



DESLUDGING OPERATORS IN PERIYANAICKEN-PALAYAM AND NARASIMHANAICKEN-PALAYAM AN OVERVIEW

February 2018



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Abbreviations

BMGF	Bill and Melinda Gates Foundation
CPHEEO	Central Public Health and Environmental Engineering Organisation
DCH	Districts Census Handbook
EHP	Environmental Health Project
FGD	Focus Group Discussion
FSTP	Fecal Sludge Treatment Plant
GoTN	Government of Tamil Nadu
IEC	Information, Education and Communication
LPA	Local Planning Authority
NNP	Narasimhanaicken-palayam
NUHM	National Urban Health Mission
NUSP	National Urban Sanitation Programme
PNP	Periyanaicken-palayam
PSC	Public Sanitary Conveniences
SBM (G)	Swachh Bharat Mission-Gramin
SBM (U)	Swachh Bharat Mission-Urban
TNDMA	Tamil Nadu District Municipalities Act
TNUSSP	Tamil Nadu Urban Sanitation Support Programme
TP	Town Panchayat
TSU	Technical Support Unit
ULB	Urban Local Body

A large, stylized letter 'E' in a light green color, positioned on the right side of the page. The letter is composed of several horizontal bars of varying lengths, creating a stepped effect. The text 'Executive Summary' is placed within the lower right portion of the 'E' shape.

Executive Summary

Executive Summary

Improper disposal of fecal waste pollutes ground water and severely impacts the environment and public health. Collection and disposal of fecal sludge is not only considered a critical component of septage management, but it is also the most vulnerable link in urban sanitation. Desludging operators and workers play the crucial role of collection, transportation and disposal of human waste.

However, desludging operators are also the ones most exposed to fecal sludge from septic tanks and to harmful gases such as methane and hydrogen sulphide. This exposure leads to a range of ailments including cardiovascular degeneration, musculoskeletal disorders, hepatitis, skin problems and respiratory diseases. It is also found that many desludging operators suffer from altered pulmonary function parameters due to the nature of their occupation.

According to the Prohibition of Employment as Manual Scavengers and their Rehabilitation Rule (2013), every sewage worker/ septic tank cleaner is entitled to regular medical check-ups and vaccinations. While some rudimentary arrangements for health surveillance exist for the sanitary work force attached to government organisations (municipal corporation, municipality etc), there is no similar arrangement for private septage operators. Moreover, the transitory nature of their employment also keeps them from accessing any kind of government benefits including healthcare, insurance, education for the children, housing, old age pensions etc.

In this context, a consultation was conducted with desludging operators in the two Town Panchayats (TPs) – Periyanaicken-palayam and Narasimhanaicken-palayam to understand the work done by them with a special focus on current desludging practices, the different kinds of business models and the overall regulatory and policy framework. The exercise also looked into the working conditions of desludging operators, patterns of employment as well as their socio-economic status.

There are 54 private septage operators, who are registered under the Coimbatore City Municipal Corporation (CCMC), of which six regularly cater to the two town panchayats, reaching out to both households as well as commercial establishments. Their vehicles are allowed to discharge septage at the designated discharge point at Ukkadam (on the outskirts of Coimbatore city). It is also not uncommon to find vehicles discharging septage in farmlands as many farmers believe septage to be a good source of fertiliser, especially in coconut farms.

The consultation showed that even though a large percentage of the urban population rely on on-site sanitation systems such as septic tanks, pits and holding tanks, the business of desludging continues to be an informal and unorganised one. Operators resort to innovative ways of reaching out to customers, relying on everything from door-to-door campaigns to marketing their business through scrolls on local television channels. They sometimes spend up to Rs 2,000 per day on advertising.

The septage transportation vehicles are registered under the health department of the Coimbatore City Municipal Corporation, on submission of proper documents including details of the desludging company the vehicle belongs to, details of the vehicle such as manufacturing date and date of RC book etc. Following verification of all these documents, a fee of Rs 18,000 per vehicle per year is levied on the company, which can be divided into four instalments of Rs 4,500, payable every quarter through a Demand Draft. The fee is collected by the Coimbatore Sewage Transport Lorry Association once in three months and paid to the corporation.

It was also found that though desludging operations from on-site systems is an unorganised sector, there is a clear business model that has been worked out based on the charges levied on clients,

revenue generated and the expenditure incurred. The price for desludging individual household containments ranges from Rs 1,500 to Rs 3,000 per load, while the price for desludging the on-site systems in industries and commercial establishments ranges from Rs 800 to Rs 1,000 per load. The cost of desludging service in the peripheral areas of the city is slightly higher when compared to those in the central parts of the city. This is mostly due to the long distances that have to be covered to reach the peripheral areas.

The consultation also threw up a lot of questions on the different kinds of challenges faced by operators in the course of their work as well as possible solutions and the future course of action. Desludging operators in both town panchayats said that accessibility to the containment structures posed one of the biggest challenges in their work. Many desludging operators said that the inspection covers / lids in the existing septic/holding tanks in most households were sealed making it necessary to break these covers before beginning the process of desludging. It also meant that once the desludging was over, the operators were expected to seal the covers and restore them to their original state. The consultation also showed that there was a failure to stress on the use of safety gears during the desludging operations.

The operators also said that being restricted from travelling on certain city roads during specific hours made a huge impact on the business. Moreover, they also faced problems in parking their vehicles due to resistance from the public. The distance travelled from the point of desludging to the sole decanting facility also resulted in cost escalation. Local industries diverting their effluent into septic tanks was another issue that was raised.

The consultation also threw up suggestions to streamline desludging operations and make it more efficient, such as having a common registration process for Coimbatore and the two TPs, taking stern action against industries who are discharging industrial effluents into septic tanks and increasing the number of decanting facilities to reduce the distance travelled by the desludging trucks.



Introduction

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1. Introduction

1.1. Background

Lack of adequate sanitation poses one of the greatest barriers for Tamil Nadu in achieving her full development potential and ensuring high standards of public health for her citizens. The Government of Tamil Nadu (GoTN) has been a pioneer in not only recognizing the multiple challenges as core to improved standards of public health, but has also prioritised the full sanitation chain, including the strengthening of septage management as an economical and sustainable complement to network-based systems.

In order to achieve the Tamil Nadu Sanitation Mission, the Department of Municipal Administration and Water Supply, Government of Tamil Nadu (MAWS, GoTN) aims at scaling up access to safe and sustainable sanitation in all urban areas. Tamil Nadu envisions becoming a fully sanitised and healthy state, substantially eliminating open defecation, achieving improvements through the entire sanitation chain, safely disposing an increasing proportion of its human excreta, and re-using/ recovering resources from it.

The Bill and Melinda Gates Foundation (BMGF) supports the GoTN to realise this Mission. A Technical Support Unit (TSU), set up under this support, assists in the implementation of state-level and city-level initiatives. A consortium led by the Indian Institute for Human Settlements (IIHS) is responsible for programme implementation via TSU. Two urban locations, Tiruchirappalli and Coimbatore, are selected to demonstrate the implementation of innovations, and approaches to improve the entire sanitation chain. The learning from these two urban areas will be used to scale-up and implement programmes in urban areas across the state. The Tamil Nadu Urban Sanitation Support Programme (TNUSSP), which was launched in Coimbatore in December 2015, functions in the town panchayats (TPs) of Periyanaicken-palayam (PNP) and Narasimhanaicken-palayam (NNP).

Improper disposal of fecal waste pollutes ground water and has an extremely negative implication on the environment and public health. Collection and disposal of fecal sludge is not only considered as a critical component to septage management, but also as the most vulnerable link in urban sanitation. The desludging operators and workers play this crucial role of collection, transportation and disposal of human waste.

However, the desludging operators are also the people who are the most exposed to fecal sludge from the septic tanks and suffer from exposure to harmful gases like methane and hydrogen sulphide, which results in ailments ranging from cardiovascular degeneration, musculoskeletal disorders, infections like hepatitis, skin problems, respiratory system problems. It is also found that many of the desludging operators suffer from altered pulmonary function parameters due to their nature of occupation.

According to the Prohibition of Employment as Manual Scavengers and their Rehabilitation Rule (2013), every sewage worker/ septic tank cleaner is entitled to regular medical check-ups and vaccination. While some rudimentary arrangements for health surveillance exist for the sanitary work force attached to government organisations (municipal corporation, municipality etc), there is no similar arrangement for private septage operators. Moreover, the transitory nature of their employment also keeps them from accessing any kind of government benefits including healthcare, insurance, education for the children, housing, old age pensions etc.

In this context a consultation was conducted with Desludging Operators in the two Town Panchayats to understand the work done by them with a special focus on the current desludging practices, the different kinds of business models and the overall regulatory and policy framework. The study also looked into the working conditions of the desludging operators, patterns of employment as well as their socio-economic status.

