

PUMP UP

Towards achieving
financial and
environmental
sustainability
among privately
operated desludging
businesses in India

2020

Anindita Mukherjee

Shubhagato Dasgupta

Kshitij Jaiswal

Arushi Gupta





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ACKNOWLEDGEMENTS

This report was prepared under the research programme, Scaling City Institutions for India,

funded by the Bill and Melinda Gates Foundation (BMGF). We thank the officials of the

Chennai Metropolitan Water Supply and Sewerage Board, Public Health Engineering

Department (Government of Goa), Ujjain Municipal Corporation and Jabalpur Municipal

Corporation together with their smart city teams for giving us their valuable time for

interactions. We also thank the operators of private desludging trucks in Delhi (Aya Nagar),

Bhubaneshwar, Jaipur and Dehradun for their valuable time and business insights. We would

also like to acknowledge Mr Prashant Arya for his contributions towards the study findings.

All the findings and conclusions remain the sole responsibility of the authors.

SUGGESTED CITATION:

Dasgupta, S., Mukherjee, A., Jaiswal, K., Gupta, A. (2020). Pumped Up: Towards achieving

financial and environmental sustainability among privately operated desludging businesses

in India. Centre for Policy Research: New Delhi. DOI:



1 INTRODUCTION

1.1. Need for analysing private sector participation in desludging services

On 2nd October 2019, the Prime Minister of India marked the occasion of Mahatma Gandhi's 150th birth anniversary by declaring India as an Open Defecation Free (ODF) country and acknowledged the efforts made under the Swachh Bharat Mission (SBM). The SBM showcased a paradigm for transformation of access to sanitation, Information Education and Communication (IEC) activities and behaviour change among the citizens.

The statistics from the Department of Drinking Water & Sanitation, Ministry of Jal Shakti state that India attained 100 per cent sanitation coverage in 2019, as opposed to a mere 38.7 per cent in 2014. To enable this feat, approximately 100 million household toilets have been built in rural India, while 6 million individual toilets and 0.5 million community and public toilets (CTs/PTs) have been constructed in the urban centres of the country (MoHUA, 2019). However, the statistics of the 76th round of the NSS, conducted by the National Statistical Office, revealed that merely 71.3 per cent of the households in rural areas and about 96.2 per cent of the households in urban areas had access to a latrine facility (National statistical Office, 2019).

As per Census 2011 figures, approximately 50 per cent of the country and 12.6 per cent urban population practiced open defecation (OD). The coverage of piped sewer system stood at 32.7 per cent during 2011,

and has increased to merely 37.71 per cent in 2018 (76th NSS Report) (Figure 1). While India's largest cities have centralised sewage systems, complete with underground pipes, pumping stations, and treatment plants (Chaturvedi, 2017), the presence of sewer systems in the country has been limited, despite the focus of national programmes like AMRUT on the provision of the same. These systems require high O&M costs, uninterrupted power supply, skilled operators, and extensive maintenance, resulting in underutilised capacity and un-operational treatment plants.

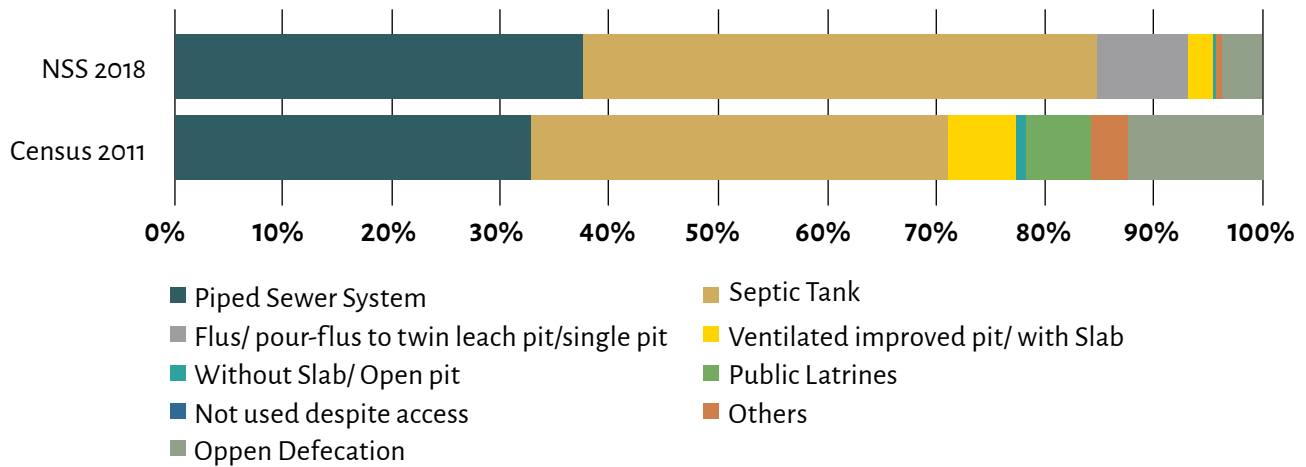
In the absence of a universal sewerage network, there is an increased reliance on On-Site Sanitation (OSS) systems, such as single pit latrines, twin pits, and septic tanks, among others. Census 2011 statistics revealed that 38.2 per cent and 6.4 per cent households were relying on septic tanks and ventilated improved pits respectively. Owing to the extensive toilet construction since the launch of the SBM, the use of septic tanks in households increased to 47.04 per cent by 2018, with 8.37 per cent households using twin leach pits or single pits. According to a CPR study, the most commonly occurring OSS system is a large primary treatment unit – the septic tank – which discharges inadequately treated effluent into open drains, and the majority of these are single chambered. On the other hand, the self-sustaining twin leaching pits are gradually emerging, which are designed to overcome the deficiencies of the single pit and allow on-site transformation of faecal sludge

into a compost, to improve soil and crop fertility (Tilley, Ulrich, Lüthi, & Raymond, 2014).

National policies in the last few decades have taken cognisance of the need for improving access to sanitation, and have also highlighted the role of the private sector towards the same. The National Urban Sanitation Policy, launched in 2008, advocated the strengthening of private entities to accord priority to sanitation provision, including planning, implementation and O&M management. It also highlighted the role of Public Private Partnerships (PPPs) in respect of key projects/activities identified in the city sanitation plan. However, the launch of the National Policy on Faecal Sludge and Septage Management (NFSSM) in 2017 was the pioneer in recognising the imminent need for addressing the safe management of faecal sludge and septage. It also encouraged the role of the private sector in safely managed sanitation and guided cities towards undertaking steps to engage private businesses in FSM.

The issues of safe and sustainable sanitation are also attaining traction in rural India, which continues to be heavily dependent on OSS systems and also has a greater prevalence of OD, in comparison to urban India. To further leverage the benefits of the toilets constructed under SBM, the Rural Sanitation Strategy for 2019-2029, prepared by the Ministry of Jal Shakti, also emphasises the requirement of high managerial and operational competence to ensure sustainability and utilisation of investments in sanitation.

