



# PROCESS DOCUMENTATION FOR ESTABLISHING MUZHU SUGADHARAM INFORMATION SYSTEM

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## Abbreviations

<b>AC</b>	Advisory Committee
<b>BMGF</b>	Bill and Melinda Gates Foundation
<b>CMA</b>	Commissionerate of Municipal Administration
<b>DTP</b>	Directorate of Town Panchayats
<b>FSM</b>	Fecal Sludge Management
<b>FSSM</b>	Fecal Sludge and Septage Management
<b>FSTP</b>	Fecal Sludge Treatment Plant
<b>GoTN</b>	Government of Tamil Nadu
<b>MAWS</b>	Municipal Administration and Water Supply
<b>MuSu</b>	Muzhu Sughadharam
<b>NNP</b>	Narasimhanaicken-palayam
<b>PNP</b>	Periyanaicken-palayam
<b>STP</b>	Sludge Treatment Plant
<b>TCC</b>	Trichy City Corporation
<b>TNUSSP</b>	Tamil Nadu Urban Sanitation Support Programme
<b>TP</b>	Town Panchayat
<b>TSU</b>	Technical Support Unit
<b>ULB</b>	Urban Local Body





# Introduction

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# 1. Introduction

## 1.1 Background

The Muzhu Sugadharam (MuSu) Information System is a state-wide initiative by the Municipal Administration and Water Supply (MAWS) Department of the Government of Tamil Nadu (GoTN) and implemented by the Tamil Nadu Urban Sanitation Support System (TNUSSP) to collect and compile accurate and relevant data on septage management at the Urban Local Body (ULB) level. This document outlines all the processes followed to design and develop the MuSu information system to monitor the Operative Guidelines for Septage Management, the broad indicators covered therein and the final monitoring/dashboard mechanism.

### 1.1.1 Tamil Nadu Urban Sanitation Support Programme

The Government of Tamil Nadu (GoTN) has been a pioneer in recognising the importance of securing full sanitation as core to improved public health outcomes for all citizens. The GoTN was the first Indian State to issue the Operative Guidelines for Septage Management for Local Bodies in Tamil Nadu in September 2014. The guidelines prioritised the strengthening of Fecal Sludge and Septage Management (FSSM) as the economical and sustainable solution for small and medium towns, and as a supplement to network-based sewerage systems in bigger cities.

To help achieve Tamil Nadu's Sanitation Mission (Muzhu Sugadhara Tamizhagam), the Bill and Melinda Gates Foundation (BMGF) is supporting the GoTN by setting up a Technical Support Unit (TSU) within the MAWS Department. The TSU is accountable to the Advisory committee (AC), chaired by the Principal Secretary (MAWS). A consortium of organisations led by the Indian Institute for Human Settlements (IIHS), and comprising Gramalaya, Keystone Foundation and CDD Society have been commissioned to implement the programme via TSUs at the state and city levels.

TNUSSP aims at effecting improvements along the entire urban sanitation chain in the state of Tamil Nadu, and demonstrating innovations in two model urban locations. A two-pronged approach is being adopted: working in the two model urban locations to demonstrate city level transformations across the sanitation chain, while in parallel, creating an enabling environment, implementing statewide actions, and scaling-up of innovations. The first phase of the programme is for a period of two years from November 2015 to October 2017.

TNUSSP works in the model cities of Tiruchirappalli (Trichy), and Periyanaicken-palayam (PNP) and Narasimhanaicken-palayam (NNP) town panchayats (TPs) in Coimbatore district. Both these locations represent the two most significant typologies in the State for scaling up – Trichy, a large city that is partially sewered that needs supplementation by FSSM to achieve 100 per cent sanitation outcomes; and the latter, a cluster of smaller TPs, that requires options to properly treat their human waste. The programme works closely with the Tiruchirappalli City Corporation (TCC), and PNP-NNP TP Councils.

## 1.2 Operative Guidelines for Septage Management for Local Bodies in Tamil Nadu

The Government of Tamil Nadu issued the Operative Guidelines for Septage Management in September 2014, covering containment, collection, transportation, treatment and disposal. The Septage Management guidelines for the local bodies include both residential and non- residential / commercial waste but excludes industrial waste. The guidelines seek to empower urban local bodies (ULB) with knowledge and facilities for effective septage management.

The guidelines comprise the following eight components:

### **1.2.1 Design and Construction of Septic Tanks**

- a. Evaluate existing septic tank designs and other storage/treatment systems and modify (in case of variation) based on the recommended design.
- b. Issue notice to households and establishments for septic tanks that do not meet the standard septic tank design under the Tamil Nadu Public Health Act, 1939.
- c. Identify insanitary latrines and convert them to sanitary latrines for safe collection and disposal of waste.

### **1.2.2 Pumping and De-sludging**

- a. Conduct periodic and routine de-sludging based on the capacity of septic tank.
- b. Collection system for cluster Local Bodies: Wherever sewage is currently discharged into fresh water or stormwater drains, Local Bodies to ensure a proper collection and transportation system, and treatment of sewage at the nearest STP, and safe disposal.

### **1.2.3 Septage Transportation**

- a. Local body clusters have been identified for treatment of collected septage at the earmarked STP locations.
- b. Only certified and licensed Septage Transporters to de-sludge and transport waste to the designated STP.
- c. Septage Transportation Vehicle Operators involved in the process of collection, treatment and disposal of sewage should be well trained and equipped with safety gears, uniforms, tools and proper vacuum trucks, to ensure safe handling of sewage.

To operationalise the guidelines, 35 clusters of Local Bodies have been identified based on the existing location of STPs. The local bodies have been grouped in such a way that all collections points are situated approximately within 18-20 km radius of the designated STP.

### **1.2.4 Treatment & Final Disposal**

- a. Design of Decantation Facility: Decantation facility should be designed based on the expected volumes of septage generated in local body clusters with adequate capacity for the next five years based on the urbanisation trend in the cluster.
- b. Quality Check: Input quality of the collected septage should be tested at the decant facility for presence of any metal or traces of industrial waste. No commercial or industrial waste should be unloaded through these facilities.

### **1.2.5 Information, Education and Communication**

- a. IEC and training for Municipal staff on standard septic tank design, the need for periodic inspection and de-sludging of sewage, design of a decant facility, and about tender for engaging licensed operators.
- b. IEC for Residents to sensitise them on best septage management practices including the health hazards associated with improper collection and treatment of waste, the ill-effects of discharging sewage into freshwater/stormwater drains.
- c. IEC for Septage Transporters / Private Vendor on the safe collection and transportation of sewage including vehicle design, de-sludging process, safety gears and safe disposal at the nearest STP.

### **1.2.6 Fees/Charges for De-sludging, Transportation and Treatment**

- a. Fees for de-sludging should be collected from residents.
- b. Transport charges should be determined based on market rates.
- c. For treatment, the on-going rate of Rs. 150-200 can be charged for 9,000 litres of waste collected.
- d. Periodic revisions of charges to be effected based on revisions in costs involved.

### **1.2.7 Record Keeping and Reporting through MIS**

#### **a. Management Information Systems**

Information related to septage generation from households and commercial establishments needs to be collected by the Local Bodies. Household level details such as insanitary latrines, septic tank location, operator in-charge for each location, vehicle details, and name and location of STP earmarked for disposal of septage and decant facility should be duly collected by all Local Bodies.

