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Cluster Model and Regulated De-sludging Service Provision in Tamil Nadu

March 2021

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For Citation: TNUSSP. (2021). Cluster Model and Regulated De-sludging Service Provision in Tamil Nadu.

This document is produced as part of Tamil Nadu Urban Sanitation Support Programme (TNUSSP). TNUSSP supports the Government of Tamil Nadu (GoTN) and cities in making improvements along the entire urban sanitation chain. The TNUSSP is being implemented by a consortium of organisations led by the Indian Institute for Human Settlements (IIHS), in association with CDD Society, Gramalaya, and Keystone Foundation.

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2. BMGF funding acknowledgment: This Research / Work was supported by Bill & Melinda Gates Foundation.

3. Acknowledgement: We thank Somnath Sen, Rajiv Raman and the Commissioner of Municipal Administration, Director of Town Panchayats and their team of officers for their support and sharing of relevant data.

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Abbreviations

AC	Appeals Committee
CPHEEO	Central Public Health and Environmental Engineering Organisation
FS	Fecal Sludge
FSM	Fecal Sludge Management
FSTP	Fecal Sludge Treatment Plant
GoTN	Government of Tamil Nadu
JC	Joint Committee
MoU	Memorandum of Understanding
O&M	Operation and Maintenance
OG	Operative Guidelines
OSS	On-site Sanitation System
SIP	State Investment Plan
SLA	Standard License Agreement
STP	Sewage Treatment Plant
TNUSSP	Tamil Nadu Urban Sanitation Support Programme
ULB	Urban Local Body

1. Introduction

1.1 Urban Sanitation Context

As per Census 2011, 48.4 per cent of Tamil Nadu's population live in urban areas, making it one of the most urbanised states in India. Urban areas in the state are categorised into a three-tier hierarchy with Municipal Corporations, Municipalities and Town Panchayats.

Table 1. 1: Urbanisation Structure in Tamil Nadu

S.No	Urban Local Body	No.	Population	% of Population
1	Corporations	15	1,34,28,002	43%
2	Municipalities	121	96,84,799	32%
3	Town Panchayats	528	80,90,847	25%
	Total	**664**	**3,12,03,648**	**100%**

Source: Census 2011

Within these urban areas, on-site sanitation systems (OSS) remain the dominant household sanitation arrangement across the state, with nearly 70 per cent of households connected to OSS and 30 per cent to piped sewer system (Ministry of Statistics and Programme Implementation, 2018). The sewage generated in piped sewer systems is treated in Sewage Treatment Plants (STPs). In 2017, the sewage generated from urban areas of Tamil Nadu was three times higher than the installed capacity for treatment in the state (Ministry of Environment, Forest and Climate Change, 2017). In addition to the lack of adequate treatment capacity, the absence of treatment facilities like Fecal Sludge Treatment Plants (FSTP) leads to unsafe disposal of Fecal Sludge (FS) accumulated from OSS into waterbodies around cities, causing contamination of potential drinking water sources.

The Government of Tamil Nadu (GoTN) has been a pioneer in not only recognising such challenges as core to improved standards of public health, but also prioritising the full sanitation chain, including the strengthening of Fecal Sludge Management (FSM) as an economical and sustainable complement to network-based systems.

In order to achieve the Tamil Nadu Sanitation Mission, GoTN aims to scale up access to safe and sustainable sanitation in all urban areas. As one of the first states to recognise the need for FSM to ensure access to sanitation for all, the government issued the Operative Guidelines (OG) for Septage Management in 2014. To support the GoTN in its sanitation mission and implementation of the OG, the Tamil Nadu Urban Sanitation Support Programme (TNUSSP) was launched in 2015.

2. De-sludging Services in Tamil Nadu and Introduction of the Cluster Approach

2.1 Current Status of De-sludging Services

The Technical Support Unit (TSU) of TNUSSP undertook baseline studies between 2016 and 2019 to assess the sanitation situation across the State. This involved understanding the status of various components across the full cycle of sanitation, including that of de-sludging operations.

The studies revealed that in terms of FSM service delivery, Tamil Nadu relies on an established market of private de-sludging operators. There are over 9,000 partly regulated private de-sludging operators providing de-sludging services across the State.