1.2. Objectives, Scope and Methodology

The main objective of the study is to understand fecal sludge management in Periyanaicken-palayam and Narasimhanaicken-palyam with a focus on sludge extraction, transportation and emptying done by operators in the two town panchayats. This study will also shed light on the socio-economic status of and issues faced by desludging service providers in Coimbatore city, focusing on the two model town panchayats.

The objectives of study are to understand:

- The profile of current desludging operators in PNP and NNP
- Current practices, and identify gaps
- Business models
- The overall regulatory and policy framework

The study will analyse the operators' work schedule, types of customers, their approach, investments and profitability – information that will help us develop a protocol for safe desludging. This report will act as a base to understand the demand and supply of desludging services in both town panchayats, which would be helpful for effective operations and maintenance of the upcoming Fecal Sludge Treatment Plant (FSTP) at Periyanaicken-palayam.

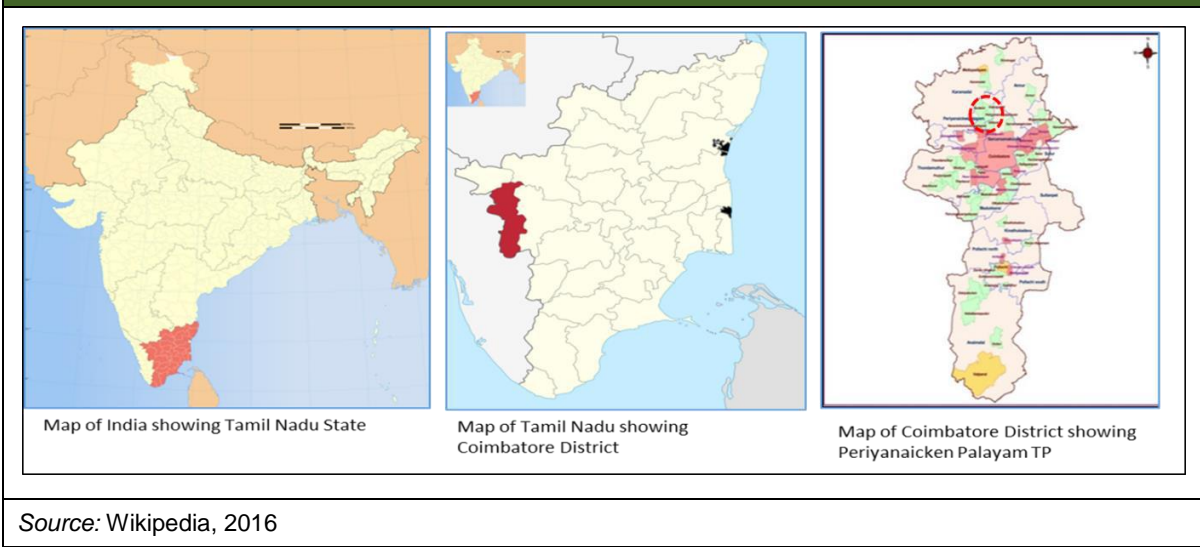
The study involved mixed methods of research methodologies. Personal interviews, focus group discussions and a number of consultations with desludging operators were conducted at their place of work.

1.3. Introduction to Towns

1.3.1 Periyanaicken-palayam

The PNP town panchayat is situated 17 km north of Coimbatore city along the National Highway 67 which runs between Coimbatore and Mettupalayam. The town panchayat is further divided into 18 wards. As per Census 2011, the population size here is 25,930 and the density is 2,767 persons per sq.km which is high compared to Coimbatore city's average of 731 persons per sq.km and the state average of 555 persons per sq.km (Census, 2011).

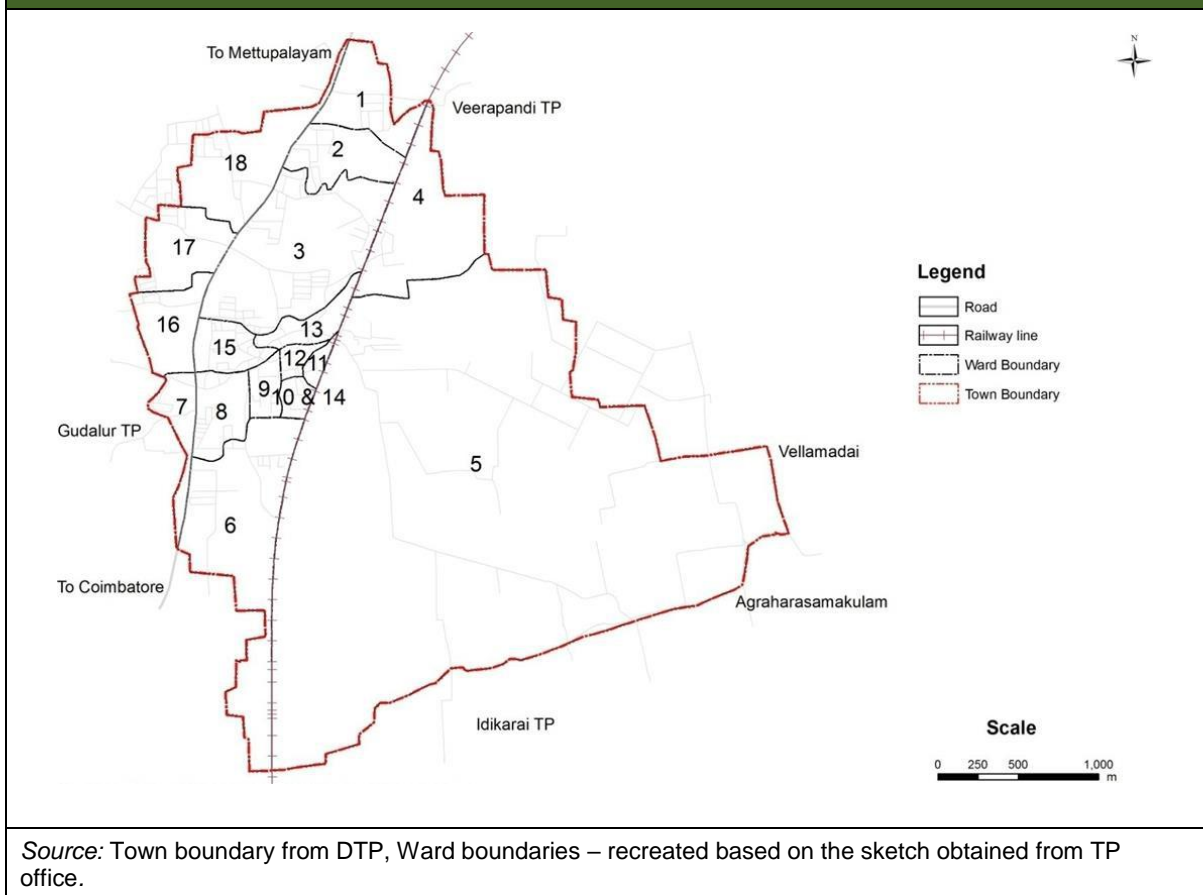
Figure 1.1: Location of Periyanaicken-palayam Town



Spatial Boundaries

PNP town covers an area of 938 hectares (9.38 sq km) according to the Local Planning Authority (LPA), Coimbatore. The TP has Kurudampalayam TP to the south, Idigarai and Veerapandi TPs to the east and Narasimhanaicken-palayam TP to the north.

Figure 1.2: Administrative Map of Periyanaicken-palayam Town Panchayat



Ward Boundary

The ULB states that there will be delimitation of wards during elections, which may change current ward boundaries.

