual nature of the cash flows as compared to collateral-based financing. This securitization of debt is reassuring for investors and enterprises also get access to the required finance.
- ii. **Blended Finance** links public finance and private capital in a way that supports the goal of efficient service delivery<sup>42</sup>. It consists of using instruments such as equity instruments, debt instruments, mezzanine instruments, guarantees and insurance, hedging, grants, and technical assistance to mitigate risks<sup>43</sup>. Blended finance is mutually beneficial to both the public funder and commercial investor. Public funder can provide grants to help sanitation businesses reduce risks and build confidence in investors<sup>44</sup>. This division of funds ensures that the enterprises get additional funding from commercial investors alongside managing the interests of investors. Blended financing aims to align with a development rationale, increase mobilization of commercial finance, tailor blended finance to a local context, ensure effective partnership, and monitor results<sup>45</sup>. The core nature of blended financing lies in creating effective partnerships between commercial investors, public funders, and credit enhancing agencies. SMEs particularly benefit from such financing structures as their cash flows prevent them to access finance from traditional investors who seek low risk and dependable cash flows.

**Govt. of Tamil Nadu support 13 ULBs by raising blending public funds with capital market issuances**

The Tamil Nadu Urban Development Fund (TNUDF)<sup>46</sup> was established as a public-private partnership to encourage private domestic financing for infrastructure investments. However, TNUDF could not reach small & medium-sized local bodies as these urban local bodies could not afford bond issuance fees, legal costs, and they did not have a credit rating. As a response to this, the state government of Tamil Nadu (GoTN) created the Water and Sanitation Pooled Fund

---

<sup>41</sup> Key Informant Interviews and Consultations with Investment Enablers

<sup>42</sup> UNICEF. (2019). Making an Investment Case for WASH.

<sup>43</sup> OECD. (2018). Making Blended Finance Work for the Sustainable Development Goals.

<sup>44</sup> The World Water Council. (2018). Increasing Financial Flows for Urban Sanitation.

<sup>45</sup> OECD. (2019). Making Blended Finance Work for Water and Sanitation.

<sup>46</sup> The World Bank Group. (2016). Case studies in blended finance for water and sanitation.

(WSPF), a type of special vehicle purpose that caters to the financing needs of small urban local bodies. The WSPF Bond received grants from the government, capital from private institutional investors, credit guarantee from USAID/DCA. These funds were pooled together to provide sub-loans to 13 ULBs. The ULBs would repay this amount to an escrow account which would be directed back to the WSPF bond as part of debt service repayment. The private institutional investor receives bond coupons in return. This arrangement had successful outcomes as the bond helped to mitigate risks and its structure was strong enough to be accredited with a high AA rating which was crucial in selling it.

- iii. **Development Impact Bonds** incentivise efficient provision of sanitation products and services, tie grant usage to the achievement of development outcomes and attract new sources of investment capital by distributing risk among investors and outcome funders. DIBs bring together private investors and corporates, as well as the government, and that shifts the credit facility assessment from a solely risk-based model to one that includes impact-based assessment as well". By utilising DIBs, governments and outcome funders reduce financial and operational risks, whilst promoting investment and innovation; for investors, it offers a "mission-aligned" investment opportunity that can create a positive impact as well as financial returns; and for social enterprises and other sanitation-focused organizations, it offers upfront funding to develop, refine and scale their business models. The first development impact bond in the water and sanitation sector, the Cambodia Rural Sanitation Development Impact Bond, was launched by iDE, the Stone Family Foundation and USAID, with support from Social Finance. DIBs represent a shift from a 'pay-for-services' model to a 'pay-for-success' model and will provide a performance-based approach to contracting, service delivery, and disbursement of funds. Our fund tracking dashboard will help enable this shift by setting the foundation for performance management in sanitation investments and bridging a critical information gap on stock and flow of private sector financing

SECTION



CONCLUSION

## Conclusion

Achieving SDG 6 in India is estimated to cost USD192 billion by 2030.<sup>47</sup> Despite the high priority placed on Water and Sanitation by the Government of India, public resources alone will not be adequate. The report identifies the following factors as key enablers to successfully achieve universal access to sanitation –

### **Enabler #1 – Targeted Public funding alongside private capital**

While there is a consensus that public financing and traditional channels such as transfers, taxes, and tariffs are not enough to address wide-ranging gaps in urban sanitation, the report views public funding as a critical enabler to crowd in commercial and development capital. Even if public budgets at both the central, state, and local levels continue to grow, non-public financing is essential to bridge the financing gap.