2.2 De-sludging Business

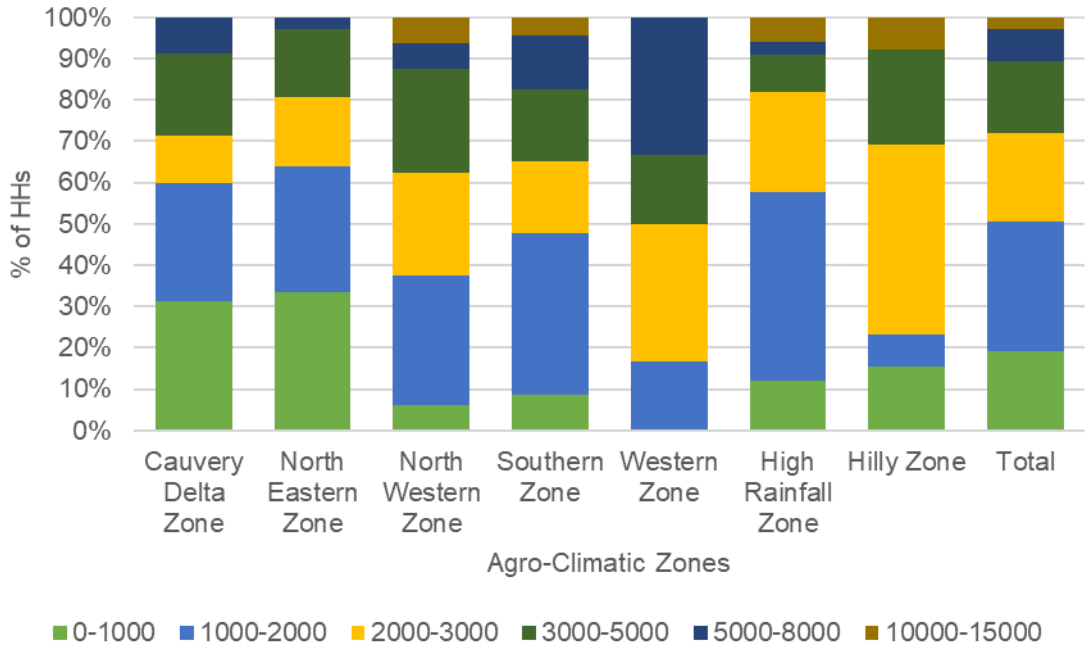
The initial discussions with de-sludging operators across the State revolved around the characteristics of their de-sludging business and operations. The findings from the discussions highlighted that private de-sludging businesses are largely family driven and male dominated. It was a hereditary occupation for many and owners of de-sludging vehicles sometimes double-up as operators and / or drivers and / or workers.

In terms of operation, the capital expenditure for de-sludging operators mainly consisted of the cost of trucks, which ranged from Rs 5 to 20 lakhs depending on whether the chassis and tanker were new or used. Tanker capacities ranged from 4,000 to 10,000 litres, with 6,000-litre tankers the most predominant type in the market. Fuel and labour costs accounted for most of the operational expenditure and varied significantly based on the size of the business, and travel distances to and from customer locations and disposal sites.

2.3 De-sludging Tariffs/Rates

The distance travelled by the operators from their place of business to the customer's location and from there to the disposal sites, was one of the most important factors influencing charges levied on customers. The baseline studies showed that majority of households pay between Rs. 1,000 and Rs. 2,000 per emptying, which are not significantly higher than the estimated rates for scheduled services. Only in areas with difficult terrain, charges tend to increase to Rs.2,000-3,000 per emptying.