Statutory status of the ULB

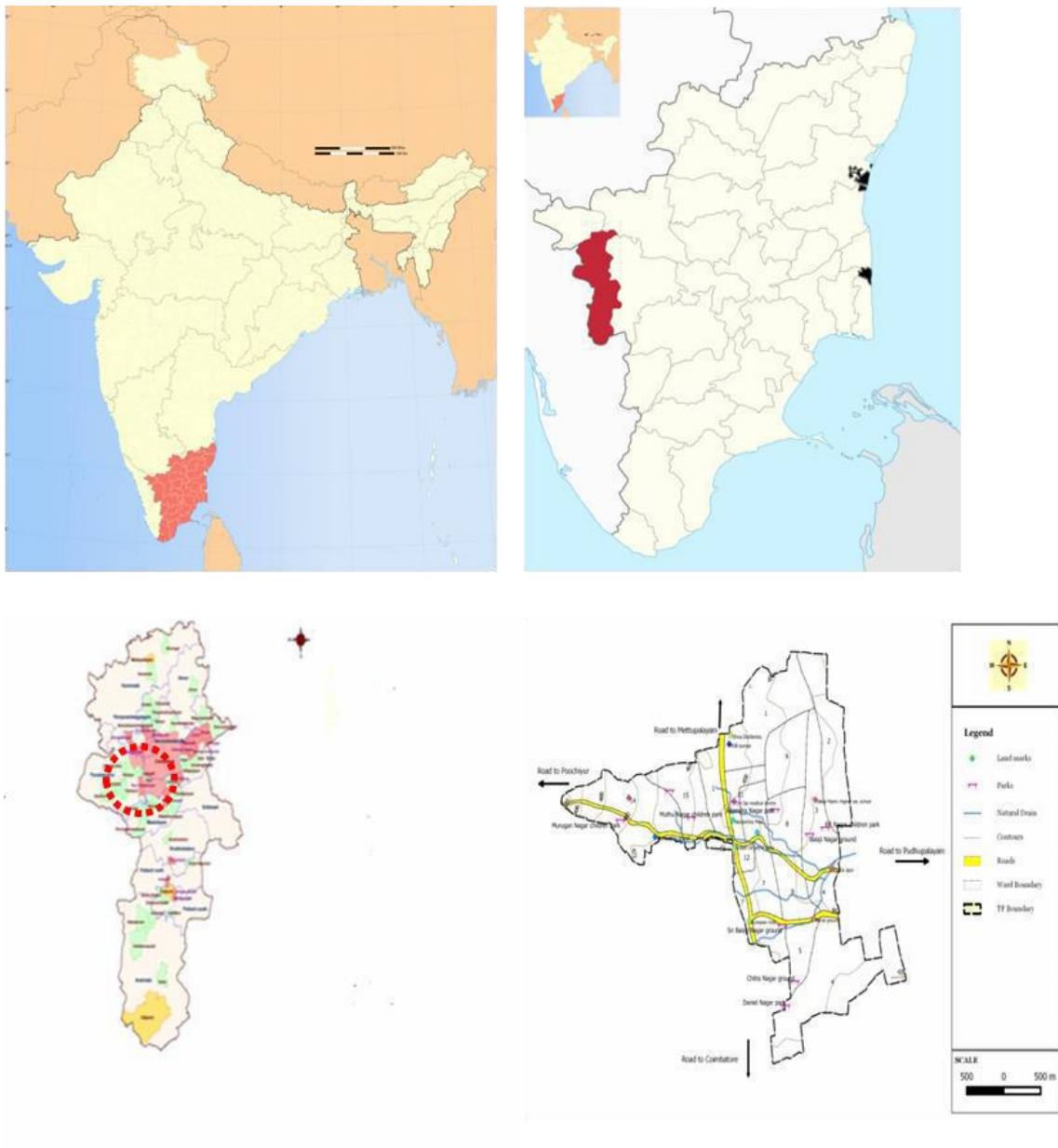
PNP is categorised as a Selection Grade town panchayat (Annual average revenue of between Rs. 16 and 20 Lakh) since 2012. It was upgraded from Selection Grade village panchayat to the status of town panchayat based on the Tamil Nadu government order (GO no.270) from Municipal Administration and Water Supply department, dated 11.06.2004.

Table 1.1: Overview of Periyanaicken-palayam	
Demographic Factors	Details
Area	9.38 sq kms
No of Wards	18
Population	26000
No of Households	7400
% of households with access to toilets	83 %
% of households depending on public conveniences	14 %
<i>Source: Census 2011</i>	

1.3.2 Narasimhanaicken-palayam

The NNP town panchayat is situated 12 km north of Coimbatore city along National Highway 67 which runs between Coimbatore and Mettupalayam. The area of Narasimhanaicken-palayam is 637 hectares (6.37 sq.km.). The town panchayat is further divided into 15 Wards. As per the Census 2011 the population size is 17,858 whose density of town is 2803 persons per sq.km, which is high when compared to Coimbatore city average of 731 persons per sq.km and state average of 555 persons per sq.km (Census, 2011).

Figure 1.3: Location of Narasimhanaicken-palayam Town

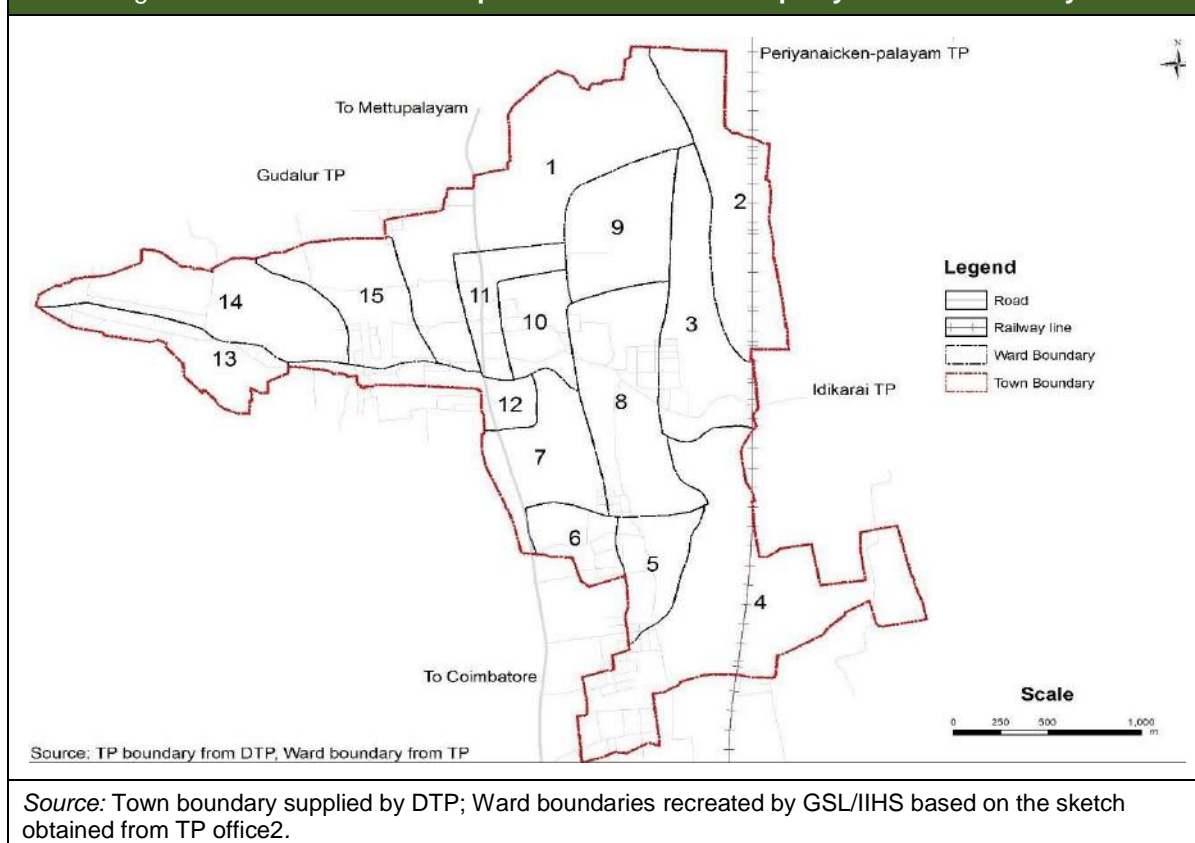


Source: Wikipedia and TNUSSP, 2016

Spatial Boundaries

NNP town covers 637 hectares (6.37 sq.km.), as per the LPA in Coimbatore. The current administrative ward boundaries are to be verified by the town panchayat; there is no record of change in TP's boundaries over time.

Figure 1.4: Administrative map of Narasimhanaicken-palayam Town Panchayat



Statutory status of the ULB

NNP is a First-grade TP³ since the year 1982. It is proposed to be upgraded to Special Grade⁴

Table 1.2: Overview of Narasimhanaicken-palayam

Demographic Factors	Details
Area	6.37 sq kms
No of Wards	15
Population	17900
No of Households	5000
% of households with access to toilets	75%
% of households depending on public conveniences	20%
Source: Census 2011	



Overview of Sanitation in PNP & NNP

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2. Overview of Sanitation in PNP & NNP

2.1. Access to Toilets

2.1.1 Individual Toilets

The 2011 Census shows that 1,269 households in PNP do not have access to individual toilets and depend on public sanitary conveniences or defecate in open. However, the latest data from the PNP town panchayat office, which was collected for the Swachh Bharat Mission (SBM), indicated that the number of households without individual toilets is 709 (8 per cent) out of a total of 8,585 households. The SBM data also showed that only 576 households out of the 709 identified (81 per cent) have space in their compound to construct a toilet. The rest of the households (133) do not have any space and will have to be encouraged to use a community solution.