Public funding has the potential to encourage private investments through:

- Fund-matching efforts in capital investments
- Creating financial vehicles and clear regulations
- Fostering innovation, through tech incubators and procurement pipelines
- Creating service professionalization programs, loan guarantees, and capacity building for SMEs

### **Enabler #2 – Building Sanitation markets with strong value chain linkages**

The second key enabler to fully tap private sector potential in Sanitation is building strong markets with positive linkages. As outlined in the report, there are market failures right from how enterprises are organized to the overall economics of demand, supply, costs, and revenue streams of services along the value chain.

Development capital, especially, DFIs and other philanthropic organisations should focus their time, attention, and resources towards creating higher market linkages between different sanitation segments and approach sanitation investments by systematically unlocking bottlenecks along the value chain. Viability of business models operating in containment, emptying and transport, and treatment and reuse, are intricately linked to each other and inefficient linkages in one segment have a cascading effect on the overall value chain.

Efficient markets operating at a maximum scale will automatically attract investments. Enabling government policies and high prevalence of private enterprises that exists currently is a good starting point to build such efficiencies.

---

<sup>47</sup> Standard Chartered, "Opportunity 2030: The Standard Chartered SDG Investment Map." <https://www.sc.com/en/insights/opportunity2030/>

### **Enabler #3 – Steady investments in R&D and innovation to reduce operating costs and develop market-tested solutions**

The third key enabler to steadily attract capital is investing in innovation. There is very limited attention afforded towards research and development in sanitation technologies that will improve operating efficiencies at scale and is limited to incubators, accelerators, and CSR funding. Given the relative stickiness of sanitation demand, investments, that enable pilot technologies to be tested and refined in smaller markets before scaling up, will provide a steady stream of improvements in overall access to safely managed sanitation. This will help build an investable pipeline of sanitation enterprises and will incentivise the flow of risk capital into the sector. Further secondary benefits include increased adoption of technology in conventional business models when tested innovations exhibit tangible results and higher efficiencies in public spending.

### **Enabler #4 – More and better information about Sanitation businesses**

The fourth and the final key enabler is information gap that exists regarding the investment potential of sanitation enterprises. While this report has attempted to address this to some extent by highlighting specific attributes about sanitation business models that drive access to financing, some of the typical financing challenges they face and introducing a framework for formality of sanitation businesses – data availability and existing systems maintained and managed by these businesses is a 'black box'. While we intend to collect and analyse data from a few sanitation businesses through the course of the investment platform development, the situation warrants concerted attention towards building a database of Sanitation enterprises and investing resources towards building a strong information ecosystem about investability in different business models within the sector. This will significantly reduce transaction costs for investors, ease due diligence, and improve the evidence base on financial performance and impact of sanitation investments.

# ANNEXURE

## Annexure 1

### Policy Environment for Urban Sanitation – Odisha, Tamil Nadu & Karnataka

1. Karnataka State Sanitation Strategy
2. Odisha Urban Sanitation Strategy, 2017
3. Odisha Urban Sanitation Policy, 2017
4. TNUSSP, 2016. Behaviour Change and Communication Strategy
5. TNUSSP, 2017, TNUSSP Practice Brief #1, Legal and Institutional Arrangements for Sanitation in Tamil Nadu
6. TNUSSP, 2017, TNUSSP Practice Brief #2, Capacity Building for FSM in Tamil Nadu
7. TNUSSP, 2018. Knowledge Management and Exchange Strategy
8. TNUSSP, 2020. Systems and Procedures for Urban Sanitation in Tamil Nadu