Figure 2. 1: De-sludging Costs – Agro-Climatic Zones

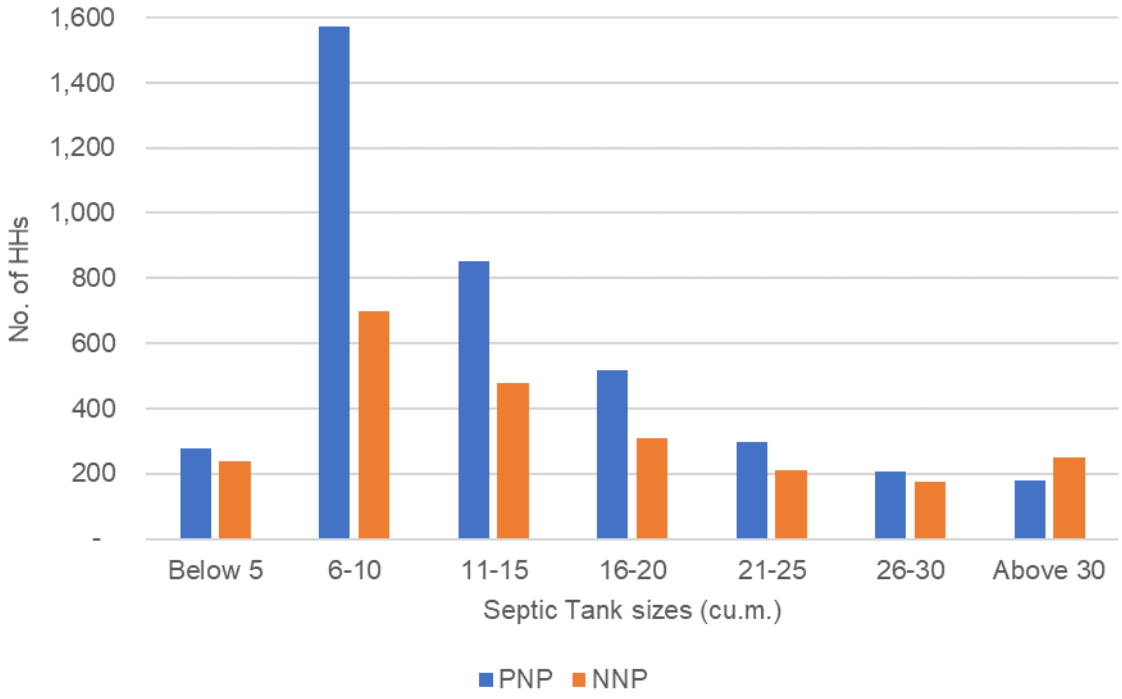


Source: TNUSSP, 2017

2.4 Low De-sludging Frequency

The comparable de-sludging tariffs of the on-demand service offered by the private de-sludging operators was also attributed to the frequency of de-sludging, which is influenced by the size of containment systems. The baseline studies showed a significant variance in the containment sizes across the state, with the average septic tank volume being 8.3 cubic metres, as opposed to the standard septic tank volume (5 users) of 1.18 cubic metre, as prescribed by the Central Public Health and Environmental Engineering Organisation (CPHEEO).

Figure 2. 2: Periyanaicken-Palayam (PNP) -Narasimhanaicken-Palayam (NNP) Sanitation Data Collection & Mapping Study



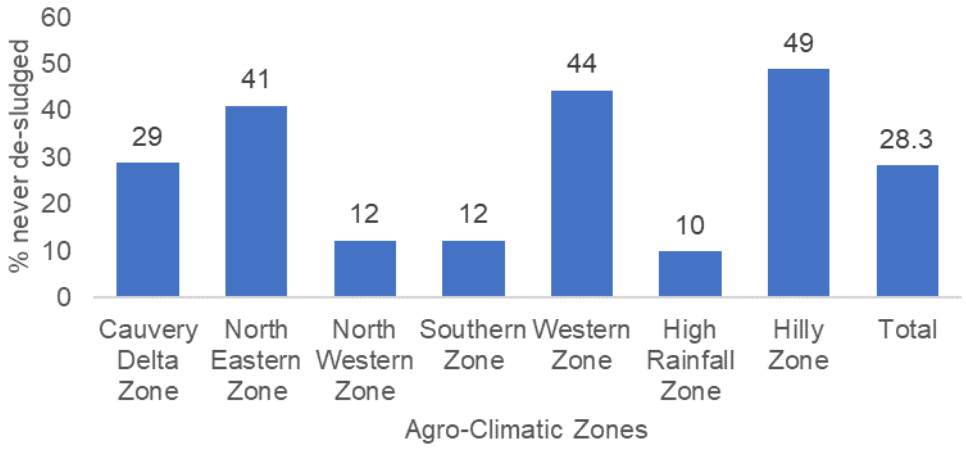
Source: TNUSSP, 2017

As shown in the graph above, a survey in two town panchayats of Coimbatore district revealed that septic tank sizes ranged from <5 to >30 cubic metres, with a majority ranging between 6-15 cu.m.

As a result of the large size of septic tanks, low frequency or no de-sludging was reported in many areas, with the exception of hilly areas. The graphs below also show that around 28 per cent of households have never de-sludged and over 32 per cent have de-sludged once in five years or more, challenging the standard de-sludging frequency of every 2-3 years[1].

[1] Many factors need to be considered to arrive at a frequency that works for all sizes of septic tanks. One of the key reasons why tanks are de-sludged is to improve treatment efficiency and performance of septic tanks, and there are ways other than scheduled de-sludging to do this.

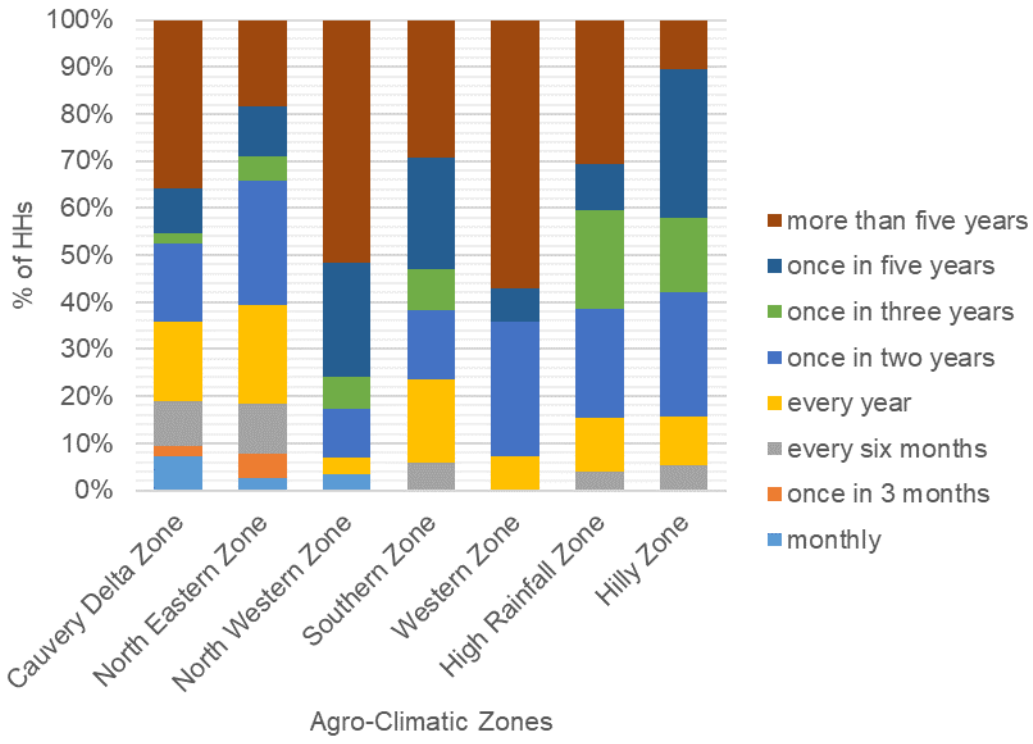
Figure 2. 3: Percentage of Households Never De-sludged