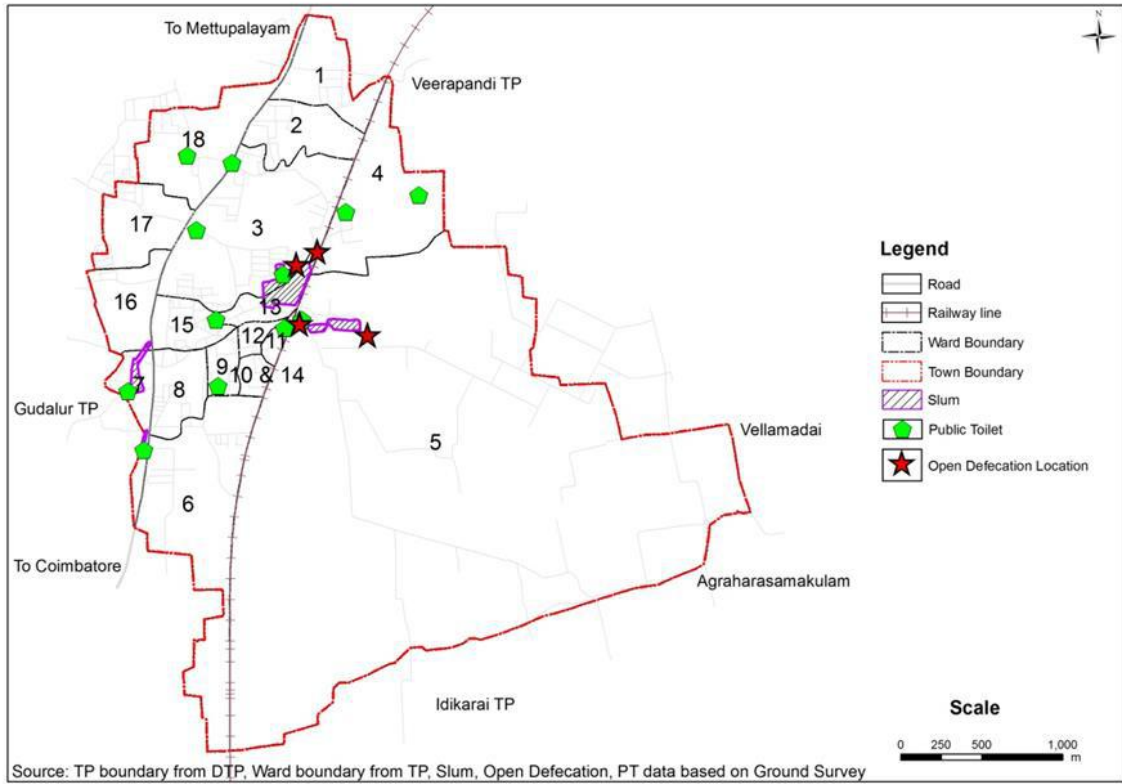
On the other hand, in NNP, of the total 5,023 households in the town area, 3,782 households (75 per cent) households have access to individual toilets, 974 households (20 per cent) depend on public sanitary conveniences and 266 households (5 per cent) defecate in the open (Census, 2011). Ward level analysis of Census 2011 data for NNP, indicated that a majority of households defecating in the open belong to wards numbered 3 and 5. Open defecation was also recorded in wards 1, 2, 4, 6, 9, 10, 14 and 15. There is a large proportion of people dependent on public sanitary conveniences in wards 2, 5, 7, 8 and 13. The data available with the TP office shows that there are 6,846 households out of which 487 households do not have access to individual toilets. Amongst the wards, ward 13, 7, 8, 3, 5 and 14 account for most of the toilet-less households.

2.1.2 Public Sanitary Conveniences (PSC) - Toilets

The PSCs in PNP cater to those without individual household toilets and the floating population. There are 13 PSCs, i.e. public and community toilets, spread across 11 wards in the town. Most of the PSCs are close to an urban poor settlement. This includes one public toilet in Periyanaicken-palayam, which is a pay-and-use toilet that operates from 5am to 10pm. An estimated 300-350 women and girls and 200-250 men and boys use this toilet daily, according to the caretaker.

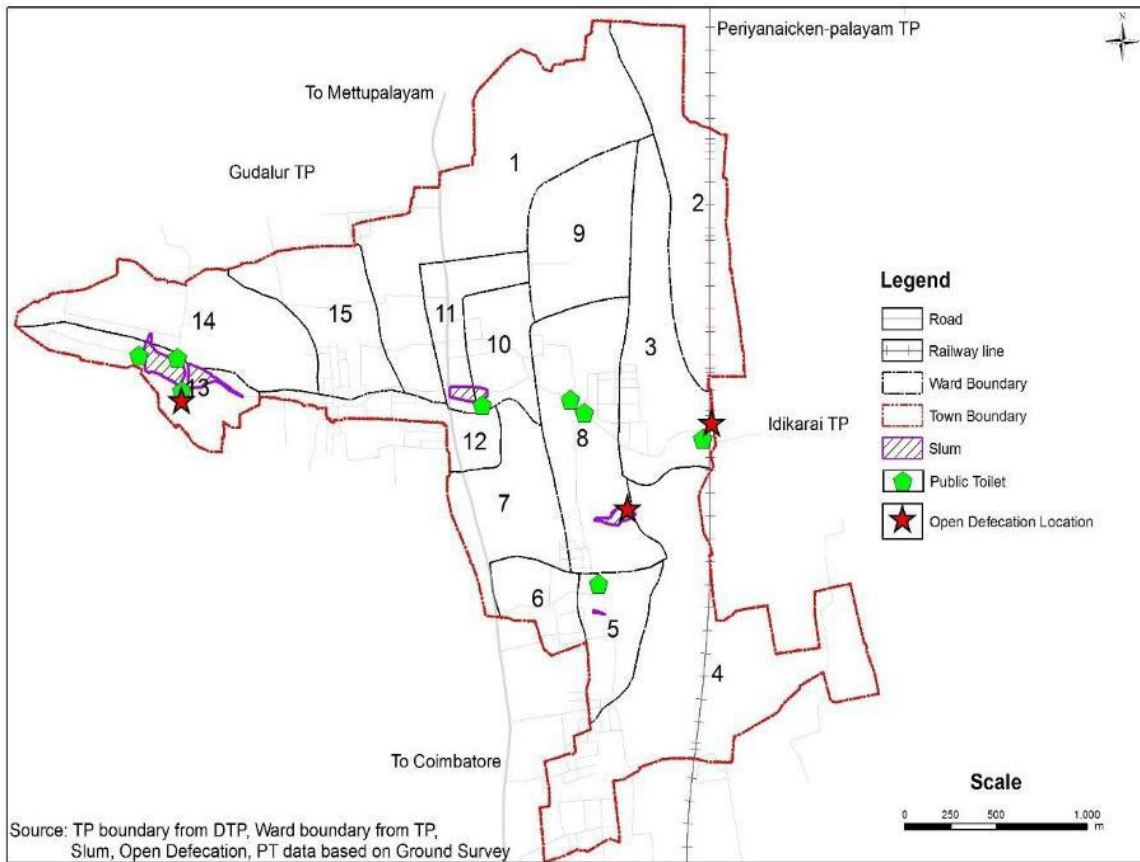
In NNP, there are 12 PSC facilities for the local community and the TP's floating population to use, which were constructed under various schemes of the government. These 12 PSCs are located across the TP and seem evenly-distributed, spatially. The PSCs together have 64 seats for men, 57 seats for women and 2 seats available separately for the elderly in the panchayat. Out of the 12 PSC facilities, one block near Pudhupalayam was designated only for women with 8 seats. No separate public toilet is available in NNP to cater to the floating population.

Figure 2.1: Public Sanitary Conveniences in Periyanaicken-palayam



Source: TNUSSP, 2016

Figure 2.2: Public Sanitary Conveniences Narasimhanaicken-palayam



Source: TP boundary from DTP, Ward boundary from TP, Slum, Open Defecation, PT data based on Ground Survey

Source: TNUSSP, 2016

2.2. Containment

2.2.1 Household arrangements

The 2011 Census reported that 6,101 households in PNP had access to sanitation facilities within the premises. Of this, 67 per cent reported availability of septic tanks (4,057), while 23 per cent were reported to be connected to piped sewers (1,372) and 10 per cent were connected to pit latrines (634). The remaining households were connected to other containment structures (not any of the above) and seven households reported being connected to the drain. Since the town panchayat does not have a sewer system, the 23 per cent who reported having sewer connections could actually be connected to the drain and also include households inside the campuses of local industries – some of which have their own local wastewater treatment facilities.

In the baseline survey conducted over February-March 2016 (TNUSSP, 2016) in PNP, 475 non-slum households and 129 slum households were canvassed. In the survey sample, more than three-fourths of the slum and non-slum households reported having a septic tank and about 10 per cent had single pits. In the case of households with septic tanks in non-slum households, 33 per cent reported having water-tight containment structures, while only six per cent reported the presence of partitions. In the case of households with septic tanks in slum households, 48 per cent reported water-tight containment

structures, while only six percent reported the presence of partitions. Thus, only eight percent of non-slum household septic tanks and six per cent of slum household septic tanks were constructed to function as structures approximating a septic tank. In slum households, there is a higher proportion of water-tight structures but without partitions – which make them function as storage tanks and lends credence to the households' fear of them filling up faster.