### Odisha

The 2011 census identified Odisha along with Jharkhand and Chhattisgarh as the top three contributors to urban open defecation in India. While the urban population in Odisha grew from 37 million in 2001 to 42 million in 2011, the inter-district urbanisation levels vary considerably. Nearly half of the urban population is concentrated in four districts. 35 percent of the urban households were identified as not having access to toilets and only around 58 percent with toilet access have water closets. The traditional outlook of underground sewerage as the only response for sanitation requirements have neglected the needs of on-site sanitation systems prevalent in the State. The census data revealed that the practice of constructing septic tanks and connecting it to open drains is rampant as the sanitation value chain is poorly developed and negligibly monitored. Odisha identified that a revised policy for Faecal Sludge Management (FSM) / septage management in addition to conventional underground sewerage systems is needed for achieving the targets of Swachh Bharat Mission (SBM) and Sustainable Development Goals (SDGs). The State also required its urban sanitation policy to incorporate a river basin pollution abatement policy to protect its major river basins from the open discharge of raw sewage. Urban Local Bodies (ULBs) in Odisha suffered from capacity constraints in managing the sanitation requirements of the population. These developments led the State of Odisha to introduce the Odisha Urban Sanitation Policy in 2017.

The Policy envisions that “ all cities and towns in Odisha become totally clean, sanitized, healthy, and liveable, ensuring and sustaining good public health and environmental outcomes for all citizens, in line with the National Urban Sanitation Policy” and will be “managed by ULBs with citizen and stakeholder participation”. The policy is based on 6 major principles:

1. Sanitation will be treated as a basic service.
2. Equity and safety of access and use shall be ensured, particularly to the vulnerable and unserved population.
3. Efforts shall be undertaken to increase the awareness of the collective goal of sanitised cities.
4. Institutional roles and responsibilities will be defined, and the capacity will be developed.
5. There shall be emphasis on operations and maintenance of sanitation infrastructure.

6. Integration of broader environmental concerns in the provisions of urban sanitation service delivery.
7. Technologies and solutions shall be chosen based on their appropriateness to the context of the cities and towns where they are to be implemented.

The policy sets out to achieve 6 outcomes in a span of 10 years:

1. All urban areas will be Open-defecation (ODF) and open discharge free (ODF+/++). ULBs will be responsible for ensuring all households, city residents and the floating population within cities have access to adequate sanitation infrastructure. ULBs will adopt appropriate and safe technology for construction, maintenance and management of sanitation infrastructure and ensure effective maintenance of the same. ULBs will also undertake initiatives for generating increased awareness about sanitation, public health and hygiene, and environmental pollution and protection to bring about a behavioural transformation among citizens.
2. Solid waste is safely managed & treated and minimal waste will be sent to landfills. The strategic interventions proposed will include reduction of waste, segregation of waste at source, scientific storage, transport, treatment, and disposal. ULBs will network with the informal sector in the Municipal Solid Waste system, including ragpickers and kabadiwallas, to ensure effective segregation and disposal of waste. They will also engage with the citizens through awareness campaigns to make source segregation and disposal more efficient. The policy aims at creating value out of waste and produce a paradigm shift from garbage as 'disposable' to 'renewable resource'.
3. The State will implement City Sanitation Plans and Sewerage and Septage Management guidelines to ensure Sewage, septage / faecal sludge and liquid waste are safely managed, treated, and disposed.
4. ULBs and State will ensure that safety standards and guidelines are strictly followed in the physical handling and management of waste
5. Women and girls will have access to safe menstrual hygiene management.
6. Cities/towns do not discharge untreated waste (water and faecal waste) into the water bodies of Odisha.

The Housing & Urban Development Department (HUDD) of the Government of Odisha is responsible for developing a strategy to implement the policy covering all 6 outcomes, along with the necessary institutional framework, provisions and guidance for planning, monitoring, evaluation, capacity building and funding. A High-Powered Committee chaired by the Chief Secretary will provide policy direction and overseeing the planning and implementation of the state urban sanitation policy while the State Sanitation Directorate acts as the implementing agency at the State level. At the district level, District-level Review & Monitoring Committee (DLRMC) and District Urban Sanitation Committee (DUSC) will be responsible for monitoring and implementing urban sanitation programmes, schemes, and strategies along with ULBs. ULBs will consist of a City Sanitation Task Force (CSTF) and City Project Implementation Unit (PIU).