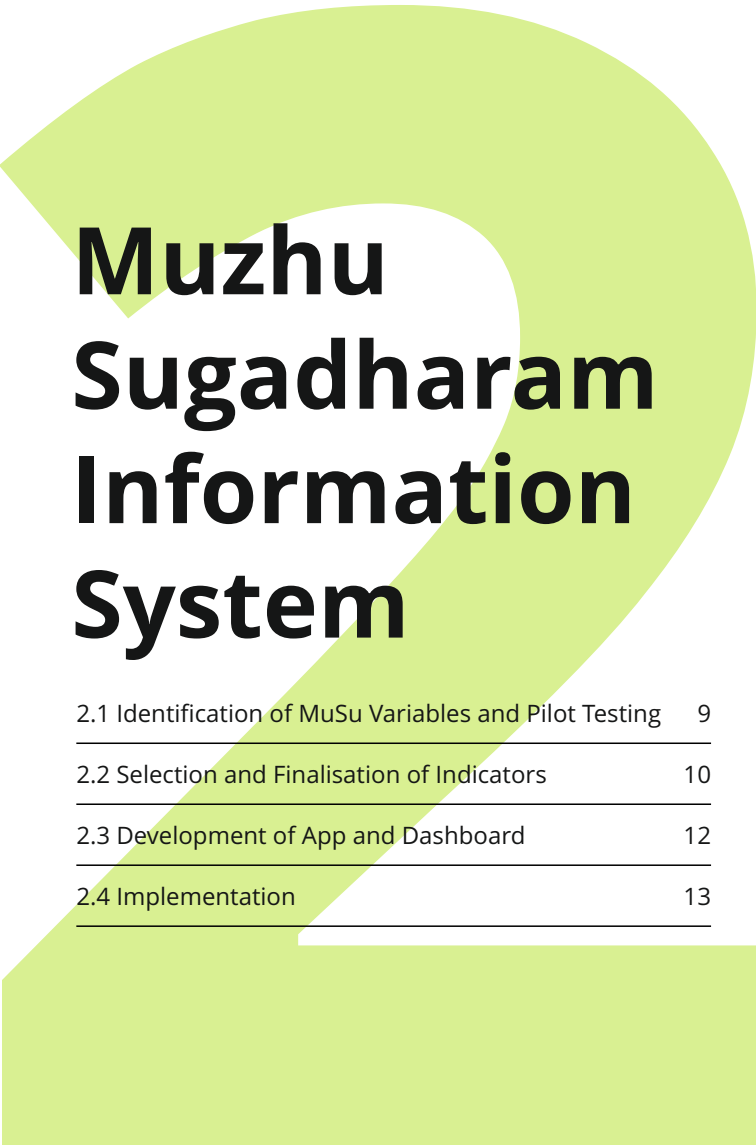
#### **b. Geographical Information System**

GIS can be used to plan the route of septage vehicles and tracking them for regular recordkeeping. Public Grievance Redressal should also form a part of local bodies' recordkeeping and helpline numbers shared with residents.

### **1.2.8 Draft By-laws**

A template of by-laws which covers the various aspects of septage management has been provided to the ULBs to adopt and enact. It includes sections on - Short title, Commencement and applicability; Definitions; Reformative measures and compliances by owners or the occupier; Administrative measures and enforcement of by-laws; Appointment and operation by operators; Penalties for violation of by-laws; Appeals; Power to remove difficulties; Saving.





# Muzhu Sugadharam Information System

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## 2. Muzhu Sugadharam Information System

Lack of reliable and accurate data on the status of sanitation in ULBs has been identified as one of the key barriers to improving the sanitation chain in the urban areas of Tamil Nadu. MuSu is a state-wide initiative by the MAWS Department and implemented by TNUSSP to collect and compile accurate and relevant data on septage management at the ULB level. A first of its kind initiative in the state, the MuSu Information system is based on the Operative Guidelines on Septage Management, 2014, and seeks to assess the current status of the ULBs with respect to septage management and track the progress across the sanitation chain. The data collected across the state will be analysed and presented on a dashboard which will provide an at-a-glance view of the key indicators on septage management by district and at the ULB level.

This document outlines all the processes followed to design and develop the MuSu Information System to monitor the Operative Guidelines for Septage Management, the broad indicators covered therein and the final monitoring/dashboard mechanism. This document is targeted at urban planners and managers planning to track the various aspects of fecal sludge management (FSM). A separate note on the MuSu App and a detailed user manual exists.

### 2.1 Identification of MuSu Variables and Pilot Testing

Table 2.1 shows the steps involved in the process of developing the MuSu Indicators along with timelines, which is broadly divided into three processes - Selection and finalisation of indicators, App & Dashboard development, and Implementation of the MuSu app. The next section discusses each of these aspects in detail.

Table 2.1: Process Involved in Development of MuSu Indicator and Associated Timelines		
S. No		
Selection of Indicators		
1	Discussion with GoTN	August 2015
2	Vendor identification	June 2016
3	Vendor Presentation to the GoTN	June 2016
4	Identification of Indicators	April 2016
5	Identifying data sources	June-July 2016
6	Field testing and incorporating field insights	June-July 2016
7	Data collection format presented to GoTN	August 2016
8	Drawing a list of indicators based on GoTN inputs	September 2016
App and Dashboard Development		
9	Development of App and Dashboard	May 2016 onwards
10	Pilot-testing of the App	October 2016
11	Incorporating field test insights	October 2016
12	Presentation of App and dashboard to GoTN	November 2016
13	MuSu Manual development	April 2017
14	MuSu Manual translation	May 2017
Implementation		
15	Designing the training module	March to April 2017
16	Training Coordination	April 2017
17	Training	April to July 2017
18	Helpdesk	May 2017
19	Data collection	July 2017 to present
20	Data quality control	July 2017 to present
Source: TNUSSP, 2017		

## 2.2 Selection and Finalisation of Indicators

### 2.2.1 Identifying variables for data collection

A list of all variables relevant to all stages of septage management – containment, collection, transportation, treatment, disposal and reuse - were identified to get an idea of the potential variables which could be tracked. With respect to collection, information was asked at the household, community toilet, public toilet and commercial / establishment level. Each indicator identified was then classified based on the source of information, unit of measure, its reliability, and frequency of availability.

Data for the above indicators comes from both primary and secondary sources including:

1. Census of India, 2011 as primary source for basic details such as demography.
2. ULB's own records (including property tax records, water and sewerage connections, desludging operators registered, data from treatment facilities, etc.).
3. Data from other departments and agencies including Tamil Nadu Slum Clearance Board, Tamil Nadu Water Supply and Drainage Board, Pollution Control Board, and other agencies.

Based on the preliminary list and subsequent discussions with the the Advisory Committee, a list of indicators which can be pursued in the first phase of the project were arrived at. A list of about 75 indicators / data points were identified as relevant for tracking in the first phase and comprised the following six thematic areas – basic and demographic information, safe containment, collection or desludging, conveyance and disposal, treatment and reuse. Annexure 1 presents the final data collection instrument used for piloting.

### 2.2.2 Pilot testing data collection format

Using the list of variables identified, a data collection format was designed for field testing. Based on the advice from the Commissionerate of Municipal Administration (CMA) and Directorate of Town Panchayats (DTP), seven sites were selected for field testing – one corporation, two municipalities, and four town panchayats. With administrative approvals obtained in advance with the help of CMA and DTP, the pilot testing was carried out between June and July 2016.