In NPP, Census 2011 figures show that 71 percent of individual toilets were the flush type connected to a septic tank, 13 percent reported being connected to piped sewers, less than one percent were connected to other systems, 13 percent had access to improved pit toilets and two percent reported releasing their night soil into the drain. However, considering the absence of sewers in the town panchayat, it is safe to presume that this data is not completely accurate. The town panchayat office does not have any database on containment systems at the household level.

2.2.2 Public sanitary conveniences - Containment

A preliminary scoping indicated that all 13 PSCs in PNP are connected to septic tanks for containment of fecal matter. It was observed that six septic tanks out of the 13 connected to these toilets are ex-filtrating due to blockage or breakage. These six are the ones connected to the public toilets located in Kasthuripalayam, Vivekanandapuram, Anna Nagar, Ooty Road, Kanguvar Street No. 1 and Shakti Nagar. None of the thirteen septic tanks are connected to soak away pits and the effluent overflows into surface drains or the open. Subsequently, the town panchayat has initiated repairs of these structures

In NNP, all 13 community are connected to septic tanks for containment of fecal matter. It was observed that three septic tanks out of the 13 connected to these toilets are ex-filtrating due to blockage or breakage. These three are the ones connected to the public toilets located in Om Shakti Nagar, Palaiyur and Sennamanaickenur. Like PNP, none of these septic tanks are connected to soak away pits, leading to overflowing; the effluent from them is overflowing in to the surface drains or in to open.

2.3. Emptying and conveyance of fecal sludge

2.3.1 Household Arrangements - Emptying

The on-site sanitation systems connected to households are currently emptied by private cess-pool operators. There are four private operators that function within the TP cluster near Coimbatore (PNP-NNP and neighbouring TPs) with eight cess-pool vehicles between them. There are two more sludge operators who come in to the TPs from Vadavalli for providing the service to households. Consultations with these six private players indicated that they empty 40 to 45 truckloads of septage from the household septic tanks/pits in a month. One service provider said they regularly empty 50 to 60 loads per month from the public toilets.

Since the average capacity of cess-pool vehicles deployed by the private players is five cubic meters, it is estimated that about 500 to 550 cubic meters of sludge is emptied in a month i.e. 18 to 18.5 cubic meters daily (average) from households and public toilets. All the desludging operators offer septic tank cleaning in individual households, commercial and industrial sectors. Along with cleaning, they also sometimes offer blockage clearing. The customer profiles are diverse, ranging from regular households to commercial hotels, marriage halls, industries and poultry farms.

The operators charge households about Rs. 1,000 to 1,500 per truck load of septage emptied from the households. The number of trips depend on the size of the septic tank and the volume that needs to be emptied. The private operators advertise their presence by distributing brochures/visiting cards and

displaying posters. Households call these private operators whenever their on-site system needs to be desludged.

Only two out of the four operators are registered with a ULB (one with Coimbatore City Corporation and another with Thudiyalur TP).

2.3.2 Public sanitary conveniences - Emptying

The septic tanks connected to the public toilet are frequently emptied as the number of people using them is high. The town panchayats have a desludging machine (a tank with a sludge pump) which has to be pulled by a tractor, as it is not attached to a vehicle. Earlier, this machine was used by sanitation workers to desludge the septic tanks of public toilets but due to heavy loads, blockages and solidification of sludge in the septic tanks, the town panchayat now hires a private operator's cess-pool vehicle (which is equipped with an air compressor) to empty these septic tanks. It is estimated that about 50-60 truckloads of septage is emptied in a month (i.e. about 50 cubic meters) from septic tanks attached to public toilets in both the TPs.

2.4. Treatment of fecal sludge

There is no treatment facility available at the TPs for treating sewage and septage. The Operative Guidelines for Septage Management in Tamil Nadu issued by GoTN in 2014 mandates that the septage/fecal sludge from the PNP Union cluster to be transported to the sewage treatment plant (STP) at Ukkadam or the nearest decanting station provided for this STP in Coimbatore city, for treatment. The installed capacity of the STP at Ukkadam is 70 MLD and operates on Sequential Batch Reactor (SBR) technology. The current inflow is reported to be only 35 MLD.

The decanting station is located near the Ukkadam Bridge and is just one km away from the STP. It is however observed that the designated point provided is just a disposal point and has no infrastructure as mentioned in the Central Public Health and Environmental Engineering Organisation (CPHEEO) manual or the Operative Guidelines for Septage Management in Tamil Nadu. The decanting station has no receiving tanks for septage, no screen chamber or sludge pumps that pump the septage to the STP inlet (as required by the Gol and GoTN guidelines). It has only a drainage channel and few manually-operated gates – these gates are reported to not have been operated since installation.

Concrete chambers with four rectangular provisions were provided before the gates, where the desludging vehicles could offload the septage. The septage gets mixed with the sewage flowing in the drainage channel and flows under the gravity through underground sewerage pipes to the STP. After objections from the local residents, RCC slab cover was provided with two manholes that would reduce odour. The location has been fenced off but is left unattended with no one to monitor trucks' movements or keep a record of unregistered sludge operators coming in to offload.

It was reported by desludging operators that a security personnel used to be present a few months ago, who checked whether trucks were registered to the corporation to legally offload and to keep a record of vehicle numbers and other details of the service providers. Only the sludge operators who have paid Rs. 4, 500 as registration fees for three months are allowed to offload the septage collected at this disposal point. It was reported that the Sanitary Inspector and Sanitary Supervisor at Ukkadam make frequent visits to ensure that only registered vehicles offload at the decanting facility. They also inspect the content disposed at the point. So far, no records are accessible at the decanting facility detailing the trucks coming in to dispose, number of trips made or type of effluent found discharged.

The Corporation has the control over the decanting stations and these are not covered under the O&M of the STP. The septage collection vehicles drop in and offload collected septage from 6.00 am to 6.00 pm and as per the District Collector's order, no vehicle is allowed to dump beyond this set timeframe. The order also mentions strict restrictions in terms of disposal of oil and chemical effluents at the facility as these may affect the performance of the STP. It was also reported that the Coimbatore Corporation is proposing to set up a watch room with a trained professional to monitor and prevent the disposal of chemical effluents into the decanting facility.

2.5. Disposal

The private cess-pool operators identified during the field survey emptying septic tanks in the town discharge their sludge into the agricultural farms. Some of the cess-pool operators also own agriculture land. Some of the farmers in the periphery of the town are interested and willing to accept septage in their farms as it is a good soil conditioner and is a source of irrigation water in the drier months. Most of the farm's soil conditioned using septage from households is used for growing fodder crops (to feed animals). On seeing better yields, it is now being used in fields growing coconut and sugarcane as well.

Box 2.1: Land Application by Farmers

A resident of Vattamallaipalayam has two acres of farmland and also takes care of his relatives' farm. He is one of the farmers who uses septage in his farm for conditioning the soil. A few cess-pool operators approached him for permission to discharge a few loads of septage. After consulting with other farmers who were already using septage, he also agreed. However, he was very specific in selecting service providers in order to get septage free of waste items such as sanitary napkins, covers, shampoo packets etc. He uses the septage to condition his two acres of land in batches. He has divided it into four patches in which he grows fodder and coconuts using septage; and maize and bananas using bore well water only - he has grown bananas by applying septage only once. This farmer applies sludge only on empty land to improve the top soil condition and does not use septage on standing crops. After applying septage, it will dry for 15 - 30 days after which the land is ploughed. The sludge operators pay him for allowing discharge in his field, a sum of Rs. 200 to 300 as it saves them a considerable amount of money. This farmer reports receiving about 4-5 loads of septage in a week in season.

Another farmer in Vellapanaickenpalayam, who cultivates CO4 Hybrid Napier Grass and CO3 fodder grass, uses septage in his farm but from one specific sludge operator only. He accepts only two loads a week and the operators ask him first whether they can offload in his land. Unlike the other farmer, he irrigates land with grown fodder crops and controls the flow to prevent damage to the ploughed field. He alters the patches after every load. He also said that some cess-pool operators dispose sludge without informing him. He irrigates the farm with septage, based on the moisture content in the field.

Source: TNUSSP Primary Studies, 2016

Desludging Operators - A Profile

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3. Desludging Operators- A Profile

3.1. Overview

There are 54 private septage operators registered with the Coimbatore City Municipal Corporation (CCMC). Most of the operators have more than one vehicle (approximately 88 vehicles in total). There are six operators that regularly cater to PNP and NNP town panchayats, registered with the CCMC. All vehicles that are registered with the CCMC are allowed to release septage at the Ukkadam discharge point.