To incentivise ULBs to improve their performance in the provision of sanitation, the State institutes an assessment scheme. This will encourage competition and transparency in sanitation actions among ULBs and improve the provision and monitoring of sanitation services and outcomes. State Sanitation directorate will introduce initiatives in association with specialised agencies of the government, NGOs, and private sector organizations, for providing training on sanitation to ULB staff and sanitation workers and development of systems and capacities of ULBs in sanitation.

## **Karnataka**

Karnataka is the 7th most urbanised state in the country and accounts for 6.28% of the country's urban population. As the level of urbanisation in Karnataka increased from 33.99 percent in the 2001 Census to 38.57 percent in 2011, it was also identified that 10.7 percent of the urban population in Karnataka resorts to open defecation. 15.1 percent of urban households have no latrines while 12 percent have pit latrines. Only 53.3 percent of the total urban areas have access to a piped sewer network and 17 percent have septic tanks. The Karnataka Urban Water Supply and Drainage Board (KUWS& DB) is the implementing body for water supply and underground Drainage projects in 276 ULBs of the state except Bangalore city, which is managed by Bangalore Water Supply and Sewerage Board.

Key challenges identified in the sanitation sector of the state include open defecation, lack of access to safe and sanitary toilets at the household level and in public places, lack of awareness among the urban poor regarding safe sanitation practices, imperfect sanitation value chain, inadequate and inequitable water distribution, inefficient treatment and disposal systems for waste water and inadequate and poor drainage system. The State also faces challenges in providing adequate sanitation infrastructure in slum areas and managing industrial waste.

The vision of the Karnataka Urban Sanitation Policy is that "All cities and towns of Karnataka have access to safe, affordable and hygienic sanitation as a basic human right with an integrated and scientific treatment approach for positive public health and environmental outcome".

This State Sanitation Strategy (SSS) provides a framework for improving and sustaining sanitation and hygiene service delivery for all citizens and eliminate open defecation. The strategy aims at a shift from a supply-driven approach, with a strong emphasis on technologies to a demand-management approach, with emphasis on behaviour change and services responding to community and consumer demand.

The State Sanitation Strategy identifies seven major goals:

1. Achieving ODF cities through promoting construction and ensuring maintenance of household and community toilets and public sanitation facilities linked to efficient faecal sludge management systems.
2. Ensuring 100% scientific handling of all human waste across the sanitation value chain.
3. Improving institutional governance in sanitation sector by prioritising sanitation requirements, strengthening state city and local institutions undertake sanitation provisions and strengthening regulatory framework on sanitation service delivery.

4. Ensuring community participation to enable sustained behaviour change regarding sanitation through awareness campaigns.
5. Ensuring technological efficiency across provision of sanitation services.
6. Establishing and ensuring compliance with benchmarks and guidelines for sanitation facilities.
7. Ensuring inclusivity of all stakeholders in planning and implementation of sanitation programs.

The guiding principles of the State Sanitation Strategy are:

1. Identifying access to hygienic and dignified sanitation as a basic human right and ensuring provision of the same to all.
2. Prioritising sustainable development in all sanitation solutions.
3. Improving awareness and promoting behaviour change for sustainable solutions in sanitation.
4. Promoting decentralisation by strengthening ULBs to provide sanitation services.
5. Focus on sanitation to achieve integrated development.
6. Focusing on a participatory approach in providing sanitation services.

The SSS strives to achieve the Sanitation Goals underlined in the policy in a phased manner. The short-term goals include facilitating the construction of toilets, ensuring maintenance of existing toilets and achieving ODF in all ULBs. Medium term goals are completion of the construction phase, laying UGD to existing individual, public and community toilets and establishing infrastructure for wastewater treatment facilities. Completion of UGDs, upgrading technology infrastructure to improve system efficiencies and sustaining ODF status in all ULBs are identified as the long-term goals of the SSS.

The State Mission on Urban Sanitation headed by Urban Development Minister provides overall guidance and policy direction to urban sanitation initiatives in the state and oversees the planning and implementation of the SSS while the State level Nodal Agency on Urban Sanitation (SSNA) facilitates the implementation of the SSS. At the district level, District Level Monitoring Committee (DLMC) monitors the implementation of urban sanitation programmes. City Sanitation Task Force (CSTF) within the ULBs will be tasked with designing, implementing, and monitoring the sanitation promotion programs in the respective ULBs.