All available data from the census was pre-filled in the questionnaire before the pilot testing field trip. Since the data requirements were comprehensive, the first point of contact was the Commissioner/ Executive Officer in each ULB who provided all information available and further gave referrals to the departments concerned, wherever required.

For the data collected during the field test, the summary of availability of information on various indicators and their reliability is presented in Table 2.2. With respect to demographics, highly-reliable Census data is available for 2011. For 2016, the population data was based on projections by city corporation, municipality and panchayat sources and hence, come with medium reliability. Information on containment practices carries low to medium reliability, while reliability of limited information on collection is generally low. Partial information on 'conveyance & disposal' and 'treatment & reuse' is available in municipalities with low-medium reliability.

Table 2.2: Availability and reliability of data on sanitation indicators							
S. No		City corporation		Municipalities		Town Panchayats	
		Available	Reliability	Available	Reliability	Available	Reliability
1	Demography	Yes	Medium – High	Yes	Medium – High	Yes	Medium – High
2	Containment	Yes	Low-Medium	Yes	Low-Medium	Yes	Low-Medium
3	Collection	No	Low	No	Low	No	Low
4	Conveyance and disposal	Partial	Low-Medium	No	Low	No	Low

Table 2.2: Availability and reliability of data on sanitation indicators							
S. No		City corporation		Municipalities		Town Panchayats	
		Available	Reliability	Available	Reliability	Available	Reliability
5	Treatment and reuse	Partial	Low-Medium	NA*	NA*	NA*	NA*
Source: TNUSSP, 2016							

The summary of findings of the pilot testing field visit was discussed with CMA and in the AC meeting. Based on these discussions, the initial set of indicators were further pruned to keep the focus on available data for the first phase, and the questionnaire was finalised. Indicators such as septage reuse, containment in community toilet and public toilets, commercial and institutional properties were removed, and planned to be included in the subsequent phases.

### 2.2.3 Indicators covered in Muzhu Sugadharam Information System

The MuSu data collection format is intended for ULBs to report data on basic details and key elements across the sanitation chain and includes information presented in Table 2.3.

Table 2.3: Indicators covered under MuSu Information System		
S. No	Type of Information	Details
1	General and demographic information of the ULB	General and demographic information of the ULB
2	Household sanitation practices and containment	Household arrangement for sanitation and containment including details of number of households practising open defecation/ using community toilets/ using household toilets along with their containment type – sewer, septic tank and pit latrines is collected. Also, number of toilets constructed under the Swachh Bharat Mission along with the containment type is collected. All data is collected for the census year and the reporting year.
3	Collection; conveyance and disposal of septage	Details of the desludging truck operators within the ULB along with their truck capacity, registration with ULB, disposal sites and distance to disposal sites are collected. Information on truck operators from the neighbouring ULB operational in its jurisdiction is also collected.
4	Treatment of septage/sewage	ULBs are also expected to provide an estimate for septage generated and for treatment along with details of the pumping station. Further, they should also report on the number of treatment plants for septage and sewage along with the technology used, capacity, utilisation and co-treatment details.
Source: TNUSSP, 2016		

Data collection format finally used is presented in Annexure 2.

## 2.3 Development of App and Dashboard

The AC advised to facilitate data entry through an app, and collate and analyse data through a dashboard mechanism which displays at a glance all indicators for all ULBs and helps visualise data.

### 2.3.1 Vendor procurement for MuSu Information System App development

To better understand the dashboard user interface, component indicators and how it aggregates information across ULBs, a vendor who had worked on a similar application in another BMGF project was invited to make a presentation to the AC. The vendor presentation demonstrated three modules consisting of data collection, consolidation, and analysis and reporting through dashboard and included information on the full cycle of sanitation. The demonstration data collection module required a single-point approval at the ULB-level while several persons responsible in the ULB can enter data using a mobile phone, a tablet as well as a web-portal. The AC was in principle satisfied with the dashboard mechanism, its data entry and processing components, and gave suggestions for a state-wide adaptation.

Given the in-principle approval for the presentation and the limited time frame, TNUSSP decided to work with the vendor Microware Computing & Consulting Private Limited (Microware henceforth) to develop and maintain the MuSu app. Although this is a deviation from the IIHS policy to procure a vendor through open bidding, it was decided to continue with the single source procurement given the timeline and in-principle approval from AC. However, competitive terms were negotiated with the vendor and justifications for selection were documented. The scope of work included:

1. Designing a MuSu Information System for use by the Government of Tamil Nadu.
2. Testing, refining and implementing the system for data collection, analyses, and production of high quality outputs.
3. Operationalising the system and carrying out the maintenance management of MuSu system.
4. Developing manuals, and training selected personnel from GoTN agencies in running the system and assuming full operational ownership.
5. Reviewing related data management systems in use within the urban administration system of the GoTN and examining possibilities for inter-linking and integration.
6. Developing an app for monitoring FSM in Tamil Nadu.
7. Recommending improvements in systems of data collection and reporting, data management and analysis for urban sanitation.

Further details are available in Annexure 3

The total cost of MuSu app development was Rs. 25 lakhs which included one year of maintenance after which an annual maintenance contract was issued as needed.

### 2.3.2 Designing the MuSu App

Based on the data collection format, an app called the Muzhu Sugadharam Information System (MuSu) was developed. Depending on the resource availability in the ULBs – with some having tablets and others having desktops – both web and tablet versions of the app were developed. The app, developed on an android platform can be easily downloaded on Android-compatible devices. For installation of the MuSu app, system configuration requirements included 1 GB RAM space, which could be used in a 32 and 64 bit processor, and was compatible with Windows 7, 8, 10 and Windows XP and Vista. The app itself was 9.3 MB in size.

For a desktop computer or laptop using the Windows operating System, the MuSu application can be downloaded only after installing an Android emulator, Bluestacks in the system. Bluestacks is a software which can emulate or run the Android operating system on the desktop or laptop for the users who want to use Android-based applications. While only one password is allowed per ULB, data can be entered through multiple devices such as a mobile phone, tablet or computer using the same password.

MuSu app features include:

- In-built protocol for handling duplicate entries
- Drop down options of known categories or data entry range with options to create new ones
- Data validity checks by controlling type of data that can be entered

- Source identification of data and option for creating new data source /category
- A hyperlink to the definition built in the software
- Flexibility to allow for changes in primary markers of a ULB - wards, boundaries, population

The technical specialists designing the software were part of TSU and all queries and clarifications on the questionnaire were handled by them. The app allowed for data entry and storage as and when it arrived. Once all data was uploaded and submitted, the ULBs cannot edit their own data. Once data is submitted at the ULB level, it is reviewed at the TSU level to check for any outliers and clarifications are sought with the ULB if required.

### 2.3.3 Pilot testing of the Application

Based on the initial version of the MuSu app, Microware and TNUSSP decided to pilot test it in nine ULBs over three days in January 2017. All field trips were facilitated by CMA and DTP. Based on the field-testing of the app, certain modifications such as including data entry options on truck capacity and list of Sewage Treatment Plant (STPs) were carried out. Also, some ULBs did not maintain any record on toilets and hence only an approximate figure was entered for them.

Importantly, it was felt during the field visit that estimating the septage generated in the ULB was difficult and hence, it was decided to also provide an excel sheet to do this calculation offline and feed in the data. Based on the data collected for nine ULBs, the dashboard was designed. Simultaneously, a user manual for MuSu app along with the Tamil version of the app and dashboard were prepared. All these were presented to the AC for approval.