FIGURE 1: Distribution of households as per the toilet facilities (Census 2011 and NSS 76th round)



1.2. Disparity in the demand and supply of desludging services by the ULBs

It is common knowledge that the faecal sludge collected and contained in septic tanks and other OSS systems needs to be periodically removed and treated before it can be safely disposed into the environment. However, as rapid urbanisation has increased the demand of desludging services, a significant gap for these services emerges for the existing as well as the newly constructed toilets, which is being addressed by an informal market of private service providers, unbeknownst to the Urban Local Bodies (ULBs).

While the Urban Local Bodies (ULBs) are traditionally responsible for providing Faecal Sludge Management (FSM) services, there remains a major disparity in the demand and the supply of service provision by the ULBs. The challenge of limited ULB capacity is further exacerbated by the burgeoning size of the urban population and the consequent increase in the need for services along the entire sanitation value chain.

Moreover, as validated by CPR case

studies, the prevailing OSS systems are heterogeneous in nature – they do not follow the IS codes, coexist with groundwater sources, and are emptied highly infrequently as they are much larger than the recommended sizes. Further, despite the inherent benefits of self-sustainability of the twin-pit system, it was observed that they lack the functionality for alternating use, thus defeating their purpose (Dasgupta, Agarwal, & Mukherjee, 2019). As a result, it is extremely difficult for the ULBs to evaluate the different typologies of OSS systems that exist within their jurisdiction and provide the corresponding services for FSM.

1.3. Proliferation of an informal market of private businesses for desludging services

Against this backdrop, many Indian cities are witnessing participation from small-scale entrepreneurs who are addressing the demand for desludging and treating the collected faecal sludge from the existing and the newly constructed toilets under the SBM, majority of which are connected to OSS systems. These entrepreneurs provide services rang-

ing from emptying/desludging the OSS systems, transporting the collected faecal sludge, and operating treatment facilities for the same. However, in most cases, private sector participation (PSP) in the FSM sector is laced with informality and unsafe practices like indiscriminate open dumping of faecal sludge, disuse of personal protective gears and standardised equipment, among others.

The lack of capacity within the designated government bodies for adequate service provision, coupled with the increased efficiency brought in by the private sector, necessitates the inclusion of the private sector as a means for efficient execution of service delivery. There is a looming need to account for the steady mushrooming of the informal private sector and analyse the prevailing business practices in this market. Facilitated by the findings of the preceding report on PSP – “Bridging the Gap: Opportunities for Private sector Participation in Faecal Sludge and Septage Management”, this report endeavours to outline recommendations to streamline the informal market of private operators and maximise their potential.



2 OBJECTIVE, APPROACH AND METHODOLOGY

2.1. Objective: To enable the market of desludging services work better and more efficiently by optimally regularising the informal sector

The existing models of service delivery across regions are diverse and exclusive, which cannot be encompassed in national policies which recommend standardised solutions. It has also been observed that local governments have a limited understanding of the prevailing gaps in their unique sanitation ecosystems, and the specific synergies that private partnerships can achieve. The situation is further complicated with recent programmes advocating for a one-size-fits-all approach.

This report envisages to contribute towards an enabling environment for private entrepreneurs, which will require localised policies and programmes, pertaining to specific requirements of the city/state, as determined by the ULBs. Through an analysis of the prevailing practices in the formal and informal markets of desludging businesses, this report outlines recommendations pertaining to economic, planning and management decisions undertaken by the ULBs, working in tandem with private entrepreneurs. These recommendations are based on the underlying principles of financial and environmental sustainability, to contribute towards outcomes that facilitate efficiency and enable these markets to further the agenda of universal sanitation service delivery.

2.2. Approach and methodology: Evaluating eight Indian cities to outline recommendations for best practices

Through case studies of eight Indian cities – Aya Nagar (Delhi), Jaipur, Bhubaneswar, Dehradun, Panaji, Chennai, Ujjain and Jabalpur – CPR aimed to evaluate the extent of PSP in the collection and conveyance of faecal sludge services across these cities (Mukherjee, Arya, Dasgupta, & Chhabra, 2019). The case studies attempt to encompass the dynamism and the variability that was observed in the informal markets for desludging services.

It was observed that private operators practiced open dumping in four of the cities studied – Aya Nagar (Delhi), Jaipur, Bhubaneswar and Dehradun. Further, the ULBs in these cities barely interacted with the private operators and had minimal awareness about the extent of such businesses. The operators also exhibited a disregard of the standard and recommended desludging practices, consequently manifesting environmental and public health hazards in their practices.

On the contrary, the market was heavily regulated in the cities of Jabalpur and Ujjain. In Jabalpur, there were no licencing policies for private operators and the incumbent private businesses were also brought under a municipal contract. As a result, the demand for the private operator in Jabalpur was routed through the ULB, thus deterring them from operating

independently. In the case of Ujjain, the service delivery was solely provided by the ULB, with no private participation and lack of licensing policies for the same. The markets of Jabalpur and Ujjain were also characterised by a lag in FSM service delivery, and standard service delivery charges were determined by the ULB in Jabalpur, thus creating an unsustainable business environment and leading to the crowding out of private operators.

In the case of Panaji and Chennai, relatively developed markets were observed, wherein the private market was successfully working in tandem with the ULBs. These markets were regulated by state level policies which enabled the private operators to charge the consumers market determined prices, enabling them to optimise business practices and transform them into profitable avenues. This was also corroborated by the assessments of the preceding study on PSP by CPR (Mukherjee, Arya, Dasgupta, & Chhabra, 2019), which found that the markets of Panaji and Chennai were more profitable in comparison to those of Jabalpur and Ujjain.

Although the advocacy of PSP in FSSM service delivery has gained significant traction, governments at all levels need to reevaluate the scale and scope of the policies addressing private sector participation in FSM. Through an underlying business modelling exercise, this report attempts to evaluate various models for PSP in FSM, and strengthen the understanding vis-à-vis private and public partnerships. The recommendations thus outlined aim to suggest the optimal degree of

government intervention in private businesses to achieve service efficiency.

Limitation of the study:

The eight case studies were conducted in two phases – in 2017

and 2018. Since then, numerous state-level policy changes in the domain of FSSM have been introduced, which have altered the local FSSM contexts and business operations. Insofar, while the findings from these case studies

may be outdated to an extent, the recommendations outlined in this report aim to inform a long-term understanding of the FSSM sector, focusing on the wide-ranging policy changes for future interventions.