Each of the six private septage operators who service the two TPs have more than one desludging vehicle. These vehicles are mounted with a tanker, whose capacity varies between 3,000 and 6,000 litres. The table below details the number of desludging vehicles and the workforce employed with the septage operators servicing the two TPs.

Table 3.1: List of Operators in PNP & NNP			
Company Name	No. of Trucks	Drivers	Cleaners
Hari Ram Enterprises	2	2	4
Shakthi Cleaning Services	5	5	9
SPS Enterprises	2	2	4
Everfresh Enterprises	2	2	2
Annai Septic Tank Services	5	4	8
Arvind Cleaning Services	3	3	12
Total	16	17	26
<i>Source: TNUSSP, Consultation with Desludging Operators, 2018</i>			

It is also important to note that, in many cases, the staff handling the desludging vehicle also manage the business, interact with clients and maintain the accounts.

3.2. Demographic Details of Desludging Operators

Desludging operators come from varied backgrounds, which can be divided into three main categories:

1. Those involved in desludging and scavenging as an ancestral occupation – often based on caste.
2. Those who have been desludging for the last 8-10 years and have taken it up as a livelihood option
3. Those who see a business opportunity in desludging services. Many owners of desludging vehicles fall into this category.

3.3. Service Delivery

All desludging operators offer septic tank cleaning services for individual households, commercial establishments and industries. Along with cleaning, they also offer to clear blockages in the drains and pipes.

Customer profile: The customer profiles range from households to commercial establishments like hotels, marriage halls, industries and poultry farms. The prominent industries around PNP and NNP include Kumaran Mills, LMW, Roots, Shiva Distilleries. Hotels and marriage halls in the town panchayat also regularly avail desludging services.

The operators' profiles also vary with some catering only to households while others prefer to work with bulk generators of septage such as big commercial establishments or industries. Some of the operators who work solely with households said that they did not carry out desludging operations in industries because of the high content of industrial effluents in their septage.

3.4. Customer Service

Box 3.1: Desludging Operator's Association

There is an association for desludging operators in Coimbatore. Since the desludging business is an unorganised business, this association was initially set up to conduct meetings, discuss the needs of the members and devise ways to improve business. Over a period, the frequency of meetings has greatly reduced, with members meeting only once a year. Most of the time, information is shared via SMS or WhatsApp.

Source: TNUSSP, Consultation with Desludging Operators, 2018

As mentioned above, desludging of septic tanks and twin pits is an unorganised business and desludging operators often resort to innovative ways to reach out to customers. While most of them rely on door-to-door campaigns, some operators have also printed 'business cards' with their address and phone numbers which are handed out to clients. A few operators go a step ahead, marketing their business through scrolls on local television channels. Some operators admitted to spending around Rs 2,000 per day on advertising their services.

Households are known to call desludging operators only when their septic tanks are almost full or overflowing, while commercial establishments and industries have a more regular arrangement with the desludging operators who arrive on pre-designated days.

Figure 3.1: Cards distributed by desludging operators for marketing



Source: TNUSSP, Consultation with Desludging Operators, 2018

3.5. Vehicle specifications

Most of the vehicles used for desludging have been manufactured between 2002 and 2015 in either Chennai or Namakkal and are specifically designed to clean septic tanks and pits. The inner surface of the tank is lined with rubber or coated with rust proof material. There is a common opening at the bottom of the tank for suction and discharge of fecal sludge. The valve is four inches in diameter and placed at least 110 cm above the ground level. The sludge is normally collected using hosepipes of 4 inches diameter and 150 metres length. These hosepipes are connected using a plastic or metallic coupler arrangement.

The types of pumps used are mainly vacuum pumps, while a few use centrifugal/tullu. The operators also prefer foreign-made pumps to Indian pumps because of their better quality and longevity. The pumps are powered using the main truck engine using a connecting shaft arrangement. The tanks' capacity ranges between 4,000 and 8,000 litres.

Out of the 88 private trucks registered with the CCMC, only one truck was purchased from Whale Enterprises - known for manufacturing high quality desludging vehicles with pressure release valves, to prevent implosion while sucking.

3.6. Current desludging practices

Households contact operators directly by phone when the septic/holding tank is nearing or has reached its full capacity. The operators collect details about the onsite-sanitation systems, after which they visit the house and check the feasibility of accessing the system.

3.6.1 Arrival and setup

On arrival, the workers check the location of the tank and confirm the approximate number of loads. After the approximation, the operator and the customer bargain on the cost of desludging per load. After fixing the rate, the truck is parked at the closest location for the desludging and the hose is pulled up to the tank.

3.6.2 Field conditions and approaches

After bringing the hose to the tank, the surrounding environment is checked to see if the conditions are suitable. Any children nearby are asked to keep away from the tank. The manhole is opened or broken (if sealed) using a crowbar or bare hands. The other tools used by the workers are spades, clamps and buckets. As the manhole is opened, the workers leave it open for a few seconds to let the gas escape.

3.6.3 Cleaning up and sealing

If the sludge is very thick inside, the workers use a crowbar to mix the sludge and make it slurry. Then the motor is switched on to pump the slurry into the tank until it has reached full capacity. Finally, the tank will be closed safely and sealed with cement (if broken) by the operators themselves. The average time taken for emptying is from 10 to 30 minutes, which varies depending on the capacity of the tank. The overall time taken to complete the desludging process from arriving at the household to disposal would depend on the distance to the nearest decanting facility.

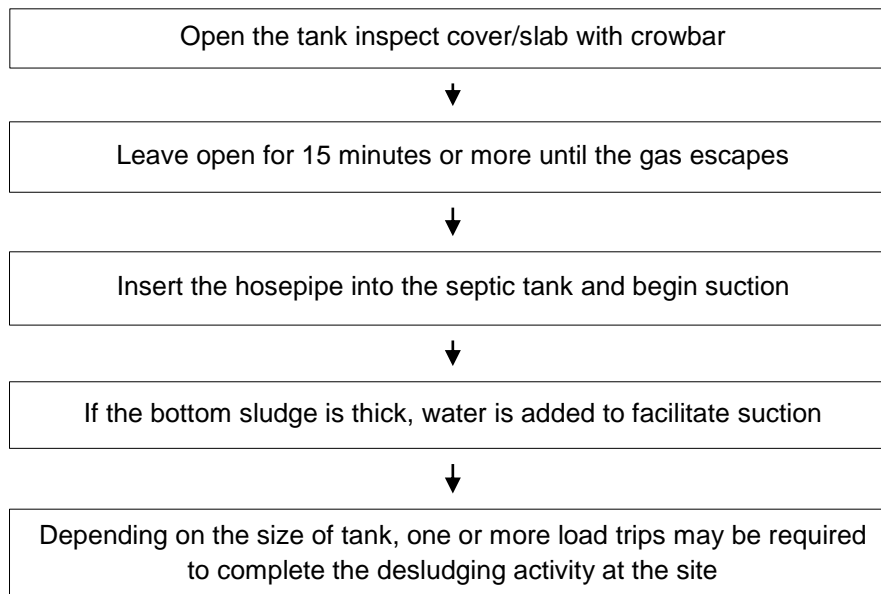
3.6.4 Operational timings

The work timing reported by all operators is from 6 am to 6 pm, although many have been observed working from before 6 am until very late into the night. The traffic schedule for the vehicles to traverse the city is from 11 am to 4 pm.

3.6.5 Parking

Parking has always been a problem for these trucks during the day. They do not have designated spots to park their vehicles, but most operators have managed to find designated spaces for their vehicles to halt at night.

DESLUDGING PRACTICES: A PICTORIAL REPRESENTATION



3.7. Occupational Hazards

When the manhole is removed during the desludging process, workers are often exposed to harmful gases like hydrogen sulphide, methane, ammonia and carbon monoxide. Excess inhalation of such harmful gases may cause asphyxiation, leading to suffocation and sometimes death. As most workers do not wear safety gears, they are prone to direct contact with fecal sludge, which may lead to skin disorders and even infection of the stomach and alimentary canal.

Some of the reasons for the failure to use Personal Protective Equipment (PPE), as reported by the desludging operators, include:

- 1 Unavailability of good quality safety equipment: Workers reported that PPE is not procured by the owners and the owners claimed that procuring good quality safety equipment continues to be an issue. Some of them also complained that the workers did not use gloves and masks even when they were present in the vehicle.
- 2 While cuts and bruises are common in their line of work, one desludging worker reported that he suffered burn injuries while attempting to burn up the gas accumulated in the septic tank immediately after opening the inspection cover, but still did not use the PPE as he found it uncomfortable.
- 3 Desludging workers have not been trained in the proper use of mechanical equipment and PPE. Additionally, there are no health check-ups and most of the workers are not covered by an insurance policy.