The dashboard has been designed in such a way that the ULB can view its own data over time, while state agencies and authorised persons can view the data across all ULBs. While multiple downloads of the app are allowed to facilitate usage across devices only one user id is allowed per ULB.

For now data is resident in the Microware server. To facilitate data migration to the GoTN server, a security audit of the application by a government-empaneled company has been completed. Steps are under way to enable the GoTN to assume ownership of the data.

## 2.4 Implementation

### 2.4.1 Orientation on MuSu App for Government Officers

Participants from 12 Corporations, 124 Municipalities and 528 Town Panchayats attended the orientation programme that was held zone-wise across the state. Three participants each from the Municipal Corporations and Municipalities, including the Commissioner, Executive Engineer and a Computer Data Entry Operator attended the orientation programme. The participants from the Town Panchayats included the Executive Officer, Sanitary Inspector and a Data Entry Operator. The list of officers was provided by CMA and DTP and was used as basis for planning the training in each zone. The facilitation of the training programme was done by CMA and DTP. Between April 2017 and July 2017, a series of 35 sessions across 21 days were organised, and 1,992 ULB officers (516 from corporations and municipalities and 1,584 from town panchayats), two each from Chennai Metropolitan Water Supply and Sewerage Board and Greater Chennai Corporation were trained. Each orientation session was designed for three hours and included

- A brief introduction on TNUSSP and the Operative Guidelines for Septage Management
- MIS app & dashboard – An introduction
- Downloading the app on the laptop/tab/smart phone
- Orientation on the MIS app including details on the helpline

Also, an information docket containing the Septage Management guidelines, MuSu app manual, brochure on TNUSSP along with the helpline number was shared with the participants.

The queries raised during the orientation were around three broad themes. Firstly, since FSM is a relatively new concept among ULBs, a number of questions were related to understanding the difference between underground sewerage system and septage management, treatment options, funding options, land requirements and public acceptance. Secondly, app related queries included bluestacks compatibility with Windows and IOS as well as options of uploading photographs. Participants also wanted to know if internet connection was required for data entry. Lastly, data

challenges envisaged included obtaining SBM data on the number of toilets connected to sewers/ pit latrines/ septic tanks. Some ULBs reported to have done an internal survey and planned to use that data. Questions were also raised on the definition of various indicators and methods for estimating septage at the ULB level for which the excel sheet was provided and explained. One participant felt that reliability of open defecation data may be an issue as accurate reporting may lead to questions by superiors. Participants were requested to call the helpline for any queries related to the app or data entry. Feedback was obtained at the end of the orientation and was mainly found to be useful. Table 2.4 presents the activities involved and the time required to complete the MuSu app development process.

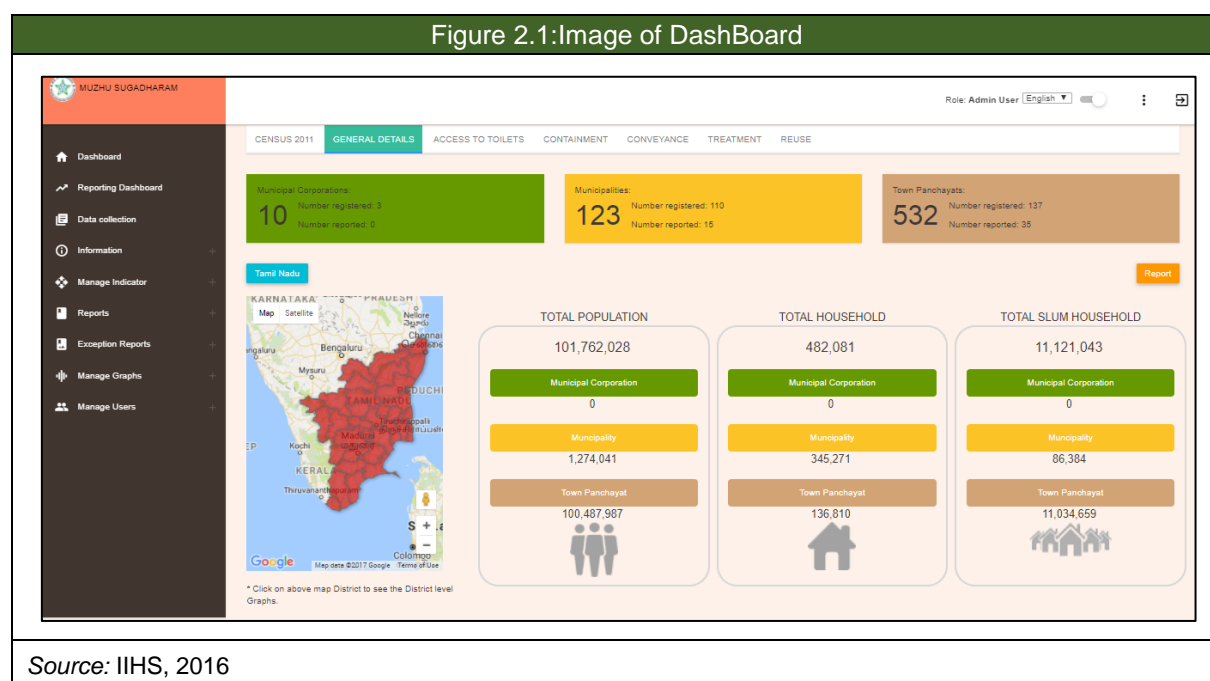
## 2.4.2 MuSu: Going live

ULBs were requested by CMA and DTP to upload the first set of data by September 30, 2017. The helpline has been active since May 2017 and has handled multiple calls mainly related to application download, Bluestacks download, registration issues, and password issues. In some cases, where the problem could not be solved over the phone, teamviewer software was used to gain access to the system and resolve the problem.

The data collected across the state was analysed and presented on a dashboard that provides at-a-glance view of key indicators on septage management by the state, district and at the ULB level.

As and when the data was reported, the internal team checked it for possible gaps and errors. The data was further validated with the ULB. It was observed that data on the number of households and slums, access to safe containment, details of de-sludging operators and trucks functional in the ULB, disposal site/STP and distance to disposal site/STP, estimate of septage received for treatment at the STP, details of decanting and pumping stations and treatment of septage were reliable as they were from credible sources like Census 2011, ULB records or CMA. However, the data on the estimate of septage and sewage generation was incomplete for most of the ULBs.

The first set of data submitted by ULBs was analysed and presented to CMA and DTP.



### **2.4.3 Emerging lessons and Insights**

1. Given that the concept of septage management is relatively new in India, sensitisation on its various aspects was required at the ULB level to ensure officers understand the context of MuSu Information system.
2. MuSu Information system compiles information which typically needs to be sourced from multiple officers in the ULB. It will take a few cycles of data submission for the ULBs to get familiar with the indicators and the methods of collecting this information.
3. ULBs are also facing a shortage of human resources to plan, implement and report on the multiple programmes and projects at hand. Hence, ULBs had to be nudged to complete MuSu information amidst their other tasks.
4. Some data calculations are complex and can be time-consuming such as the estimate of septage generated. While an excel sheet was provided to aid estimation as a separate document, this could have been built-in in the app.
5. Some technical issues in the ULBs such as system compatibility with MuSu Information system and Bluestacks installation had to be handled.