Base: HHs [N=178]

Source: TNUSSP, 2017

Figure 2. 4: De-sludging Frequency



Base: HHs [N=228]

Source: TNUSSP, 2017

Thereby, de-sludging operators described facing a myriad of challenges to run their business. The improper, large-sized containment systems defaulting the standard measurements lead to low frequency of de-sludging services, reducing business for operators. The fuel and labour costs were

the key operational expenditures stated by operators and the spending on fuel increased when operators travelled long distances to dispose at the limited number of treatment facilities.

2.5 The Need for Cluster Approach

The TNUSSP baseline studies with de-sludging operators reiterated the fact that operators resorted to unsafe disposal practices and disposed the fecal sludge in nearby waterbodies, stormwater drains, fields and other such open spaces.

While there are multiple reasons underpinning the prevalence of open dumping of fecal sludge, the lack of adequate disposal facilities is most significant, with de-sludging operators reporting difficulties in traveling long distances to dispose fecal sludge at designated facilities. This has also led to operators transferring the high transportation costs on to the customers.

To address this need for appropriately located disposal facilities, the GoTN in its OG adopted an approach of clustering Urban Local Bodies (ULBs) around treatment plants that optimised distance travelled by operators as well as increased the utilisation of the treatment facilities.

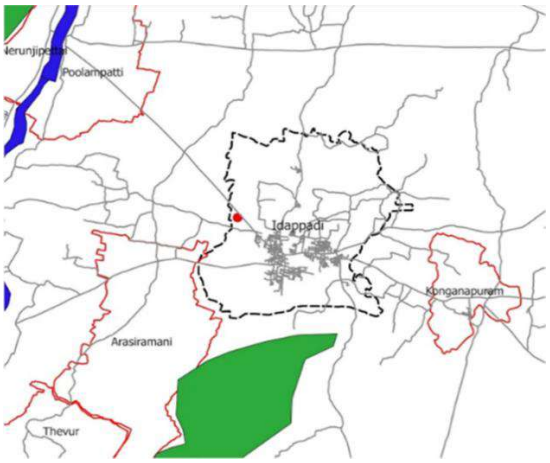
2.6 Introducing the Cluster Approach

The 2014 OG identified 35 clusters of local bodies based on the existing locations of STPs. The local bodies were grouped such that all collection points were situated within a radius of approximately 18-20 km of the designated STP. The OG also stipulated that decanting facilities should be designed based on expected volumes of septage generated in local body clusters with adequate capacity for the next five years based on the projected urbanisation in the cluster.

Further discussions with operators to operationalise the cluster approach revealed that the optimal travel distance to disposal facilities was within 10-12 km from customer sites. In addition to the distance factor, the studies also showed municipalities to be in a better position to manage treatment facilities with more resources and capacity, than the smaller town panchayats.

In essence, the baseline studies and discussions reiterated the benefits of a cluster approach to ensure total sanitation across the state. Hence, taking into account these findings, the government developed a State Investment Plan (SIP) that focused on scaling up treatment across the state on the basis of the cluster approach.