3 CREATING A NEW BUSINESS MODEL BASED ON THE KEY TAKEAWAYS FROM CASE STUDIES

The base assumptions for the purpose of this study are informed by the informal markets, as observed through CPR studies, wherein it was observed that the ULBs lacked awareness regarding the desludging businesses operating in their jurisdiction. Based on the case studies, this model assumes a “Base Case” wherein the average price charged per trip to serve the request in such cities is INR 1000 (USD 14), and indiscriminate open dumping is practiced. In addition to the price per trip and the practice of open dumping, the key assumptions of the Base Case are outlined as follows:

Key Assumptions of the Base Case

- Price charged per trip is INR 1000
- Indiscriminate open dumping is practiced
- There is a single truck serving all the desludging requests in the area/city
- The price is independently determined by the private operator
- The private operator does not follow any regulations pertaining to licensing requirements for operating a septic tank emptying service, taxation, use of protective equipment or designated dumping at a treatment facility
- There are no planning or city management restrictions imposed on business activities
- There is no demand segmentation and price differentiation between consumers

3.1. Financing Assumptions

Capital Expenditure:

TABLE 1: Capital expenditure of a single truck business operator

Item	Cost	Depreciation Rate
Truck/Tractor	₹12,00,000	10%
Container	₹5,00,000	25%
Pump and Pipe	₹3,00,000	33%

- o Container and pipe & pump replaced after every 4 years and 3 years of operation respectively
- o 30% down payment is made for the total Capital Expenditure
- o Interest on loan is pegged at 24% p.a., and the loan is taken from an informal source, owing to the absence of an institutional source of credit
- o The term of loan repayment is 5 years

Operational Expenditure:

TABLE 2: Operational expenditure of a single truck business operator

Item	Cost
Fuel Cost	₹70 per litre
Maintenance cost	₹15 per trip
Cost of Driver	₹100 per trip
Cost of Helper	₹50 per trip
Rent	₹1000 per month

- o Annual rate of inflation is assumed to be 3.5%

3.2. Operating Assumptions

- The business operation captures a market share of 50% and 75% in the first and the second year of operation respectively, and is able to attain a 100% market share from the third year of operation
- There are 25 working days in a month
- There are 4 requests served per day on an average
- There are 1200 requests served in a year
- There is absence of a designated treatment facility and the operator has to pay monthly rents to the vigilant authorities to be able to carry on open dumping.

Through a business modelling exercise undertaken with the stated assumptions, the average annual Return on Investment (RoI) for a ten-year business cycle was calculated at 49%.

3.3. Introduction of a Designated Treatment Facility in the Business Model

To further understand the variability of the business costs, this model also assumes the availability of a designated treatment facility. In this case, as the operator will have to practice dumping of the collected faecal sludge at a designated facility, the additional distance thus travelled will not only impact the fuel costs incurred, but will also impose a tipping fee on the operations. Further, the operating costs will vary vis-à-vis the distance travelled to the treatment facility, to account

for which, this model assumes two designated dumping facilities at two different spots for the business and estimates the costs incurred in each of the following cases:

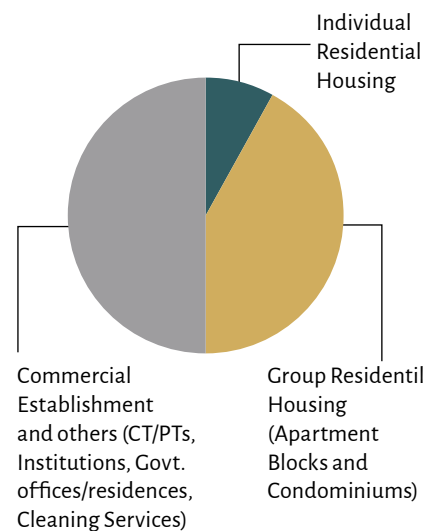
- A nearby treatment facility is assumed to be at a distance of 5km (10km roundtrip)
- A distant treatment facility assumed to be at a distance of 15km (30km roundtrip)

3.4. Demand Segmentation

The customers of faecal sludge emptying services are broadly divided into two categories: Standalone “Household Customers” and “Bulk Customers”. The consumers are segmented into either of these two categories, based on the frequency of the desludging request placed by them. If a consumer requests for a desludging service at least once a month, they are categorised as Bulk Customers (government buildings, apartments, hotels, community toilets/public toilets, sewers/drains etc.). Standalone household consumers are those that require desludging services every 2-3 years (individual household of 5-6 members). The composition of the demand for desludging services significantly impacts the revenue generation capacity of a business, as there is a prevailing pattern of price differentiation for charges of desludging services from standalone households and bulk customers, the former often being less than the latter. The case studies undertaken by CPR across eight cities revealed the varying composition

of demand for desludging services. However, the emergent pattern from the eight cities revealed that the market was majorly driven by bulk customers. Therefore, this study assumes that bulk customers comprise 92 per cent of the desludging market, and standalone household customers comprise the rest. Within the category of bulk customers, it is further assumed that commercial establishments, government institutions CTs/PTs, etc. account for 50 per cent of the demand generation, while 42 per cent of the demand is generated by group residential housing, such as apartment blocks and condominiums.

FIGURE 2: Demand Segmentation of Different Categories of Customers





4 POLICY RECOMMENDATIONS FOR OPTIMISING THE PRIVATE SECTOR-LED DESLUDGING MARKET IN URBAN INDIA

4.1. Current business models could easily serve the urban poor through cross-subsidisation mechanisms

Increasing urbanisation in India has also concomitantly increased inequality and poverty in cities. Consequently, about one-fifth of urban India resides in slums (Census 2011). Urban poor residents residing in slums and squatter settlements have a small dwelling unit and toilets that are connected to OSS systems as these settlements are often bereft of a sewer network, thereby requiring frequent desludging. However, as the desludging services by private operators are often provided at a substantial cost from the perspective of the urban poor, such services are often unaffordable for them. In this scenario, an urban poor household may choose to neglect the need for desludging, creating a public health and environmental health hazard, or resort to manual cleaning of the OSS systems.

To avoid further marginalisation of the urban poor, urban sanitation policies must account for the extension of mechanical desludging services to these households through cross-subsidisation. Such inclusive pricing strategies can potentially enable private entrepreneurs to provide services to the urban poor households at an affordable price.

Based on the business model developed through the evidences captured in the case studies, a cross-subsidisation case is developed to evaluate whether urban poor households can be served by private service providers at a subsidized rate without significantly affecting the profitability of the businesses. For this purpose, the category of standalone household customers is further divided based on their economic status – into poor and non-poor. It is assumed that within the standalone household category of customers, approximately 50 per cent fall under the low-income or the poor category.

The business modelling exercise revealed that it is possible to impose differential pricing between the urban poor category and the relatively higher income category customers.

Keeping the business cycle ROI fixed at 49 per cent (as per the Base Case), the prices are calculated for each of the customer categories – bulk customers and standalone household customers (poor and non-poor). Figure 3 suggests that without differential pricing, each customer category pays INR 1000 for desludging services. However, assuming that the standalone household customers (both poor and non-poor) are served at half the rate, there is a marginal increase in the prices charged to

bulk customers (from INR 1000 to INR 1040) whereas the standalone households can still be served at approximately half of the initial price (without cross-subsidisation). Similarly, even if the price to poor standalone household customers is fixed at INR 500, there is a marginal increase in the additional cost transferred to the other two consumer categories. This is primarily because bulk customers comprise 92 per cent of the market for desludging services.