# Annexure

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# Annexure 1: Data Collection Format used for Piloting

## Data Collection Format for Reporting Implementation Status of the GoTN Septage Management Operative Guidelines

*(Draft for Pilot Test)*

### Introduction

The Technical Support Unit formed under the MAWS Department and led by IIHS is in the process of finalising a data collection and reporting system to track the status of implementation of the operative guidelines for Septage management. This format canvasses data on the key elements across the Sanitation Value Chain:

1. Demographic information
2. Safe Containment
3. Collection or de-sludging
4. Conveyance and Disposal
5. Treatment
6. Reuse

Data on the above parameters are reported from a) Census of India, 2011; and b) ULB's own records (including property tax records, water and sewerage connections, de-sludging operators registered, data from treatment facilities, etc.). Data not readily available in the form require needs some estimation which is indicated in the format. This was pilot-tested in seven ULBs <sup>1</sup> between June 29 and July 01, 2016, by a two-member team from the TSU. The data sheets with the reported data from the seven ULBs are enclosed.

S. No	Indicators and Unit	Source	Data	Data Type (Census/ULB Records, Projection, Estimation, Guesstimate) and Reliability (High, Medium, Low)
I	<b>GENERAL INFORMATION</b>			
1	Name of the ULB			
2	Category of ULB (Corporation/ Municipality/ Town Panchayat)			
3	Total Urban Area (Sq.km)	ULB Data		
4	Date of last revision of boundaries (dd/mm/yy)	ULB Data		
5	Total number of wards	ULB Data		
6	Total Population in 2011	Census 2011		

<sup>1</sup> City Corporation (Trichy), Municipalities (Avadi and Thuvakudi), Town Panchayats (Koothappar, Manachanallur, Periya-naicken Palayam and Narasimha-naicken Palayam)

S. No	Indicators and Unit	Source	Data	Data Type (Census/ULB Records, Projection, Estimation, Guesstimate) and Reliability (High, Medium, Low)
7	Total Population of the ULB in 2016	ULB Data		
8	No. of Households in 2011	Census 2011		
9	No. of Households in 2016/current year	ULB Data		
10	No. of Total Slums in 2016/ current year	ULB Data from TNSCB - Trichy		
11	No. of Notified Slums in 2011	ULB Data from TNSCB - Trichy		
12	No. of Notified Slums in 2016/ current year	ULB Data from TNSCB - Trichy		
13	No. of Non- Notified Slums in 2011	ULB Data from TNSCB - Trichy		
14	No. of Non- Notified Slums in 2016/ current year)	ULB Data from TNSCB - Trichy		
15	Slum Population in 2011	Census 2011		
16	Slum Population in 2016/ current year	Not Applicable (NA)		
17	No. of Households in slums in 2011	Census 2011		
18	No. of Households in slums in 2016/current year	Not applicable (NA)		
<b>II</b>	<b>ACCESS TO SAFE CONTAINMENT</b>			
<b>A</b>	<b>Household Arrangements 2011</b>		/	
1	No. of Households with Pour flush to Sewer facilities	Census 2011		
2	No. of Households with Pour flush to Septic Tank	Census 2011		
3	No. of Households with Pour flush to Other	Census 2011		
4	No. of Pits -Improved	Census 2011		

S. No	Indicators and Unit	Source	Data	Data Type (Census/ULB Records, Projection, Estimation, Guesstimate) and Reliability (High, Medium, Low)
5	No. of Pits - Unimproved	Census 2011		
6	No. of Households with Nightsoil directly draining into open drains	Census 2011		
7	No. of Households with Service Latrines-cleaned by animals	Census 2011		
8	No. of Households with Service Latrines-cleaned by humans	Census 2011		
9	No. of Sub- Total Households with Individual Household Latrine (IHHL)	Census 2011		
10	No. of Households using public toilets	Census 2011		
11	No. of Households practicing Open Defecation	Census 2011		
12	Total households under ULB	Census 2011		
<b>B</b>	<b>Household Arrangements 2016</b>			
1	No. of Households with Pour flush to Sewer facilities	ULB Data		
2	No. of Households with Nightsoil directly draining into open drains	Not applicable (NA)		
3	No. of Households with Service Latrines-cleaned by animals	Not applicable (NA)		
4	No. of Households with Service Latrines-cleaned by humans	Not applicable (NA)		
<b>C</b>	<b>Community Toilets (CT)</b>			<i>Note: Community Toilets have an identifiable core group of regular users</i>
1	Number of CT Units: Latrines - Men	ULB Data		
2	Number of CT Units: Urinals - Men	ULB Data		
3	Number of CT Units: Women	ULB Data		

S. No	Indicators and Unit	Source	Data	Data Type (Census/ULB Records, Projection, Estimation, Guesstimate) and Reliability (High, Medium, Low)
4	Number of Seats for Women	ULB Data		
5	Number of Seats for Men	ULB Data		
6	Number of Seats for Children	ULB Data		
7	Number of Seats: Disabled	ULB Data		
D	<b>Public Toilets (PT)</b>			<i>Note: Public Toilets are for use by floating populations and casual users – and may not have an identifiable core group of regular users</i>
1	Number of PT Units: Latrines - Men	ULB Data		
2	Number of PT Units: Urinals - Men	ULB Data		
3	Number of PT Units: Women	ULB Data		
4	Number of Seats for Women	ULB Data		
5	Number of Seats for Men	ULB Data		
6	Number of Seats for Disabled	ULB Data		
E	<b>Commercial and Institutional Properties</b>			
1	Pour flush to Sewer facilities	Not applicable (NA)		
2	Night soil directly draining into open drains	Not applicable (NA)		
3	No. of Service Latrines- cleaned by animals	Not applicable (NA)		
4	No. of Service Latrines- cleaned by humans	Not applicable (NA)		

S. No	Indicators and Unit	Source	Data	Data Type (Census/ULB Records, Projection, Estimation, Guesstimate) and Reliability (High, Medium, Low)
III	<b>COLLECTION</b>			
1	Properties being de-sludged using mechanical equipment	ULB records		
IV	<b>CONVEYANCE AND DISPOSAL</b>			
A	<b>Septage</b>			
1	Total generation from different on-site sources / arrangements	ULB Data		
2	Estimated No. of Sludge Operators with ULBs	ULB Data		
3	Estimated No. of Private Sludge Operators	Not applicable (NA)		
4	Estimated No. of Total Sludge Suction trucks	ULB records		
5	No. of Sludge Operators registered	ULB records		
6	No. of Trucks Dumping in Secured Locations monthly	ULB records		
7	Estimated Volume of Septage being taken to secured locations monthly (m3)	ULB records		
8	Estimated volume of septage being cleaned per month (m3)	Not applicable (NA)		
V	<b>TREATMENT</b>			
A	<b>Assets</b>			
1	No. of Decanting Stations (location)	ULB Data		
2	No. of Septage Treatment Facilities (location, capacity, type)	ULB records		
3	No. of Sewerage Treatment Plants (location, capacity, type)	ULB Data		
4	No. of Interim Facilities (location, type)	Not applicable (NA)		

S. No	Indicators and Unit	Source	Data	Data Type (Census/ULB Records, Projection, Estimation, Guesstimate) and Reliability (High, Medium, Low)
B	<b>Wastewater + Septage treated (MLD)</b>			
1	Total Wastewater Treatment Capacity (MLD)	ULB Data		
2	Total Septage Treatment Capacity	ULB Data		
3	Total Treatment Capacity	ULB Data		
4	Total Waste-water Treated	ULB Data		
5	Total Septage Treated	ULB Data		
6	Total Waste-water + Septage Treated	Not applicable (NA)		
<b>VI</b>	<b>REUSE</b>			
1	Amount of waste-water re-used (m3)	Not applicable (NA)		
2	Amount of sludge treated (m3)	Not applicable (NA)		