Figure 2. 5: Map Representing a Simple ULB Cluster



Source: TNUSSP, 2018

2.7 Scaling the Cluster Approach

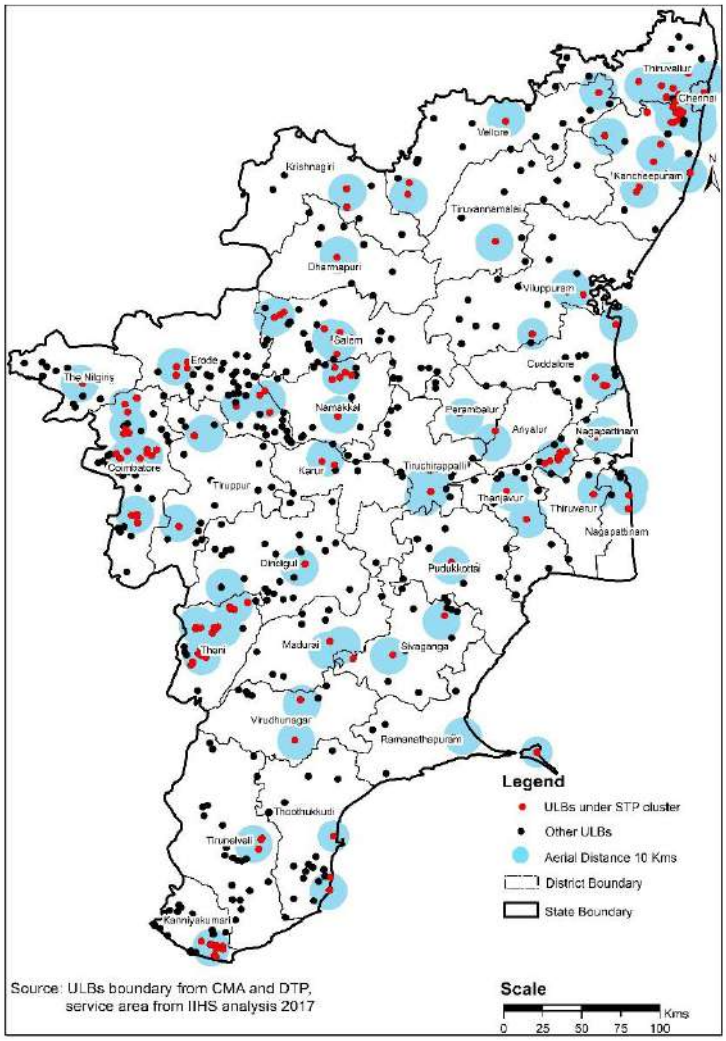
With the creation of adequate treatment facilities recognised as a critical first step, the SIP was prepared based on two core principles: 1) utilisation of existing treatment facilities through co-treatment of septage with sewage; and 2) adoption of a cluster approach, wherein ULBs are clustered around an existing or new treatment facility.

The plan was to be scaled up across the state in a phased manner as follows:

1. Phases I and II covers a population of 14.8 million through co-treatment at STPs.
2. Phase III secures municipal solid waste management (SWM) sites to locate FSTPs and covers a population of 3.4 million through clusters of municipalities and town panchayats.
3. Phases IV and V are clusters in small town panchayats or standalone FSTPs and cover a population of 6.4 million.

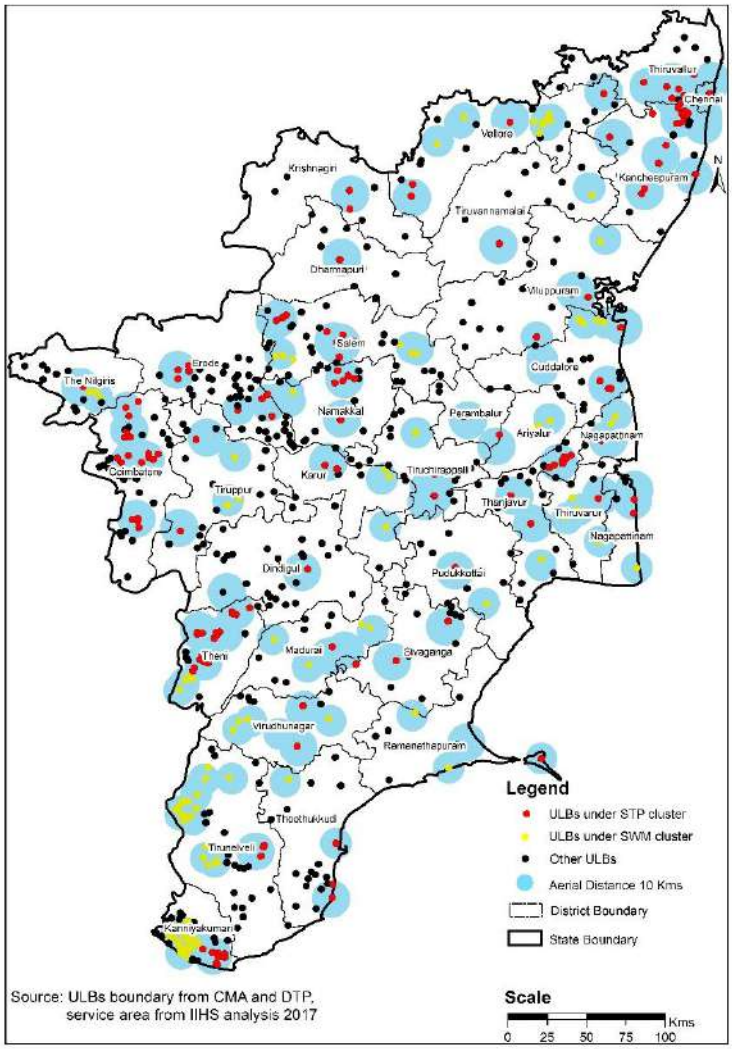
The GoTN is working on two phases – I, II, III – simultaneously. In 2018, the government sanctioned Rs. 200 crores for 49 FSTPs and in 2019, Rs. 31 crores for an additional 11 FSTPs under Phase III.