Further, the business model also reveals that it is also possible to serve the standalone household customers (in the poor category) free of charge, as the prices charged to bulk customers and standalone household customers (non-poor) merely increase by about 7 per cent if the services to the poor are rendered for free. Therefore, it is evident that providing subsidised (or free of cost) services to the low-income or urban poor households is possible with minimal additional price burden on bulk and standalone non-poor customers if the entrepreneur aims to maintain the same level of ROI (i.e. 49 per cent). The local governments will require to work with the private entrepreneurs to encourage cross-subsidisation that will not only ensure efficient and inclusive service delivery but also will achieve sustainable outcomes for the environment.

Example:

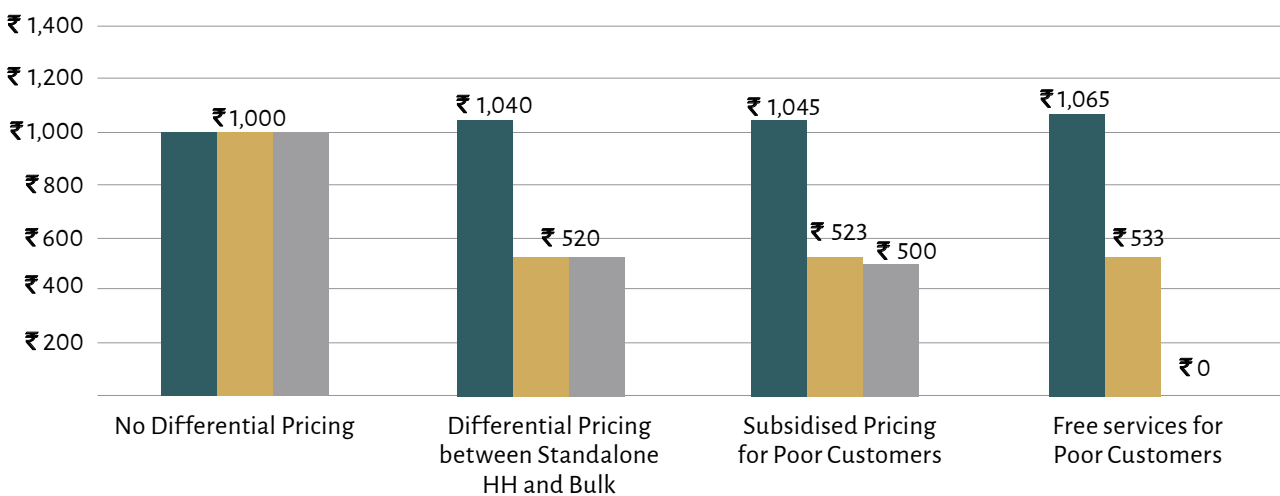
In Goa, Chennai and Ujjain, differential pricing has been observed between Standalone Household Customers and Bulk Customers. The table below elucidates that the desludging

prices charged for Bulk customers is almost double the price charged for standalone household customers. Further, anecdotal evidences indicated that the private providers in these cities often recognised the economic

constraints faced by the urban poor standalone households, and often provided them desludging services free-of-charge.

Location	Emptying Cost for Standalone Household customers (INR)	Emptying Cost for Bulk customers (INR)
Goa	1500 - 3000	3000 - 3500
Chennai	900 - 1500	1500 - 3000
Ujjain	500	900

FIGURE 3: Differential pricing for different categories of customers



4.2. Optimising the distance to the treatment facility is critical for operators providing affordable services

Owing to the evidences from the eight cities, the Base Case assumes that the private entrepreneurs practice indiscriminate open dumping. However, for a well-functioning, sustainable and safe

market, it is important to ensure that the private service providers have access to a dumping facility. Further, to ensure a continued affordability of services, it is fundamental to optimise the distance of the treatment facility, as it plays a critical role in determining the price of the service.

A nearby dumping and treatment facility will render the service costs

to the minimum level whereas a distant facility would be a burden on service provider, thus transferring the additional costs to the end user. A distant facility also increases the number of desludging and dumping trips that a service provider would have completed in comparison to the trips undertaken if the facility was located nearby.

Example:

In Jabalpur, there were three Faecal Sludge Treatment Plants (FSTPs), strategically located at around 10km radius from each other, to ensure that the plants were within the optimal distance for the desludging truck operators to serve the customers in different areas of the city. Further, the ULB charges INR 1500 from both bulk

customers and standalone household customers for desludging services.

In Jaipur, although there are 9 functional STPs in the city and the service providers seem to be aware of them, the septage in the city finds its way directly to the disposal, mostly to a nullah or a nearest available sewer

manhole. It was noted that there were discussions of setting up decentralised FSTPs near the present disposal sites, thus making it optimal for the service providers to operate without going far away located STPs or without the need for disposal into a nullah or sewer manhole.

Therefore, it strategically planning the location of the treatment facility will not only incentivise service providers to undertake more deluding trips per day, but also minimise the additional cost of dumping that is transferred to the consumers.

Two cases are assumed – a “nearby” treatment facility is located within a 10km round-trip radius for the service provider; and a “distant” treatment facility located within a 30km round-trip radius for a service provider. The business modelling exercise evaluates the changes in the prices charged to different categories of consumers for desludging services, keeping a sustained profit stream for the private operators with a business cycle ROI fixed at 49 per cent. It is observed that the distance of a newly introduced treatment facility will inevitably impact the pricing of the services due to an increase in the fuel costs and maintenance costs, and has been elucidated in the following figures.

Figure 4 illustrates the changes in the prices charged to different consumer categories in the case

of a nearby treatment facility, and the changes in prices charged if a cross-subsidisation mechanism is also implemented. Evidently, the prices charged to the consumers increase – by 50 per cent in case of no differential pricing. However, the prices thus obtained still fall within the range of service delivery prices observed from the eight cities. Further, the business model shows that the price differential is possible in this case as well, with only a marginal increase in the price burden transferred to the bulk customers in all the three cases – i) price charged to standalone household customers is half the price charged to bulk customers; ii) price charged to poor standalone households is fixed at INR 500; iii) poor standalone households are served for free.

Figure 5 illustrates the changes in the prices charged to different consumer categories in the case of a distant treatment facility, and the changes in prices charged if a cross-subsidisation mechanism is also implemented. In the case of a distant facility, there is a substantial increase in the prices charged

to the consumers, even without differential pricing strategies, as prices increase by approximately 2.5 times, assuming the entrepreneur maintains a business cycle ROI of 49 per cent. Differential pricing will further increase the costs transferred to bulk customers. However, if differential pricing strategy is implemented, the increase in the price charged to bulk customers is relatively low in comparison to the price charged without differential pricing strategies. Thus, optimising the distance to the treatment facility is crucial to maintain a well-functioning and balanced market of desludging service delivery.