For efficient monitoring and evaluation of sanitation service provisions, Karnataka has introduced sanitation ratings and ranking exercises for the ULBs in the state linked to reward schemes. The State has identified the need to institutionalise incentives to encourage ULBs to prioritise sanitation and plans to enforce achievement of defined benchmarks and linking funding with progress towards achieving service level benchmarks. ULBs are encouraged to promote the participation of primary stakeholders i.e. users of services in planning and implementation. State also plans to introduce citizens' report cards, citizens' monitoring committees, self-assessment system, inter-city competitions, concurrent evaluation, and third-party assessments as monitoring tools for improving urban governance of water and sanitation services.

The capacity of ULBs in the State needs to be improved for efficient provision of sanitation services. The SSS aims at strengthening ULBs through adequate staffing and defining Annual Action Plans for Urban Development Department and ULBs. The State will establish dedicated centres with adequate domain expertise to address the sanitation training needs of the state department and ULBs with funding assistance from the Ministry of Urban Development (MoUD). Municipal Cadre will be created to help in improving the performance of the urban local bodies and attract qualified people to the services. Enough capacities will be established in higher education and vocational training to enable state and city departments to execute sanitation obligations. Capacity building programs targeting artisans (builders, pump mechanics, well sinkers), planners, community mobilizers, hygiene promoters, and community leaders will be introduced to ensure public participation.

### **Tamil Nadu**

As per the 2011 Census, 48.4 per cent of Tamil Nadu's population live in urban areas, making it one of the most urbanised states in India. In terms of sanitation arrangements, on-site sanitation systems (OSS) remain the dominant household sanitation arrangement, with nearly 67 percent of urban households connected to septic tanks. Recognising the missing links in the sanitation value chain which contributes to inadequate sanitation facilities, the Government of Tamil Nadu (GoTN) issued the Operative Guidelines (OG) for Septage Management in 2014.

Sanitation deficits identified in urban Tamil Nadu include the practice of Open Defecation (OD) despite having access to toilets at home, poorly constructed septic tanks leading to leaks, irregular desludging and maintenance of tanks, unsanitary disposal of collected sludge, inadequate treatment facilities and constraints in their capacity utilisation and piecemeal approach towards septage management.

The State Government's Mission for Total Sanitation, Muzhu Sugadhara Tamizhagam, is a campaign aimed at achieving 100 percent sanitation coverage across the State of Tamil Nadu. Tamil Nadu Urban Sanitation Support Programme (TNUSSP), launched in 2015, is an integral part of the mission which supports the government in identifying governance mechanisms to sustain and scale FSM solutions across the State, building capacity to implement FSM of a range of stakeholders including government officers, desludging operators and masons, and behaviour change towards improved hygiene and safe sanitation practices within urban communities including students.

In Tamil Nadu, the Municipal Administration and Water Supply Department (MAWS) is the principal department responsible for planning, design, and execution of urban sanitation initiatives. The Tamil Nadu Water Supply and Sewerage Board (TWAD) is the main engineering agency for implementing all water supply and sewerage schemes outside the Chennai Metropolitan Area. The Corporation of Chennai and Chennai Metro Water are separate entities whose jurisdiction of services is limited exclusively to the Chennai Metropolitan Area.

The Muzhu Sugadharam campaign identifies the need for the State to become the custodian of sanitation to address the issue of multiple laws and actors governing the provision of sanitation in Tamil Nadu, devolution of sanitation service delivery to ULBs, provision of capacity building and training for sanitation workers, encouraging communities to take ownership of FSM and involvement of private players as stakeholders.

Muzhu Sugadharam identifies Behaviour Change Communication (BCC) as an important component for efficient sanitation service provision. The BCC strategy for Muzhu Sugadharam addresses three major objectives:

1. Campaigns to address the taboo and stigma associated with sanitation
2. Encourage sense of ownership and responsibility among individuals and households towards sanitation outcomes.
3. Encouraging ULBs and Urban sector agencies to prioritise initiatives in Full Cycle Sanitation and Septage Management

BCC campaigns are planned in two variations: Umbrella campaigns which address broad, overarching issues like propagating septage management as a viable alternative to Under Ground Drainage (UGD)/sewerage based solutions and creating awareness regarding the importance of sanitation workers in the value chain, and specific campaigns which will be based on smaller, more specific topics.