Figure 2. 6: Phase I & II- SIP



Source: TNUSSP, 2018

Figure 2. 7: Phase III- SIP



Source: TNUSSP, 2018

As these treatment facilities come into operation, they will be shared by the clusters of ULBs which include municipalities and town panchayats, for the scientific treatment and disposal of fecal sludge generated within the respective jurisdiction.

3. Operationalising the Cluster Model Memorandum of Understanding

At present, with 11 FSTPs completed and 45 FSTPs under various stages of construction, and co-treatment being enabled at 48 STPs, the government recognised the need to develop governance mechanisms that formalised the cluster model and ensured the sustained usage of treatment facilities.

In May 2020, the GoTN issued a Government Order (G.O (2D) 35) to operationalise the cluster approach and institute a governance mechanism – a Memorandum of Understanding (MoU) to formalise the working arrangements between ULBs for the joint usage of shared treatment facilities, including cost sharing of Operation and Maintenance (O&M).

3.1 Memorandum of Understanding (MoU)

The MoU establishes the cluster approach and provides ULB clusters with a facilitative framework for the O&M of the upcoming shared FSTPs as well as the co-treatment process at existing STPs.

While there exist few examples of such formal arrangements between local authorities that either share or provide services in the areas of water supply and solid waste management, none appear to be implemented at scale. This MoU is the first of its kind in the area of sanitation to be institutionalised at the state level.

Key Considerations and Decisions - During the process of developing the MoU, alternate options were considered for certain critical aspects of the MoU and key decisions were taken by the Advisory Committee[2]. These include the following:

1. Framing the MoU as a Tripartite Agreement: This would entail the concessionaire (or FSTP O&M contractor) being party to the MoU along with the concerned ULBs. This, however, was ruled out to reduce complexity and avoid confusion with respect to ownership and purview over the FSTP (which lies solely with the Host ULB).
2. Sharing of FSTP O&M costs: This would be done on the basis of (i) loads received or (ii) a base fee plus additional cost. The AC decided that the sharing formula would be tied to population, and costs shared in proportion to the ULB population.

By stipulating the terms and conditions for the shared usage of treatment facilities, the MoU aims to enable the smooth and sustained functioning of the FSTPs/STPs. The MoU details a set of obligations for the Host ULB i.e. the ULB where the treatment facility is located, as well as Participating ULBs i.e. ULBs that cluster around the said treatment facility. The key attributes of the MoU are:

- To define the stakeholders involved in the O&M and use of FSTPs, and in the co-treatment process.
- To set out the responsibilities of ULBs along with the terms and conditions for the use of the shared facility.

[2]As a part of TNUSSP, GoTN constituted the Advisory Committee and State Working Groups to help establish credibility of FSM as a sustainable and standalone sanitation solution and enable its quick scaling. Key members of the AC include Additional Chief Secretary, Municipal Administration and Water Supply Department (Chair), Heads of Departments (CMA, DTP), representatives from key departments and state agencies, and special invitees.

- To encourage the usage of treatment facilities, whilst affording Host ULBs the right to recover costs of operating and maintaining these facilities.
- To establish the principles by which O&M costs are shared between the ULBs served by an FSTP.
- To safeguard funds collected for the O&M of the FSTP, and thereby ensure financial sustainability.

The table below describes the various components of the MoU.

Table 3. 1: Salient Features of Memorandum of Understanding

S.No.	Salient Features	Details
1	Obligations of the Host and Participating ULBs	Prior to and from the starting date of operations
2	Payment Terms (only applicable for FSTP clusters)	As per agreed distribution of O&M fees, and paid on receipt of demand notice
3	Dispute Resolution	Joint Committee (JC) comprising representatives of regional authorities. Disputes referred to Appeals Committee (AC) constituted of senior officers of Commissionerate of Municipal Administration and Directorate of Town Panchayats.
4	Review and Amendment	On AC approval.
5	Term and Renewal	Three-year term and renewal to be agreed upon by all parties.
6	Temporary Shutdown/ Downtime of the Facility	Prior intimation to participating ULBs and de-sludging operators to avoid de-sludging or arrangements in the next nearest available treatment facility.
7	Force Majeure Event	Host ULB to notify Participating ULBs about the nature, extent and estimated duration of the event. Parties to discuss resumption of obligations.
8	Termination	On AC approval.

In summary, the MoU brings together ULBs in a cluster to oversee the use and maintenance of shared treatment facilities whilst accessing the services of treatment facilities. The MoU is a significant step towards ensuring sustainability of treatment facilities by:

- Safeguarding funds collected for the O&M of the FSTP.
- Mandating ULBs to follow proper disposal and treatment processes.

In order to sustain operations of the treatment facilities, adequate volume of fecal sludge is a key requirement. With this aim of promoting the usage of the treatment facilities and preventing open dumping, the MoU assigns Host and Participating ULBs the responsibility of ensuring that all de-sludging operators operating within their jurisdiction are regulated or streamlined through a formal licensing agreement.