It is evident that assuming the presence of a strategically located treatment facility, cross-subsidisation mechanisms are still financially viable, illustrating that the poor customers could still be served at a relatively lower cost or even free of cost. In the forthcoming set of recommendations outlined in this report, the business viability is assessed assuming the presence of a treatment facility, with two cases – nearby and distant facilities.

FIGURE 4: Differential Pricing for 10 km round trip FSTP site (Nearby Dumping Facility)

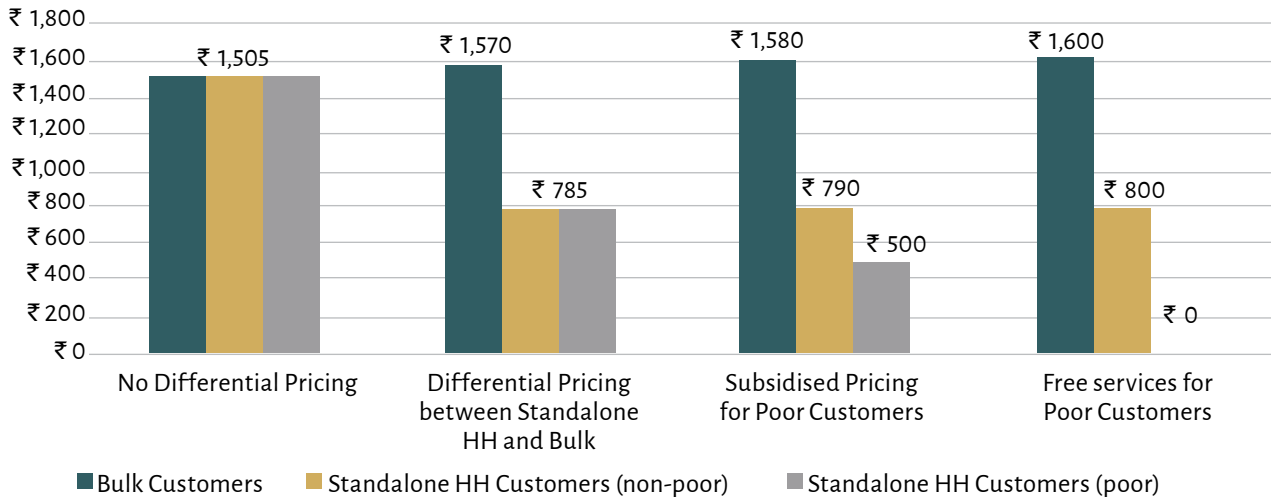
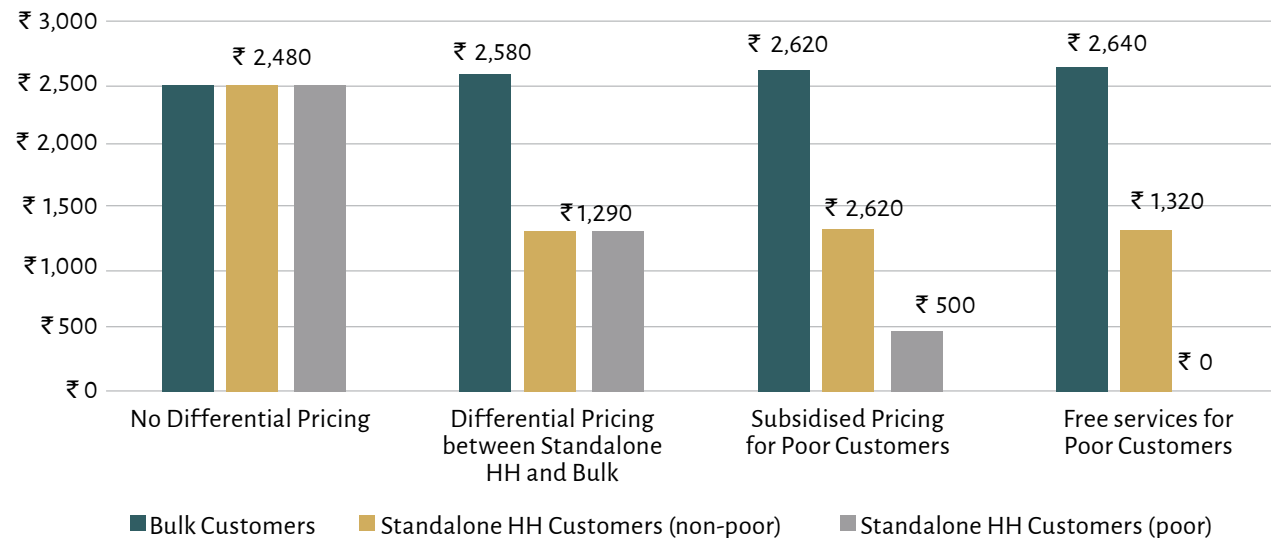


FIGURE 5: Differential Pricing for 30 km round trip FSTP site (Distant Dumping Facility)



4.3. Competitive desludging markets enable accurate price discovery

Evidence from the case studies reveals that at present, the desludging markets are characterised by kinships and family ties, thus manifesting high barriers to entry. This often cultivates cartelisation practices, leading to exorbitant prices charged by the service providers. In such a

scenario, the introduction of another competitor would not only reduce the market share of the existing player, but also increase the price an operator would have to charge in order to maintain the same level of ROI as the Base Case, i.e., 49 per cent.

It is assumed that the introduction of a business competitor is in the third year of the business cycle will impact the market share of

the business, thereby resulting in a proportional decrease in the number of trips and price per trip for the following three years. Based on the evidences of collusion from the case studies, this model further assumes a collusion of the two businesses in the sixth year of the business cycle, which enables the foremost operator to restore original prices.