3.8. Transport and disposal practices

3.7.1 Decanting stations/ treatment plant

There is only one decanting point allotted by the CCMC for the registered vehicles to discharge their septage near the Ukkadam STP. This facility does not have any monitoring system to record and verify the vehicles coming to the area. There is a fence around the decanting station which is open from 6 am to 6 pm by the CCMC. Vehicles are allowed to discharge septage only during these hours.


3.7.2 Open Disposal

As it is monitored by the public, there is minimal illegal discharge of septage within the corporation area. But illegal discharge is being practiced on the outskirts of Coimbatore city and in a few tracts of farmland around the TPs. Farmers are also known to request operators to discharge septage into their farms because it is considered a good source of fertiliser, especially in coconut farms. Desludging operators favour this option as it reduces time as well as transportation costs.

Box 3.2: Fecal Sludge Treatment Plant welcomed

The desludging operators welcomed the news of the upcoming FSTP in Periyanaicken-palayam and said that this would reduce the transportation cost, which would result in desludging services being provided to customers at reduced prices.

Source: TNUSSP, Consultation with Desludging Operators, 2018



Regulatory and Legal Framework

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4. Regulatory and Legal Framework

The Government of Tamil Nadu has outlined clear guidelines regarding the construction, safe emptying and disposal of fecal waste from on-site sanitation systems, through a number of legislations dating back to the 1920s.

4.1. Building Regulations

Building regulations under the Tamil Nadu District Municipal Act (TNDMA) states that while buildings are being constructed, there should be a provision for secondary means of access for the removal of filth through drains and cesspools (TNDMA, 1920). Therefore, the building plans submitted to the Executive Authority/Commissioner should clearly delineate the dimensions of the cesspool to be constructed and the position of any sewer with which the drainage is proposed to be linked. The lowest floor of the building should be constructed in a way that allows effectual drainage through adequate sullage and sewage systems. The overall plan of the house and drainage proposed should be detailed in the building plan submitted for approval from the Executive Authority of the local body (TN Building Rules, 1972).

4.2. Construction

The Corporation and the Municipal Council are responsible for providing and maintaining sufficient systems of public drains and cesspools falling under their jurisdiction. Drains/cesspools falling outside the premises of the municipality/city are under the charge of the Municipal Council/corporations but are to be altered, repaired and cleansed at the expense of the owner of the premises in accordance with the bye-laws and regulations framed by the Council in this behalf (TNDMA, 1920) (Coimbatore Municipal Corporation Act, 1981).

4.3. Collection and Transport

The Tamil Nadu District Municipalities Act, 1920 holds the municipal council responsible for all collected sewage from the containments in the city. The Act defines a scavenger as a person who is involved in the collection and removal of filth either directly or through driving carts used for this purpose. As part of property tax, the municipality can charge a scavenging tax for removal of filth from a household (TNDMA, 1920). The municipality is obliged to make arrangements and provide directives for regular removal of filth from private premises, private markets etc. in authorised covered vehicles. The municipality is also obligated to provide for depots for depositing the collected filth (TNDMA, 1920).

The TNDMA also specifies that the filth must be disposed off only using vehicles intended for this purpose. Only authorised vehicles/carts with adequate covers to prevent the escape of its contents and stench and that have provisions to prevent negligent spills during removal are to be used in the municipality. Further, under Section 316 of the Act, a person who fails to obtain license for any vehicle is charged with a fine of Rs. 50 and the tax amount payable by him for the vehicle (TNDMA, 1920). As per Section 233 of the Coimbatore Corporation Act, 1981, all Corporations are also obliged to maintain an establishment under the Commissioner's jurisdiction, which undertakes the removal of filth from toilets, which are not connected to public drains.

4.4. Operative Guidelines on Septage Management (2014)

Issued by the state government in 2014, these guidelines have defined design and construction of septic tanks, desludging and transportation of fecal sludge as some of the key elements involved in septage

management. According to the guidelines, periodic and routine desludging based on the capacity of the septic tank should be undertaken and local bodies should ensure proper collection/transportation and treatment of septage at the nearest STP.

The guidelines also state that only certified and licensed septage operators can desludge and transport waste and those involved in the process of collection, treatment and disposal should be well-trained and equipped with safety gear.

4.5. Registration of Operators' vehicle

All six operators in PNP and NNP have been in the desludging business for the past 10 to 15 years and five of them have licences issued by the Coimbatore City Municipal Corporation. The sixth operator has registered his vehicle at the Thudiyalur Panchayat.

However, during the study, a few operators revealed that they do not operate within the City Corporation limits and do not use the decanting station at Ukkadam and have, therefore, not registered their vehicles with the CCMC.

4.5.1 Registration Process at CCMC

After being approved by the Regional Transport Officer (RTO), the vehicles are given a Dangerous and Offensive (D & O) license by the CCMC after paying Rs. 1,500 or Rs. 3,000 depending on the capacity of the vehicle. After getting their license, these operators enter an agreement with the CCMC on specifics regarding operations and maintenance, workers' safety, working hours, renewal of registration (by paying quarterly or an annual tipping' fee of Rs. 18,000/annum per vehicle), desludging boundaries.

4.5.2 Regulation by Corporation/TP

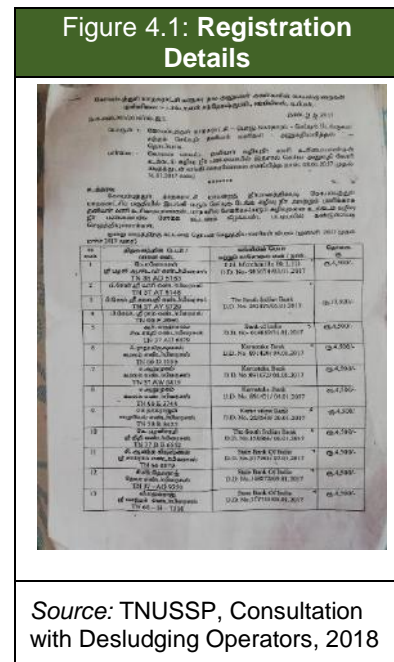
The septage transportation vehicles are registered under the Health Department of the Coimbatore City Municipal Corporation. The basic criteria for registration requires the following documents from the operators:

- Vehicle details
- RC book
- Company details
- Details of the owner and workers
- Life insurance
- Safety disclaimer by the owner and the workers

Following the verification of all these documents, a fee of Rs 18,000 per vehicle per year is levied on the company. There is a system of paying the fee every quarter (Rs 4,500) in the form of a Demand Draft. The fee is collected by the Coimbatore Sewage Transport Lorry Association once in three months and paid to the corporation.

Once the fee is paid, a license is issued by the CCMC, which states that the vehicle has the approval to desludge septage from households and commercial establishments within the corporation limits and is allowed to dispose at the Ukkadam STP.

After obtaining the license, the vehicles are split zone-wise and directed to their respective zonal offices for further processing. The completed applications are received at the zonal offices for scrutiny and the prescribed fee of Rs 1,500 is to be remitted for each trade on intimation to the applicant. The applications are sent to the concerned clerks in zonal offices, who in turn, forward the applications to



the sanitary inspectors for remarks. The sanitary inspectors examine the vehicles and submit their remarks to the Assistant Commissioner through the concerned zonal sanitary officers. The recommended Dangerous and Offensive Trade License (under Section 360 of the Coimbatore City Municipal Corporation Act 1981) is then issued to the applicants at the zonal offices.

The sanitary inspector and the respective zonal sanitary officers are also responsible for monitoring the proper disposal of fecal sludge at the designated spots. They also have the power to levy penalties and seize the vehicles if found guilty of illegally disposing fecal sludge into an open environment. However, it has not been specified what the quantum of fine to be levied is.

The license is to be renewed every year. The consultation showed that there is proper monitoring system in place, to keep track of proper disposal into the STP. As per the license registration terms, the registered vehicle should only serve the population within the corporation boundary.

Box 4.1: Concern over **business encroachments**

During our consultation with the operators, a complaint was raised about vehicles from other districts encroaching into Coimbatore and taking away their clients. They also accused corporation officials of turning a blind eye to this problem. This was raised with the City Health Officer (CHO), who said that the CCMC only checks to see if the vehicle has basic documentation and meets the conditions specified before issuing the license and not if the vehicle/operator is from Coimbatore. There is no rule denying permission to desludging operators from outside Coimbatore.

Source: TNUSSP, Consultation with Desludging Operators, 2018

4.6. Business Model

Though desludging operations at on-site sanitation systems is an unorganised sector, there is a clear business model that exists based on charges levied on the clients, revenue generated and expenditure incurred.

4.6.1 Pricing /Charges

The price for desludging individual household containments ranges from Rs 1,500 to Rs 3,000 per load, while the price for desludging on-site systems in industries and commercial establishments ranges from Rs 800 to Rs 1,000 per load. The charges for desludging are fixed by individual operators on a case-by-case basis

The cost of desludging services in peripheral areas of the city is slightly higher than the central parts. This is mostly because of the longer distances that have to be covered to reach peripheral areas.