4. Regulating De-sludging Services

4.1 Need for Regulated De-sludging Model

De-sludging services in Tamil Nadu entail a large number of partly regulated private de-sludging operators providing an on-demand service to a majority of households and establishments, supplemented in some areas by a state-run subsidised service. As highlighted in the previous sections, these operators practice unsafe disposal and work in unsafe conditions. Hence, the GoTN seeks to address these challenges through a light touch regulated de-sludging model that is market-based with provisions for the urban poor. The model focuses on strengthening and regulating the existing on-demand services as opposed to introducing a new system of scheduled services. It aims to ensure safe sanitation along with enhanced accessibility and sustainability of de-sludging services. This model is part of the FSM cluster model under implementation by the GoTN adopted as part of the SIP.

4.2 Introduction

The key objectives of the regulation model adopted by Tamil Nadu are:

1. To ensure and enable proper de-sludging practices by improving access to treatment facilities and removing barriers to safe disposal.
2. To ensure minimal disruption to existing de-sludging businesses and protection of livelihoods.
3. To ensure worker health, safety and welfare.

Thereby, in addition to the MoU as part of the Government Order (G.O (2D) 35), the GoTN also issued the Standard License Agreement (SLA) that streamlines the collection and conveyance process and aligns de-sludging operations with the cluster approach.

4.3 Standard License Agreement

The SLA was developed to achieve the above-mentioned objectives as well as comply with the provisions of the OG, Ministry of Housing and Urban Affairs' guidelines and Swachh Survekshan 2020 that emphasise treatment of septage, licensing of operators and regulation of open dumping. While it was primarily aimed at preventing open disposal of FS, the SLA reinforces the cluster approach.

Through the SLA, the GoTN has mandated 'Host ULBs' (i.e. ULBs where treatment facilities are located) to license private de-sludging operators serving within the cluster. De-sludging operators can operate across ULBs in a cluster once the vehicle is registered/licensed with the Host ULB. When the de-sludging operators apply for license, they are required to provide a set of documents as listed in the table below:

Table 4. 1: Documents required for Licensing

S.No.	Documents / Requirement	Phase
1	Vehicle documents - RC book, Insurance, FC, Goods vehicle permit and photograph of vehicle	At the time of new license / renewal

Table 4. 1: Documents required for Licensing		
S.No.	**Documents / Requirement**	**Phase**
2	Worker / Driver - Name, Photo ID proof, Medical certificate, Personal accident insurance cover of Rs. 10 lakhs	At the time of new license / renewal
3	Signed undertaking preventing manual scavenging as per G.O. (Ms) No. 293 MAWS Department dated 26.11.2010	At the time of new license / renewal
4	Equip vehicle with approved GPS device and provide access to ULB	Ongoing
5	Ensure periodic training, maintenance of logbook and usage of safety gears	Ongoing

As per the SLA, operators are mandated to equip their vehicles with approved GPS devices that can be accessed by ULBs to ensure disposal only at the designated treatment facilities. The SLA is to be renewed annually, and it is not valid for collection and transportation of industrial waste or mixed industrial waste. In terms of occupational safety, licensed operators are to undertake periodic health and safety training for employees and improve access to safety gears, and ensure their usage during collection, transportation and disposal of FS.

The SLA also mandates ULBs to periodically publish a list of licensed operators to ensure households and establishments engage only such licensed operators. Further, ULBs are required to share information on grievance redressal mechanisms for households to address violations.

4.4 Advantages of the Regulation Model

While the cluster approach offers operators access to a larger market (i.e. cluster of ULBs as opposed to a single ULB) through a single license, the SLA provides a light-touch regulation of a thriving de-sludging market in the state.

The SLA promotes usage of treatment facilities by reducing the financial burden on private operators and limits rent-seeking opportunities, by mandating a nominal License Fee of Rs. 1,000 per vehicle per year, and a Tipping Fee of Rs.100 per load. Additionally, it requires operators to improve the health and safety of employees.

The regulation model not only streamlines the de-sludging process without price interventions but also ensures minimal disruption to the existing market.

Box 4. 1: Key Advantages of the Tamil Nadu Regulation Model

- ❖ Streamlines de-sludging process by providing access to adequate treatment facilities through the cluster approach
- ❖ Provides de-sludging operators access to a larger market through the cluster approach
- ❖ Promotes use of disposal facilities by reducing financial burden (i.e. minimal fees)
- ❖ Minimises disruption to a functional market with no price intervention
- ❖ Addresses sanitation workers' safety and welfare requirements

The regulated de-sludging model primarily aligns de-sludging operations with the cluster approach to ensure safe collection and disposal at treatment facilities. However, to ensure inclusivity and accessibility of de-sludging services to all sections of the population, other de-sludging models for the urban poor and bulk generators have been proposed.