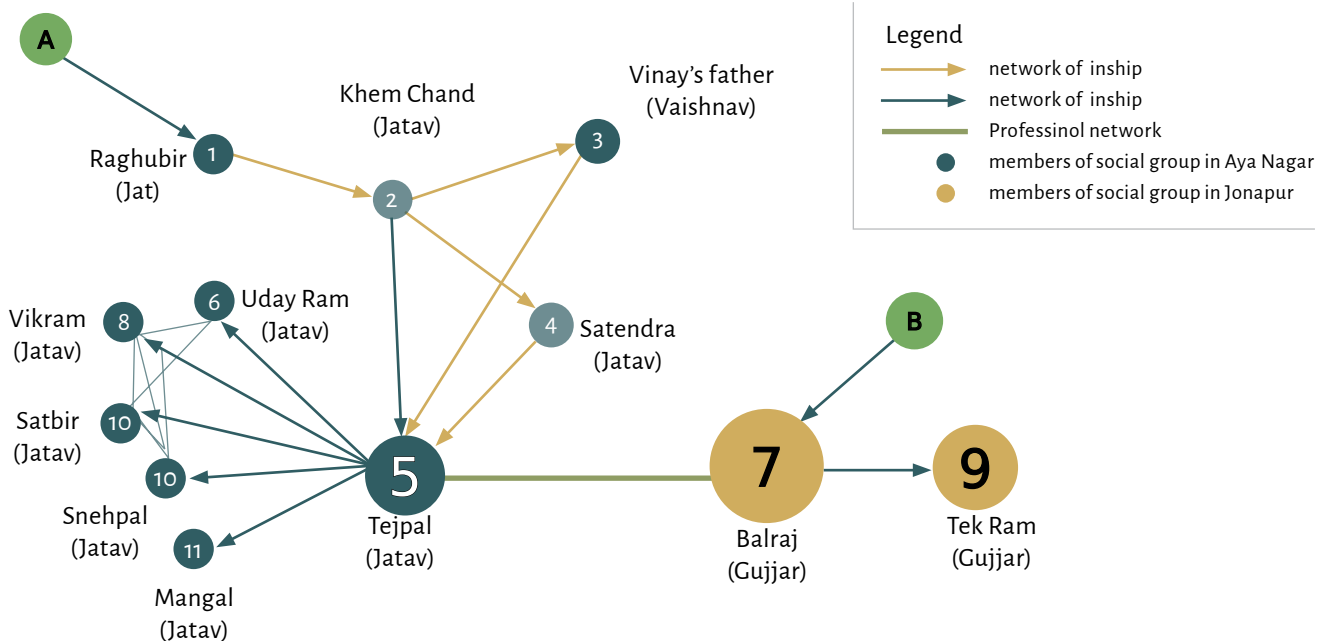
Assuming the business aims to maintain the Base Case level of ROI, i.e., 49 per cent, the cost of competition would be transferred to the customers and the service delivery charges would have to be inevitably increased. However, this price increase is not substantial, as it increases by only 20-30 per cent of the original prices in all the three cases – i) Base case (without any treatment facility), ii) case of nearby facility and iii) case of distant facility. It is evident that a market characterised by

competition ensures equilibrium prices that neither discourage the consumers from availing desludging services nor hinder the profitability of the business. Further, the presence of additional service providers would also ensure a higher number of cumulative desludging trips undertaken in a city, thereby increasing the probability of timely served desludging requests and significantly reducing public health and environmental risks.

Example:

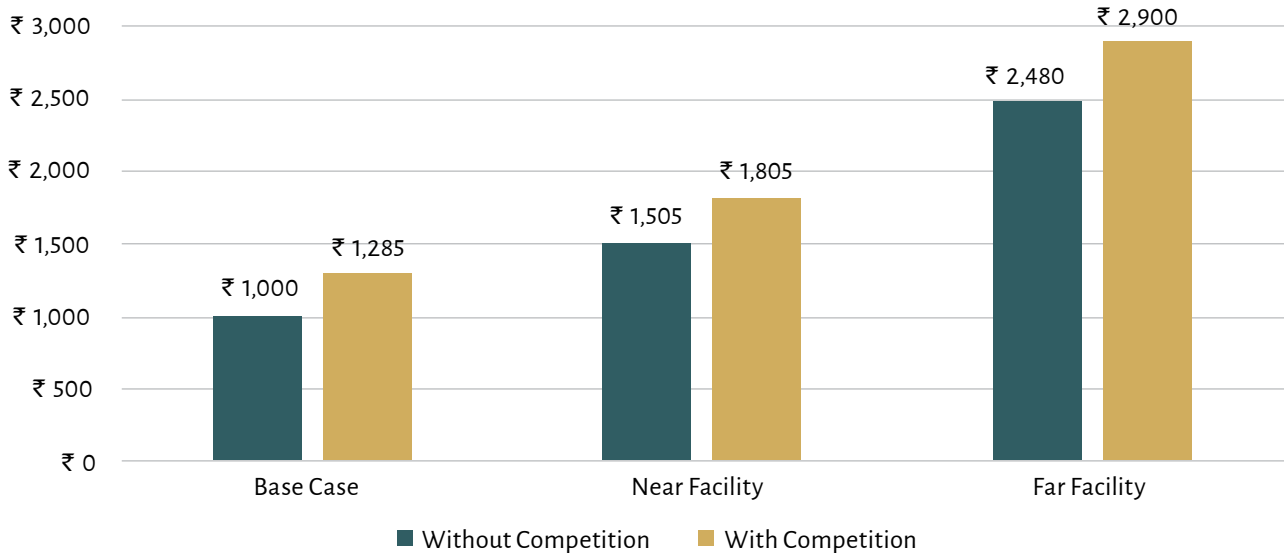
In Delhi's Aya Nagar, since 2016, there exists a cartel of 12 desludging operators, mostly kin and kith of each other, who work in mutual cooperation in order to check competition, regulate service tariffs and organise work allocation. While they attempted to control the tariff in the area, such practices were unsustainable as other competitors were able to provide services at a cheaper rate. This was followed by collusion among the competitors which resulted in further increase in price than before.

FIGURE 6: Chronological foray of service providers into the septic tank emptying market in Aya Nagar and the existing social networks



SOURCE: Working In Tandem: The Informal Septic Tank Emptying Market In Aya Nagar, Delhi
 NOTE: The illustration depicts the two social groups present in the market. It highlights chronological entry of 12 operators (both former and existing into the business. the size of the shapes is proportional to the number of vacuum trucks owned by an operator. The individuals Khem Chand and Satendra were no longer part of the business at the time of investigation, but had nevertheless encouraged new entrants into the business while they were active. Individuals A and B designate unknown operators who influenced Raghubir and balraj respectively into entering the profession .They were immediate family members and operated in other areas.

FIGURE 7: Customer prices with and without competition



4.4. Price ceiling mechanisms deter business viability

Owing to the frequency and scale of desludging requests served by private entrepreneurs, a privately operated desludging business has the potential to transform into a natural monopoly over time and charge exorbitant prices. To obliterate this possibility and to protect the consumers from exploitative pricing strategies adopted by such entrepreneurs, price ceiling mechanisms are often implemented by the monitoring agency. However, a price ceiling imposed by the ULB on these businesses may be counterproductive, as it could potentially deter business activities. Further, given the relatively small size of the sector, business operators are likely to be small and local private players, surviving on thin profit margins at the niche stage of the business operations.

From the eight cities studied, a demand side analysis reveals that price ceiling for bulk and non-poor

standalone household customers restrains the profitability of the business. This is because more than 90 per cent of the customers are bulk customers who not only possess the potential to pay a higher amount for desludging services and but also generate demand at a much higher frequency in comparison to standalone household customers. The revenue generated from servicing bulk customers thus forms a significant proportion of the total business revenue, and is vital for the financial sustainability of the business.