# Annexure 2: Final Data Collection Format

## Data Collection Format for Reporting Implementation Status of the Operative Guidelines for Septage Management

### Introduction

The Technical Support Unit formed under the MAWS Department and led by IIHS is, in the process of issuing a data collection and reporting system to track the status of implementation of the GoTN's Operative Guidelines for Septage Management (Sep, 2014). This format is intended for ULBs to report data on the following key elements across the Sanitation Value Chain:

7. General and demographic information of the ULB
8. Safe Containment at the property level
9. Collection, conveyance and disposal of septage
10. Treatment of septage/sewage

The sources of data for the above parameters shall include:

- a) Census of India, 2011
- b) ULB's own records (including property tax records, water and sewerage connections, de-sludging operators registered, data from treatment facilities, etc.)
- c) Data from other departments and agencies including TN Slum Clearance Board, TWAD Board, Pollution Control Board, and other agencies

This format has two parts:

Part 1: of the format has data pre-filled from Secondary sources. The ULB need not take any action on this, if these are correct according to the ULB records. If any data is incorrect, this may be indicated by the ULB in a separate space provided for Notes.

Part 2: of the format needs to be filled by the ULB using their records. Some data may not be readily available and hence, ULB Officers will need to collect data from the relevant source, e.g. de-sludging operators may be asked to furnish data on the size of de-sludging vehicles in their fleet, number of properties being de-sludged weekly or monthly etc. Some sample checks may also be needed to validate data from other agencies (e.g. TNSCB) or updated in case data is old. Further, data may not be available to the accuracy or in the form required, and hence, some projection or estimation may have to be done. Remarks about the reliability of the data reported may be indicated in a separate space provided for Notes.

**Data Compiled by:**

**Approved by:**

**Date:**

### Part 1: Pre-filled General Information

This data has been pre-filled from Secondary sources, mainly the Census of India, 2011.

1.1	GENERAL INFORMATION		
S.No.	Indicators and Unit	Unit	Data
1	Name of the ULB		
2	Category of ULB (Corporation/ Municipality/ Town Panchayat)		
3	Total Urban Area	Sq. km	
4	Total Population in 2011	number	
5	No. of Households in 2011	number	
6	Slum Population in 2011	number	
7	No. of Households in slums in 2011	number	

**Notes (Please indicate if any discrepancies are noted with respect to the above, and the nature of discrepancy):**

## Part 2: Data to be furnished by ULB

Please fill this format using ULB data, or data from other official sources that the ULB uses e.g. TNSCB, Pollution Control Board, etc.

<b>2.1</b>	<b>GENERAL INFORMATION</b>			
<b>No.</b>	<b>Indicators and Unit</b>	<b>Source</b>	<b>Data</b>	
1	Total Population of the ULB in (current year: 2016)*			
2	No. of households of the ULB in (current year: 2016)*			
3	Have the boundaries changed post 2011? (Yes/No)			
	If Yes, when? (dd/mm/yy)			
	If No, what is the last revision of boundaries? (dd/mm/yy)			
4	Whether the number of wards have changed post 2011? (Yes/No)			
	If Yes, state the number?			
	If No, what is the old number?			
<b>5</b>	<b>Current Status of Slums (Year: _____)</b>			
<b>No.</b>	<b>Type of Slums</b>	<b>Notified Slums</b>	<b>Non-notified Slums</b>	<b>Total</b>
1	Number of Slums*			
2	Number of Slum Households*			

\*Note: Please provide data on these parameters that the ULB considers updated and reliable. These could be from other surveys (eg. TNSCB) or studies/feasibility reports, or if not available, projections based on Census 2011.

**Notes (Please indicate if any discrepancies are noted with respect to the above, and the nature of discrepancy):**

## Part 2.2

- 1) For Current Year estimates for all categories (last column), please use Census of India 2011 projections or other projections available with the ULB (from other Govt. agency/scheme).
- 2) For A-1 and 2, adjust with the number of households with new built toilets.
- 3) For A-3, please reconcile the Census 2011 figures which is for number of households, with the figures of the ULB or Utility records - that maybe for the number of properties connected to the sewerage system. Normally, the Census 2011 figures maybe higher than the number of properties connected to sewers in 2011. Please provide your observations or explanations if there are significant differences between these in the space provided below Table 2.2. Current year figures will similarly need to be reconciled to estimated number of households, based on properties connected, according to the ULB/Utility records.
- 4) For A-4, and 5, please take account of the following:
  - a) Number of Households who built toilets under Swachh Bharat Mission (Urban, SBM-U). These maybe connected to sewers, septic tanks or pit latrines.
  - b) From ULB records of building permissions accorded (since April 01 2011) for construction/upgradation of houses, please compile the number of additional toilets in the three categories i.e. connected to sewer, septic tanks or pit latrines.
- 5) For A-6 and 7, please account for households with insanitary latrines, upgraded or reconstructed

under the ULB's enforcement drives undertaken since April 01, 2011. Again, please compute upgraded toilets in the three categories i.e. sewer, septic tanks or pit latrines.

<b>2.2 ACCESS TO SAFE CONTAINMENT</b>			
<b>No.</b>	<b>Indicators and Unit</b>	<b>Data</b>	
<b>A</b>	<b>Household Arrangements</b>	<b>Census 2011</b>	<b>(Current Year: __)*</b>
1	No. of Households practicing Open Defecation		
2	No. of Households using Public or Community Toilets		
3	No. of Households Connected to Sewer facilities		
4	No. of Households Connected to Septic Tank		
5	No. of Households with Pit Latrines		
6	No. of Households with Pit Latrines – Unimproved		
7	No. of Households with Night-soil directly draining into open drain		
8	No. of Households with Individual Toilets		
9	No. of Households with Individual Toilets but members still resorting to Open Defecation		
<b>8</b>	<b>Total Households</b>		
<b>B</b>	No. of Toilets constructed under SBM up to date _____		
	i) Toilets connected to sewer		
	ii) Toilets connected to septic tanks		
	iii) Toilets connected to Pit Latrines		

**Notes (Please indicate if any discrepancies are noted with respect to the above, and the nature of discrepancy)**

<b>2.3</b>	<b>DE-SLUDGING OPERATORS FUNCTIONAL IN ULB</b>	<b>Number</b>
1	Total no. of de-sludging operators operating in the ULBs area	
2	No. of private de-sludging operators registered by the ULB	
3	Details of de-sludging operators from neighboring ULBs functional in this ULB	

<b>2.4 COLLECTION, CONVEYANCE AND DISPOSAL OF SEPTAGE</b>					
<b>No.</b>	<b>De-Sludging Operators</b>	<b>Below 5,000 Litres</b>	<b>5,000-8,000 Litres</b>	<b>8,000-10,000 Litres</b>	<b>Total</b>
1	No. of Functional De-Sludging Suction trucks owned by ULB				
2	No. of Privately owned Functional De-Sludging Suction trucks				

<b>2.5 DETAILS OF DISPOSAL SITE/STP AND DISTANCE TO DISPOSAL SITE/STP</b>			
<b>No.</b>	<b>De-Sludging Operators</b>	<b>Disposal Site/STP</b>	<b>Distance to Disposal Site/STP (km)</b>
1	De-Sludging Operator-1		
2	De-Sludging Operator-2		
3	De-Sludging Operator-3		