4.5 Inclusive De-sludging Service Provision

Inclusive sanitation ensures equitable service provision for all segments of the society. The urban poor are unable to access de-sludging services due to various reasons which include issues of affordability, availability of de-sludging services at short notice and physical accessibility. In addition to on-demand de-sludging service provided by private operators, certain ULBs continue to run subsidised services as well, but these services are limited, and it requires time to avail these services. Further, the de-sludging vehicles face physical constraints of narrow pathways to reach urban poor households and inaccessible spaces to service the septic tanks and pits. Hence, there is a need to create enabling service delivery models to reach the urban poor, public facilities, institutions and establishments, and areas with difficult terrains facing monopoly of private providers.

TNUSSP is exploring models to offer appropriate de-sludging services for different segments. This includes:

1. Informal settlements: ULB-run/contracted or private on-demand service at subsidised rates.
2. Bulk Generators (CT/PTs): ULB-run/contracted on-demand/scheduled service at subsidised rates.

The de-sludging service models for bulk generators are being piloted in CT/PTs in PNP/NNP and Trichy. Similarly, a pilot for affordable de-sludging model has been conducted in two locations of Trichy.

5. Implementation of Cluster and Regulated De-sludging Model

To ensure institutionalisation of the provisions of the MoU & Licensing mechanisms, a byelaw for Septage Management framed as part of the OG has been updated and circulated across ULBs. These byelaws, once enacted by all host and participating ULBs, will be key to enforcing the cost-sharing mechanisms as part of the MoU and licensing of de-sludging operators at the cluster level. At present, nearly 43 ULBs have received general approval for issuing public notification of the byelaws which would be followed by the final gazette notification process.

At the state level, the implementation of the MoU and Licensing agreement as part of the Cluster approach has been undertaken through various methods. A series of webinars have been conducted for ULBs officials from nearly 200 ULBs. Digital learning modules have also been developed around the MoU and licensing agreement in Tamil. These digital modules were created as self-learning videos to ensure accessibility to resources for ULB officials such as Municipal Commissioners, Executive Officers, Engineers inter alios. Additionally, field level support and coordination for signing of MoUs is ongoing and nearly 21 ULBs (11 FSTP and 10 STP ULBs) have signed the MoUs across Tamil Nadu.

As FSM is a relatively new area for GoTN, the operationalisation of the two governance mechanisms has faced challenges such as knowledge gaps, lack of officers' capacity to pick up additional responsibilities, and apprehensions in terms of availability of funds for financing and cost-sharing of FSTP O&M. In terms of licensing, with disparate systems already in existence in certain ULBs, there is certain resistance to shift to nominal fees prescribed as part of the standard licensing agreement. Additionally, the COVID-19 pandemic has put a strain on the finances and realigned the priorities of officers, and hence, needs a push from the state level to re-start and sustain the cluster operations.

As with most governance mechanisms, enforcement is key to sustainability which involves unique implementation models, monitoring support as well as a concerted effort to build awareness, capacity, and address concerns through a consultative process.

Bibliography

Commissionerate of Municipal Administration (2014). *Operative Guidelines for Septage Management for Local Bodies in Tamil Nadu*. Municipal Administration and Water Supply Department, Government of Tamil Nadu.

Ministry of Statistics and Programme Implementation. (2018). *National Sample Survey (76th Round) Drinking water, sanitation and hygiene in India.*

Ministry of Environment, Forest and Climate Change. (2017). *Lok Sabha Unstarred Question No. 2541.* Government of India.

Municipal Administration and Water Supply Department (2014). *Septage Management – Operative Guidelines for Septage Management for Urban and Rural Local Bodies in Tamil Nadu – Approved – Orders Issued (G.O. (Ms) No. 106.)*. Government of Tamil Nadu.

Municipal Administration and Water Supply Department (2018). *In principle approval for creation of 49 numbers of Faecal Sludge and Septage Management (FSSM) treatment facility to cover 51 Municipalities and 59 Town Panchayats – Orders – Issued (G.O. (Ms) No. 88.)*. Government of Tamil Nadu.

Municipal Administration and Water Supply Department (2020). *Faecal Sludge and Septage Treatment Plants – Approval of Faecal Sludge and Septage Management Licensing Agreement and Memorandum of Understanding of the Faecal Sludge and Septage Treatment Plants prepared by TSU of TNUSSP, IIHS for the use of the constructed Faecal Sludge and Septage Treatment Plants – Orders – Issued (G.O. (2D) No. 35.)*. Government of Tamil Nadu.

TNUSSP. (2016). *Baseline Studies for Urban Sanitation: Tiruchirappalli, Periyanaicken-Palayam, Narasimhanaicken-Palayam*.

TNUSSP. (2017). *Tamil Nadu State Baseline Study: Technical Assessment of Sanitation Chain*.

TNUSSP. (2018). *Draft State Investment Plan for FSM*.

TNUSSP. (2019). *Kilakarai Baseline Study for Urban Sanitation*.

TNUSSP. (2019). *Kodaikanal Baseline Study for Urban Sanitation*.

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