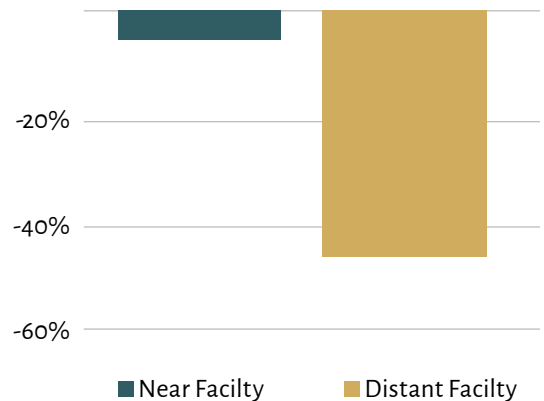
In the markets which experienced a high ROI, prices were market driven with minimal ULB intervention. In the Base Case, which is characterised by the absence of ULB interventions and an accessible treatment facility, the private entrepreneur is able to sustain a business cycle ROI of 49 per cent at a market determined desludging price of INR 1000. However, as observed

in the previous sections, the introduction of a treatment facility would inevitably increase the prices charged to the consumers. Assuming a ULB regulated market with the price for desludging services fixed at INR 1000, without demand segmentation, business activities would be indubitably unsustainable. This is also illustrated in Figure 8, which shows that over a 10-year business cycle, the ROI in the case of both nearby and distant treatment facilities would be negative, thus crowding out the private businesses, revealing the unviability of price ceiling mechanisms in this sector. Instead, policies should foster well-functioning markets that are characterised by a healthy competition among entrepreneurs and a direct flow of finances from the customers to the businesses, which would also facilitate market-determined prices and ensure sustained business viability.

Example:

In Ujjain, price ceiling of desludging services as a result of ULB regulation has led to the crowding out of private players in the FSSM sector. In order to minimise the negative impact of price ceiling on profitability, the private players have collaborated with the ULB for sourcing the desludging requests through the latter. As revenue is transferred to the private operators through the ULBs, it deters efficient business activities and achievement of equilibrium process. Often, the payments to private entrepreneurs are also delayed, hindering their day-to-day operations. In addition, the revenue potential from bulk customers is also not realised when the price ceiling mechanism is practiced.

FIGURE 8: Impact of price ceiling



4.5. Excessive taxes and fees disincentivise formalisation of desludging businesses

A cumulation of vehicle tax, GST on equipment, corporate tax along with other fees like fee for license to operate and PUC certification, account for approximately 31 per cent of the annual business turnover. Lowering or exempting some of these charges may facilitate the business operations by reducing the opportunity costs incurred while undergoing the process of filing such charges and maintaining records for the same.

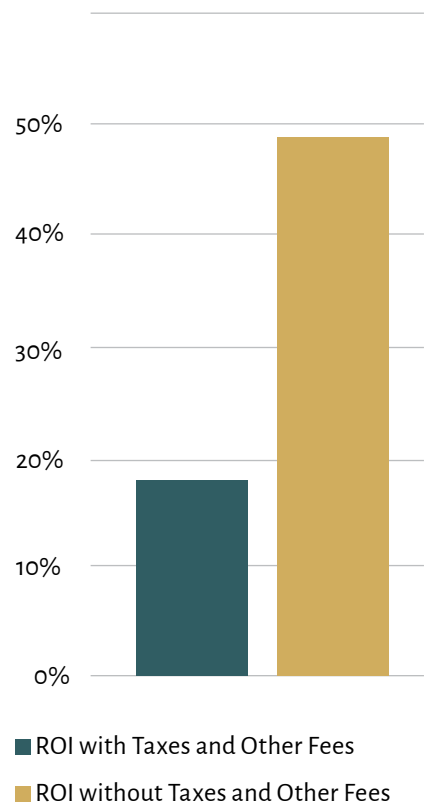
For analysing the impact of taxes and other fee over the 10-year business cycle, this business model assumes that no cost is borne by the business under ‘Taxes and Other Fees’ in the Base Case scenario. Then, the costs are added under the ‘Taxes and Other Fees’ component to analyse the impact of the same on the ROI.

Figure 9 suggests that when taxes

and other fees are imposed on the businesses, the profitability of the business reduces significantly as the 10-year business cycle ROI reduces from 49 per cent to 18 per cent. Thus, a high proportion of such charges also discourages private entrepreneurs from considering the formalisation of their businesses, and may induce them to practise tax evasion with the objective of remaining profitable. It has been observed that through tax evasion, numerous informal and unorganised desludging businesses remain cost competitive and acquire a considerable share of the market, thus creating a barrier for those entrepreneurs who would otherwise execute their business under the formal purview. Therefore, it is important to ensure that proportion of taxes and other charges are within the ambit of affordability for business operators, especially in cities like Aya Nagar (Delhi), Jaipur, Bhubaneshwar and Dehradun where the truck operators’ interaction with the local authorities and legal system was absent.

FIGURE 9: Effect of Taxes and other fees on business cycle ROI

Impact of Taxes and other Fees on the 10-year Business Cycle ROI



4.6. Imposing crucial health, safety and environment regulations will have a marginal impact on pricing

Environmental regulations are an essential and integral part of a robust FSSM policy. Under these regulations, measures such as mandatory dumping at a designated treatment facility, mandated use of Personal Protective Equipment (PPE), obtaining a license to operate a desludging business and timely renewal of fitness certificate are undertaken. To achieve the

regulatory goals, ULBs can also consider subsidising the cost of dumping and distributing PPE as a means to support business activity.

To measure the impact of the environmental regulations on the business, additional costs including a tipping fee at the dumping facilities, costs of PPE, licensing cost and the fee to obtain a fitness certificate are added in the Base Case of the business model. Further, assuming a fixed 10-year business cycle ROI of 49 per cent, the increment in prices is calculated in the case of a nearby and a distant treatment facility.

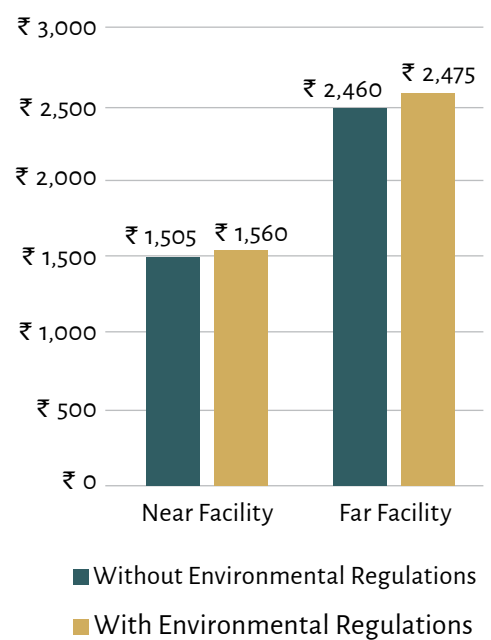
Assuming the presence of a treatment facility, the increase in the desludging prices is marginal – 3.6 and 3.8 per cent in the case of a nearby and distant treatment facility respectively, to maintain the Base Case level of profitability, as demonstrated in Figure 10. Thus, it is financially feasible to mandate the compliance with environmental regulations in the FSSM sector, as the cost of such regulations is nominal when compared to the cost of bearing environmental and health-related consequences arising out of indiscriminate open dumping.