<b>2.6</b>	<b>ESTIMATE OF SEPTAGE AND SEWAGE GENERATION IN THE ULB</b>	
<b>No.</b>	<b>Indicators and Unit</b>	<b>Data (Estimated)</b>
1	Per Capita Drinking Water Supply in the ULB ( <i>litres per capita per day - lpcd</i> )	
2	Estimate of generation of septage (from septic tanks) per year ( <i>Million Litres</i> )	

<b>2.7</b>	<b>ESTIMATE OF SEPTAGE RECEIVED FOR TREATMENT</b> ( <i>To be filled by ULBs with UGSS and STPs only</i> )	
<b>No.</b>	<b>Indicators and Unit</b>	<b>Data (Estimated)</b>
1	Estimate of septage received for treatment per year ( <i>Million Litres</i> )	

<b>2.8</b>	<b>DECANTING AND PUMPING STATIONS</b> ( <i>To be filled by ULBs with UGSS and STPs only</i> )		
<b>No.</b>	<b>Location of Pumping Station</b>	<b>Decanting Facility Available (Y/N)</b>	<b>System for Recording details of Trucks depositing Septage Functional (Y/N)</b>
1			
2			
3			

<b>2.9</b>	<b>TREATMENT</b> ( <i>To be filled by ULBs with UGSS and STPs only</i> )						
<b>No.</b>	<b>No. of Treatment Plants</b>	<b>Plant for treating Septage</b>	<b>Plant for treating Sewage</b>	<b>Technology</b>	<b>Capacity (MLD)</b>	<b>Utilisation (MLD)</b>	<b>Co-Treatment (Y/N)</b>
1							
2							
3							

**Notes:**

# Annexure 3: Terms of reference for App Development Vendor Activities

DRAFT 1

## **Terms of References for Design and Operationalisation of a Management Information System (MIS) for the Implementation of Government of Tamil Nadu Septage Management Operative Guidelines**

### **1. Introduction**

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.

There are severe deficits along the urban sanitation chain in the State:

- Despite improvements in coverage in recent years, a large number of urban residents are forced to defecate in the open.
- One in every 10 households is dependent only on public toilets.
- Only about 27 per cent of urban household toilets are connected to sewer (UGD) systems, mostly in larger cities. UGDs are difficult to scale up to all urban areas due to financial and capacity constraints.
- About 38 per cent of the household toilets are connected to septic tanks, and 7 per cent are improved pit latrines (45 per cent on-site systems), but their construction, maintenance and regular cleaning needs attention.
- Treatment capacities (for sewage and septage) and their operational efficiencies need enhancement so that 100% of human excreta is treated.
- Urban Local Bodies (ULBs) and institutions responsible for ensuring sanitation infrastructure and services delivery need to be strengthened considerably so that they can manage the full cycle of sanitation—from safe containment in toilets, safe conveyance, to disposal/re-use after treatment.
- Citizens, community groups, informal and private sector stakeholders need to be mobilised to play an active role in improving the full cycle of sanitation.

While sewerage and treatment plants have received policy attention and investments in larger cities of the state, on-site systems that are the predominant household arrangements across the state, have received limited attention. The unregulated construction of these on-site structures often render them inefficient as treatment systems and also pose the hazard of discharging partially treated effluents to the drains and thence to water bodies, polluting freshwater sources. These septic tanks are also not de-sludged regularly creating major health and environmental hazards.

Limited data is available on the coverage and effectiveness of these de-sludging services as these are mostly operated by the informal sector. The sludge collected from septic tanks is often disposed into either natural stormwater drainage systems, nearby surface water body, or vacant land, especially in the absence of any treatment facilities nearby. Sewerage (UGD) systems in many locations suffer from problems of maintenance; the sewage generated does not reach the treatment plants in many instances, and the existing sewage treatment plants are unable to fully treat the waste received. Finally, Urban Local Bodies (ULBs) and other urban

sector agencies have not recognised the full cycle of sanitation, especially on-site installations, as an item needing their attention.

The Government of Tamil Nadu (GoTN) has been a pioneer in not only recognising the above challenges as core to improved standards of public health, but also has prioritised the full sanitation chain, including the strengthening of septage management as an economical and sustainable complement to network-based systems. The GoTN. has clearly articulated the need to address sanitation in the coming years. As a part of this, the “Namma Toilet” (“Our own Toilet”) or Public Toilets were rolled out in the urban areas. The GoTN issued the Septage Management Operative Guidelines in September 2014. In addition to GoTN's own investments in urban sanitation, the current policy environment in India prioritises urban sanitation at scale. Septage management has become eligible for funding under the Atal Mission For Rejuvenation And Urban Transformation (AMRUT), and Swachh Bharat Mission aims at improving access to toilets.

The Bill and Melinda Gates Foundation (BMGF) is supporting the GoTN to achieve the Sanitation Mission of Tamil Nadu by helping set up a Technical Support Unit (TSU) within the MAWS, with Sub-TSUs in Trichy City Municipal Corporation; and Periyanaicken-Palayam and Narasimhanaicken-Palayam Town Panchayats cluster in Coimbatore. The Technical Support Unit (TSU) is run by the Indian Institute for Human Settlements (IIHS) along with Gramalaya, Keystone Foundation, and CDD Society as partner organisations.

IIHS wishes to commission an agency (“Agency” hereinafter) to design and operationalise a Management Information System (MIS) for tracking the implementation of the Septage Management Operative Guidelines, across the Urban Local Bodies (ULBs) in the State. In addition, the agency will design the software for the Monitoring, Learning and Evaluation (MLE) system for TNUSSP.

## 2. Assignment Objectives

The objectives of the assignment are:

1. For the Govt. Urban Sanitation MIS:
  - a. Designing a Management Information System for use by the Government of Tamil Nadu, tracking the implementation of the Operative Guidelines for Septage Management (GoTN, 2014) including interface for data collection (from multiple input media) and reporting (again on multiple media), with facilities for data aggregation and processing;
  - b. Testing, refining and implementing the system for data collection, reporting, analyses, and production of high quality outputs;
  - c. Operationalising the system and carrying out the maintenance management of the MIS;
  - d. Developing Manuals, and training selected personnel from Govt. of Tamil Nadu agencies in running the system successfully and thence taking full operational ownership; and
  - e. Reviewing related MIS and data management systems in use within the urban administration of the Govt. of Tamil Nadu, and examine possibilities for inter-linking and integration.
2. For the TNUSSP: Set up and operationalise the software and for data processing, analysing and producing outputs for the MLE system for the TNUSSP (separate from while being linked to the Govt. Urban Sanitation MIS System) in discussion with the TNUSSP Team; and help maintain and upgrade these.

3. Recommend improvements in systems of data collection and reporting, data management and analyses for urban sanitation.

### **3. Approach and Methodology**

The assignment shall deploy a team of specialists, to design, test, stabilise and operationalise, and finally train and handover the MIS for it to be sustainably operated with the Govt.'s own systems. A consultative approach will be followed by the agency to incorporate user preferences and feedback.