The roadmap for promoting urban sanitation in Tamil Nadu is identified in three phases. Phase 1 focuses on immediate actions for identifying issues across sanitation value chain, identifying appropriate treatment technologies and incentivising pilot actions and mobilising community groups. Phase 2 focuses on implementation of constructions, enforcing scheduled emptying and safe disposal and bringing in policy reforms. Phase 3 involves setting up monitoring and evaluation systems, increasing involvement of private sector and strengthening sustainability of sanitation services. State Investment Plan was developed to create adequate treatment facilities based on two core principles – utilisation of existing treatment facilities through co-treatment of septage with sewage and adoption of a cluster approach, wherein ULBs are clustered around an existing or new treatment facility. The implementation of SIP is envisioned in 5 phases where phases I and II focus on the co-treatment of septage and sewage, and phase III, IV and V on the creation of Faecal Sludge Treatment Plants (FSTPs).

Capacity building initiatives implemented by TNUSSP targeted officers from the administrative level, Public Health and Engineering departments of ULBs, masons and desludging operators. Training programmes for masons aim to create awareness regarding the role of masons in safe sanitation, providing an orientation in FSM concepts and training in construction of safe and leak-proof septic tanks and twin-pit latrines. Sessions for de-sludging operators focused on vehicle design, occupational safety procedures to ensure safe sanitation practices and equipment to be used for safe de-sludging and transport.

## Annexure 2

### Stakeholder Engagement

The following is a list of stakeholders consulted and/or earmarked for engagement through the course of the investment platform development. The businesses listed represent a non-exhaustive universe for the key business models identified in the market research phase. The investors and enablers are institutions that either has investment precedents in sanitation or have an impact thesis that broadly includes water and sanitation and/ or urban vulnerable groups.

<b>Sanitation Businesses</b>	<ol style="list-style-type: none"><li>1/ Banka Biolo</li><li>2/ Vision Earthcare</li><li>3/ Earth Recycler Private Limited</li><li>4/ TBF Environmental Solutions</li><li>5/ Tide Technocrats</li><li>6/ Blue Water Company</li><li>7/ Jalodbust</li><li>8/ Garv Toilets</li><li>9/ Saniverse</li><li>10/ Sarvo Technologies</li><li>11/ CDD Society</li><li>12/ Elefo Biotech</li><li>13/ Lootel</li><li>14/ Seamak Group</li><li>15/ Fontus Water Pvt. Ltd.</li><li>16/ Ion Exchange (India) Ltd</li><li>17/ SS Engineering Corporation</li><li>18/ SaraPlast Private Limited</li><li>19/ Eram Scientific</li><li>20/ Ekam Eco Solutions.</li></ol>
------------------------------	---

	21/ Kam-Avida Enviro Engineers
<b>Investors &amp; Investment Enablers</b>	1/ International Financial Corporation 2/ CDC Group 3/ Rockefeller Foundation 4/ Toilet Board Coalition 5/ Asia Venture Philanthropy Network 6/ Aavishkaar Group 7/ Take-a-Stake Fund 8/ Impact Future Project 9/ Elevar Equity 10/ Osprey Foundation 11/ Lok Capital 12/ Global Steering Group for Impact Investors 13/ Caspian Fund 14/ Acuite Ratings 15/ Social Alpha 16/ Acumen Fund 17/ SIDBI Venture 18/ CGTMSE 19/ Aditya Birla Capital Advisors (ABCAP) 20/ New Venture Fund 21/ LGT Venture Philanthropy 22/ Ventureast 23/ Indian Angel Network

24/ Grassroots Business Fund

25/ Unitus Capital

26/ Take-a-Stake Fund

27/ Kinara Capital

28/ Origa Leasing

29/ Annapurna Microfinance Pvt Ltd (AMPL)

30/ Shriram Transport Finance Company



# THE IMPACT PROGRAMME