Example:

In Goa, the provisions of the Goa Public Health (Amendment) Rules, 2010 prohibit the 'discharge of sewage, poisonous and polluting liquid into any water-course, lake, tanks, sea-water within five kilometres of the shore'. The PHE Department, which is responsible for overseeing the decanting and treatment of collected septage by private operators at the Tonca STP, has fixed the tipping fee at INR 500 per truck per trip. The overall high level of awareness and a heightened sense of ownership for the environment among the citizens have ensured that they have taken on the role of monitoring private cesspool operators to make sure there is no dumping into the open environment.

It is apparent that in cities where environmental regulations were strict (Panaji, Chennai, Ujjain and Jabalpur), there were no cases of dissatisfaction among service providers as well as among people on receiving end of the service.

FIGURE 10: Effect of Environmental Regulation on Pricing



4.7. Excessive planning and city management decisions restrict market driven activities resulting in the loss of operational efficiency

The ULB has the authority to control the movement of desludging trucks to facilitate easy movement of other vehicles, which results in the restriction of market driven activities. There are instances where desludging requests is directed through ULB either because ULB is the sole service provider or ULB wants to record the demand, which results in operating inefficiency of private desludging operators.

To study the impact of city management rules on desludging business, it is assumed that the number of desludging requests served in a day reduce to half of the

number of trips in the Base Case (ie, 2 per day trips instead of 4) and its effect on pricing for nearby and distant facility is measured, keeping the 10-year business cycle ROI fixed at 49 per cent. The difference in pricing is shown in Figure 11.

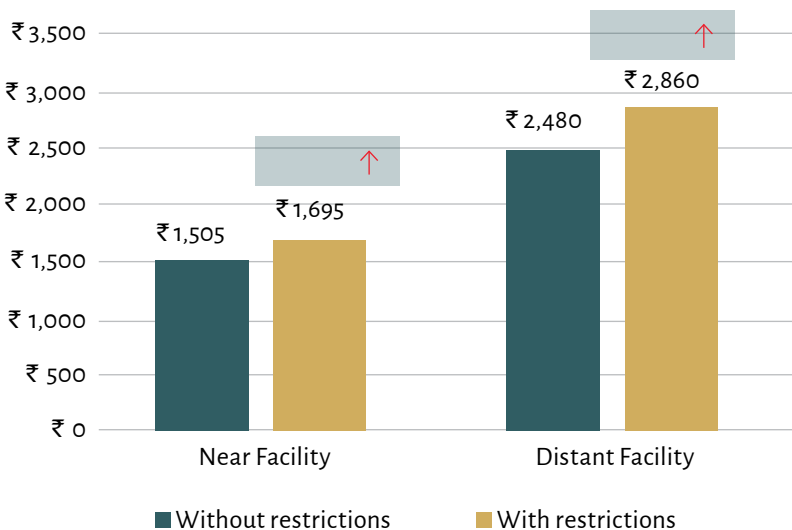
Figure 11 suggests that keeping the ROI fixed at 49 per cent, decisions like plying time restrictions can result 13 per cent and 15 per cent increase in the pricing of desludging services in the case of a nearby and distant treatment facility respectively. Thus, the absence of such plying time restrictions can ensure timely service delivery, increase business efficiency by enabling the business to increase its customer base and consequently scale-up its operations, and also reduce the time lag that develops when demand is routed through the ULB.

Example:

In Ujjain and Jabalpur, the requests are directed through the ULB – the customers place a desludging request with the ULB, who then designates a truck operator to serve the respective household – thus eliminating the direct link between the customers and the service providers. Further, the ULBs in these cities not only constraints the operator from charging market determined prices (as standard prices are fixed by the ULB), but also limits the scope of an individual truck operator to acquire new customers which could potentially expedite the process of scaling-up.

Studies conducted in Goa reveal that plying time restrictions limit the number of requests that can be served in a day by approximately 50 per cent, which have an adverse impact on the revenue potential of a business. A reduction of 25-50 per cent in the number of requests served implies a reduction of the same proportion in the revenue realised, which renders the business financially unstable and unfeasible for operations.

FIGURE 11: Effect of city management decisions on pricing of desludging business





5 CONCLUSION

The last five years witnessed an extraordinary thrust on sanitation with overwhelming results. The remarkable mission in this sector, the Swacch Bharat Mission, has resulted in millions of toilets getting constructed over a short period of time, thereby increasing the dependency of households on OSS systems. Therefore, faecal sludge collection and emptying services also need to cater to the demand by filling this newly created gap with the same pace. Towards this end, policies need to leverage the existing ecosystem of informal service providers, regularise it without hampering business profitability, and outline a systematic approach to desludging service delivery through a consultative approach with all stakeholders.

In the context of the FSSM sector, long-term, city-specific planning could drive down uncertainty and incentivise investments thereby increasing quality of service delivery. Strategic urban planning is also the key to achieve sustainable development, as evidenced by cohesive planning frameworks developed and followed by thriving cities across the world. In the case of FSSM service delivery, adequate and efficient planning could facilitate maximum value capture from the sanitation value chain and foster business activities. Further, involving all stakeholders in the process of planning is an important activity to facilitate them with a plan that is all inclusive in nature. Urban planning frameworks that encourage business activities and create an enabling environment to facilitate smooth operations and scaling-up can be an asset to significantly reduce business uncertainties.

The current business models could easily be integrated into formal setup by mandating a few guidelines based on the recommendations elucidated in this study and building on the knowledge generated by academicians, experts and civil society organisations. Such multipronged interventions are expected to provide better financial as well as environmental sustainability to all the stakeholders in the FSSM business, which translates to better service provision to customers of the business. Some of these interventions or recommendations are achievable in the short-term within the range of local planning authorities, city administration or the desludging operator's individual decisions; while a few demand the creation of an enabling ecosystem and a long-term approach for their implementation.

SCALING CITY INSTITUTIONS FOR INDIA: SANITATION

Sanitation programme at the Centre for Policy Research (CPR) is a multi-disciplinary research, outreach and policy support initiative. The programme seeks to improve the understanding of the reasons for poor sanitation, and to examine how these might be related to technology and service delivery models, institutions, governance and financial issues, and socio-economic dimensions. Based on research findings, it seeks to support national, state and city authorities develop policies and programmes for intervention with the goal of increasing access to inclusive, safe and sustainable sanitation. Initiated in 2013, the programme is primarily funded by the Bill and Melinda Gates Foundation (BMGF).