The suggested steps are:

- i) For the Govt. MIS: Familiarisation with Operative Guidelines, TNUSSP, and other urban water and sanitation initiatives in urban Tamil Nadu;
- ii) Based on the assessment of situation with the TNUSSP team (Technical Support Unit or TSU) and select ULBs, develop detailed system specifications, including:
  - (1) Input and Output interfaces over web, tablet, mobile phone, etc. taking due cognisance of data capture and transmission facilities in the different classes of ULBs; and
  - (2) Compare and recommend software architecture including operating platform, database design and management; user interface, processing system, and generation of outputs, including screen-based dashboards, and digital and printed reports.
- iii) Develop and pilot the accepted design for the ULBs;
- iv) Finalise the system based on feedback received during the test-runs;
- v) Scale up and implement the systems at the state and the ULBs level, linked in real-time to systems in ULBs and other agencies. Note that the developed software will need to handle demands of stand-alone and online-offline systems;
- vi) Develop user manuals and training guides that will guide the user on installation and operation of the software application; and will be useful in training state and ULB personnel. For doing so, prepare executable software applications and user guides for multiple site installations.
- vii) For the TNUSSP MLE System: develop the design and help implement the MLE System's software specifications, including data input interfaces over web, tablet, mobile phone, etc.; operating platform, software architecture, database and design of user interface, data input, processing system, and generation of outputs, including a Dashboard, apart from digital and printed reports; training and orienting the TNUSSP Team in managing the system; and
- viii) Carry out other related tasks from time to time, as may be needed for effective completion of the design and implementation tasks above; and their maintenance management.

#### *State level and ULBs*

The system should cover and cater to the needs of state level agencies (MAWS, including Commissionerate of Municipal Administration (CMA), Directorate of Town Panchayats, and other agencies) responsible for planning, financing and monitoring the implementation of sanitation schemes and initiatives in the state. It will cater to the needs of all the ULBs including Corporations, Municipalities and Town Panchayats.

#### *Data Collection Instruments*

For the Govt. MIS, a draft data collection instrument has been designed and pre-tested, to be filled in by the ULBs and sent to the state government. A final version will be installed based on this. The system will be designed such that there is administrative provision for changes to the structure of fields/records (input, process, outputs); as well as for scale-up in future (additions and changes to the number/type of ULBs).

The agency will work with the TNUSSP team and ULBs to ensure the effective use and implementation of the data collection process, and provide trouble-shooting support at each stage, leading to population of the database, and constant improvement in data quality and reliability.

Household or other primary surveys are not envisaged under this assignment. The TNUSSP MLE system will however have a larger set of secondary and primary (quantitative and qualitative) data being collected and reported, for which the agency will design the software for use in TNUSSP MLE.

#### 4. Suggested Software Specifications

The agency will suggest the most suitable platform and software for the Govt. MIS as well as for the TNUSSP MLE. This will be chosen in consultation with the TNUSSP team with user-friendliness, future upgradation, ease of maintenance management, inter-linking with other databases/MIS, and value-for-money, being key considerations. It is strongly suggested that open-source alternatives are given due consideration.

#### 5. Schedule of Work and Deliverables

S. No.	Output	Schedule (Weeks from Commissioning)	Remarks
1	Detailed System Specification using existing Data collection format (Govt. MIS) and development of working system for pilot	Week 2	
2	Test-run completed (at state and sample ULBs)	Week 4	
4	Final Version of software application modified based on test run feedback, and launched	Week 6	Compiled version; and original and complete software source code along with user manual presented
5	Two batches of training completed for state and select ULB personnel	Week 8	
6	Design and Operationalisation of Software and systems for MLE of TNUSSP*	Weeks 6 - 10	
7	Operations and Maintenance Management Support to State Urban MIS and TNUSSP MLE Systems (including system upgrades and changes as needed)	Weeks 7-52	Agency personnel will need to be available for maintenance on site, as well as provide backup support as needed

\* TNUSSP MLE Software design and implementation will be undertaken in parallel

## 6. Suggested Agency experience and team composition

The Agency will have at least 10 years' experience in designing, implementing and maintaining/managing MIS and MLE systems for public sector and Govt. clients in India. Experience in water and sanitation, health, education, and other social sectors shall be an advantage. The Agency with ability to work with state governments and local bodies, and in multiple language environments will be preferred.

Generic competencies of the overall team proposed should have but not be restricted to:

- Excellent knowledge of and experience in software application development and MIS/M&E
- Preparation of user manuals and training to Govt. personnel
- Proficiency with relational database technologies as well as presentation and visualisation software
- Ability to develop user-friendly software application interface including portability and use with mobile, tablet, and web-based input and output devices
- Working knowledge of security concepts and technologies, and Govt. IT Regulations

It is expected that Agency will deploy its team commencing September week 1, and services will be provided in two phases of a) design and delivery/implementation (Sept week 1 to Nov 2016; and b) System maintenance, back-up support and upgradation from Dec 2016 to Aug 2017.

While the Agency shall suggest the exact team composition and division of roles and responsibilities, the following suggested guidelines for the team may be taken into account:

S. No.	Position	Role and Level of Effort	Qualification and Experience
1	Team Leader – MIS Specialist	Overall leadership and responsible for timely and quality high-deliverables  a) About 8 weeks spread over 10 weeks b) About 4 weeks spread over weeks 11 to 52	Qualification in Informational Technology or relevant discipline; and applied experience of at least 15 years; must have more than 10 years' experience in designing and running public sector software applications, MIS and MLE systems
2	Programmers and MIS Specialists	Design of input formats for multiple input media; data collation and processing programming; and output protocols etc. Trouble-shooting support to site personnel a) About 2 Specialists for 8 weeks spread over 10 weeks b) About 4 weeks spread over weeks 11 to 52 <i>Based out of Chennai and elsewhere - part-time</i>	Experience in information system design; familiarity with software needed for web/tablet and mobile based data management, programming for data processing, preparation of manuals and implementation of user trainings, etc.

S. No.	Position	Role and Level of Effort	Qualification and Experience
3	Data Analysts and System specialists**	System maintenance and data updation, trouble-shooting  <i>a) One full-time analyst for 52 weeks based out of Chennai</i>	Experience in System maintenance, familiarity with trouble-shooting the designed application, Adept at database maintenance, query language and UI management (for new hardware in the field)
4	Data visualisation and design specialists	Design of input and output templates and dashboard, etc. - Agency to suggest level of input/days	Demonstrated design and Visualisation expertise – English and Tamil proficiency desirable
** The agency shall deploy at least one full-time analyst/specialist based out of Chennai, over the full 52-week period.			

## 7. Reporting and Coordination

The Agency will report to the Team Leader of TNUSSP, and team members assigned by the Team Leader. The Agency will present weekly work plans and report on progress, including resolving any coordination issues.

The Agency will work out of the TNUSSP offices, but liaise closely with state and ULB officers. The Agency personnel will be required to be based mainly in Chennai and travel as needed to ULBs across the state.

All hardware and software required for completion of the assignment, shall be proposed by the Agency in the proposal, including costs, etc. and the TNUSSP shall make these available and/or have the Agency procure these. All properties, hardware, software, and related material shall be handed over to the TNUSSP.

## 8. List of Project Resources

- a) Draft Data Collection Format (pre-tested) for Operative Septage Management Guidelines
- b) MIS Indicators lists (TNUSSP)
- c) Draft MLE Framework for MLE for TNUSSP
- d) Baseline Studies in Trichy and two Town Panchayats of Coimbatore: Terms of References and Draft Report
- e) TN Sanitation Scoping Study Reports









Tamil Nadu Urban Sanitation Support Programme (TNUSSP) supports the Government of Tamil Nadu and cities in making improvements along the entire urban sanitation chain.

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.