It was also clear from the consultations that the CCMC does not carry out any Information, Education and Communication (IEC) activities to promote regular desludging. Consequently, households seek desludging services only when their containment structures are nearly full or already overflowing.

4.6.2 Factors influencing the cost of desludging

The most important factor is the distance travelled by the operators from their place of business to the customer's location and from there to the disposal sites. The more the operator has to travel, the higher the cost of desludging.

Box 4.2: Long distant desludging

There are desludging operators who offer services to nearby districts such as Nilgiris. The operators carry sintex tank in a small truck, which has been modified to act as a desludging vehicle. The sludge is collected in the sintex tank and taken to the nearest disposal point. Operators say that, depending on the demand from nearby areas, they are willing to invest in proper desludging trucks, which will cater to long distant demands.

Most of these operators come from areas like Mettupalayam and Coimbatore and travel up to Kotagiri and Ooty for business. The collected sludge is composted at a yard in Mettupalayam, or in Bhavani's jasmine fields.

At present, the cost of desludging ranges from Rs 3/litre in the plains to Rs 6/litre in the hills, taking into account transport charges.

Source: TNUSSP, Consultation with Desludging Operators, 2018

Figure 4.2: Small trucks used for marketing and demo at other districts



Source: TNUSSP, Consultation with Desludging Operators, 2018

Most operators reported that their customers try to bargain for a lower rate each time they want their septic tank desludged. This was one of the reasons why the operators fixed a slightly higher rate to leave space for bargaining. Some of the operators said that they had deliberately lowered their rates to beat the competition.

During consultations most of the operators reported that they would not share business, even if they had to attend to multiple calls at the same time, as they were concerned about losing business to their rivals. Only one operator reported that he would share clients, but only in case of an emergency.

4.6.3 Income / Revenue

Each operator desludges from 3 to 30 loads of septage per day. Charging an average of Rs 1,000 per load and carrying out an average of 17 loads per day, an operator earns about Rs 17,000 per day, Rs 5,10,000 per month and an approximate annual income of about Rs 61,20,000 per year.

4.6.4 Capital expenses/Operating expenses (Capex and Opex)

The trucks have been purchased on loan by most of the operators. The Capex/Opex for desludging operators in Coimbatore is presented below based on individual interviews conducted with a few desludging operators.

Table 4.1: Capex-Opex Table							
Item	Qty		Unit price (₹)		One-time (₹)	Monthly (₹)	Annual (₹)
EXPENDITURE							
CAPEX							
Truck and accessories for desludging (including pump, tank etc.)	1		22,00,000	per truck	22,00,000		
Hose pipe (PVC, 4 in. diameter)	125		400	per metre	50,000		
Capex total					22,50,000		
OPEX							
Fuel (Diesel)	900	litres per month	70	per litre		63,000	7,56,000
Oil coolant	60	litres per month	280	per litre		16,800	2,01,600
Salary	2	Rs. per month	25,000	per employee		50,000	6,00,000
Equipment cleaning	1	service per year	25,000	per service		2,083	25,000
Engine maintenance	1	service per year	80,000	per service		6,667	80,000

Table 4.1: Capex-Opex Table							
Item	Qty		Unit price (₹)		One-time (₹)	Monthly (₹)	Annual (₹)
Tyres	4	<i>per year</i>	25,000	<i>per tyre</i>		8,333	1,00,000
Road tax	1	<i>payment per year</i>	8,000			667	8,000
Insurance	1	<i>payment per year</i>	40,000			3,333	40,000
Vehicle Fitness Certificate	1	<i>check per year</i>	20,000			1,667	20,000
Opex total						1,52,550	18,30,600
OTHERS							
GST			18%			27,459	3,29,508
TOTAL EXPENDITURE						1,80,009	21,60,108
REVENUE							
Income	510	<i>loads per month</i>	1,000	<i>per load</i>		5,10,000	61,20,000
TOTAL REVENUE						5,10,000	61,20,000
<p><i>Source:</i> Key Informant interviews: desludging services proprietors. <i>Note:</i> Items such as debt servicing and interest revenue have not been included due to paucity of information and therefore is it difficult to estimate profit/loss.</p>							

Box 4.3: Additional benefits for the employees

During consultation, it was recorded that few operators, in addition to monthly salaries, provide free accommodation and food to their employees to encourage them to stay on.

Source: TNUSSP, Consultation with Desludging Operators, 2018

4.6.5 Profitability of business

It is difficult to estimate profitability of desludging businesses due to insufficient information on loans availed, repayment period, interest rates and interest revenue. Nevertheless, based on discussions with proprietors, it was understood that desludging businesses, on average, operate with a profit range of 50-85 per cent of total earnings. Additionally, a few operators have reported acquiring new trucks in order to meet the high demand for the service, which could also indicate that there is profit in this business.

4.7. Vehicle Financing

All operators have reported taking loans to buy their vehicles. While the loan is given only for the chassis of the truck, the body of the vehicle has to be built with their own money.

Most operators receive loans from national banks at a very low rate of interest. Few operators maintain a very good loan return relationship with the bank and this has made it easy for them to get additional loans to develop their business.

Details on financing are given below:

- 1 Commercial loans for heavy vehicles are obtained through the Vehicle Finance Departments of banks and Private Vehicle Finance partners such as Shriram Vehicle Finance. These loans are generally to the tune of Rs 15 lakh and above.
- 2 Most of the time, the loan is given without a collateral and covers around 90 per cent of the entire vehicle's cost. However, the cost incurred in modifying the vehicle to suit the purposes of desludging is to be borne by the owner.
- 3 If the vehicle being purchased has already been modified for desludging, the entire cost of the vehicle can be financed through the loan.
- 4 The period of repayment is 120 months without collateral and can go up to 144 months if additional security is provided as collateral.
- 5 14 per cent is the applicable rate of interest as per RBI lending rates for commercial lending and credit worthiness.
- 6 The processing fee varies across different banks and financial players and typically, 3 to 5 per cent of the processed loan amount is taken as the processing fee.
- 7 The vehicles are insured as per the norms.



Key Challenges and Next Steps

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5. Key Challenges and Next Steps

The consultation with desludging operators and their staff threw up many questions on the different kinds of challenges faced by operators in the course of their work as well as the possible solutions and future course of action.

5.1. Challenges

- 1 Desludging operators in both the town panchayats said that accessibility to the containment structures posed one of the biggest challenges. Accessibility plays a critical role in determining the ease with which the desludging activity can take place.
- 2 Many desludging operators said that the inspection covers / lids in the existing septic/holding tanks in most households were sealed making it necessary to break these covers before beginning the process of desludging. It also meant that once the desludging was over, the operators were expected to seal the covers and restore them to their original state before leaving the client's house.
- 3 Sealed septic tank covers also trapped poisonous gases, which would be released quickly once the cover was broken.
- 4 Travelling through narrow lanes to reach households located in densely populated areas of the city was reported as time-consuming and difficult.
- 5 Desludging operators said that them being restricted from travelling on certain city roads during specific hours made a huge impact on their business. Moreover, they also struggled to park their vehicles due to resistance from the public.
- 6 The desludging operators also complained about vehicles from districts outside Coimbatore being registered with the CCMC. They blamed them for creating competition, and thus, tampering with the market.
- 7 The operators also said that the dyeing and automobile industries diverted their industrial effluents into the septic tank without scrutiny, but the desludging operators were penalised by the CCMC for disposing the same waste into the STP.
- 8 Objections were also raised over the fact that there was only one decanting facility in Coimbatore, while Trichy had five decanting stations, even though Coimbatore was a bigger city compared to Trichy. The long distance to the sole decanting station resulted in making the entire desludging operation expensive, they added.

5.2. Way Forward

During the discussions with desludging operators in both the Town Panchayats, the following suggestions were made by them to streamline the operations and improve efficiency:

- 1 The CCMC should stop the registration of desludging vehicles from other districts.
- 2 Stern action should be taken against industries who are discharging industrial effluents into their septic tanks.
- 3 There should be at least five more decanting facilities in Coimbatore city.
- 4 Many of the desludging operators were willing to be registered with the PNP Town Panchayat. Some of them suggested that a common registration process be done for Coimbatore and the two town panchayats.

During the consultation, the operators also acknowledged the importance of personal protective equipment and agreed to use it. They were also open to the idea of an exclusive call centre for desludging, which they said would help in generating additional business and expanding their market reach. The operators reacted positively to the idea of an FSTP coming up in PNP, but requested that its capacity should be increased to match the amount of sludge being generated in the two town panchayats.



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The TNUSSP is implemented by a consortium of organisations led by the Indian Institute for Human Settlements (IIHS), in association with CDD Society, Gramalaya and Keystone Foundation.