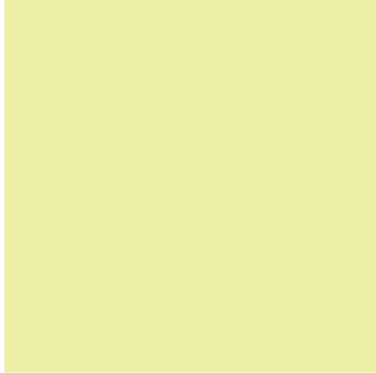


# Fecal Sludge Treatment in Karunguzhi

# The FSTP Story



Municipal Administration and  
Water Supply Department  
Directorate of Town Panchayat







Municipal Administration and  
Water Supply Department  
Directorate of Town Panchayat

## Fecal Sludge Treatment in Karunguzhi

# The FSTP Story

**For Citation:** TNUSSP, 2019. Fecal Sludge Treatment in Karunguzhi, The FSTP Story.

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## District Map of Tamil Nadu

## Introduction

Tamil Nadu is one of the most urbanised states in India, with an urban population share of 49 per cent. Unlike most other states where a significant proportion of the urban population is centered around two or three primate cities (e.g. Mumbai and Pune in Maharashtra, Bangalore and Mysore in Karnataka), urban centres are more dispersed in Tamil Nadu. The urban areas of Tamil Nadu are organised into 12 Corporations, 124 Municipalities, 528 Town-Panchayats and two Cantonment Boards. The Census 2011 also reports the presence of 376 Census Towns.

The Government of Tamil Nadu (GoTN) has been a pioneer in the sanitation sector by not only recognising the importance of the full sanitation

coverage as core to improved standards of public health, but by also prioritising the full cycle of sanitation from containment to disposal. Vision 2023 of the GoTN envisages that all citizens of the state have access to safe sanitation, which includes the implementation of Underground Sewerage Schemes (UGSS) and development of Sewage Treatment Plants (STPs) in all Urban Local Bodies (ULBs).

Since conventional UGSS is cost intensive and has a long gestation period, the state is strengthening septage management as an economical and sustainable complement to network-based systems.

## Need for Septage Management

- UGSS is absent in many areas of the state
- There is financial strain on the small ULBs to maintain UGSS
- Economically less privileged communities depend upon on-site sanitation
- A large number of households have invested in septic tanks
- Septic tanks are not cleaned regularly, and many of them drain out into the storm water drains
- Many places have inadequate and informal de-sludging services

- Unsafe transport and lack of proper treatment systems results in environmental pollution
- Untreated sewage is being disposed of unscientifically

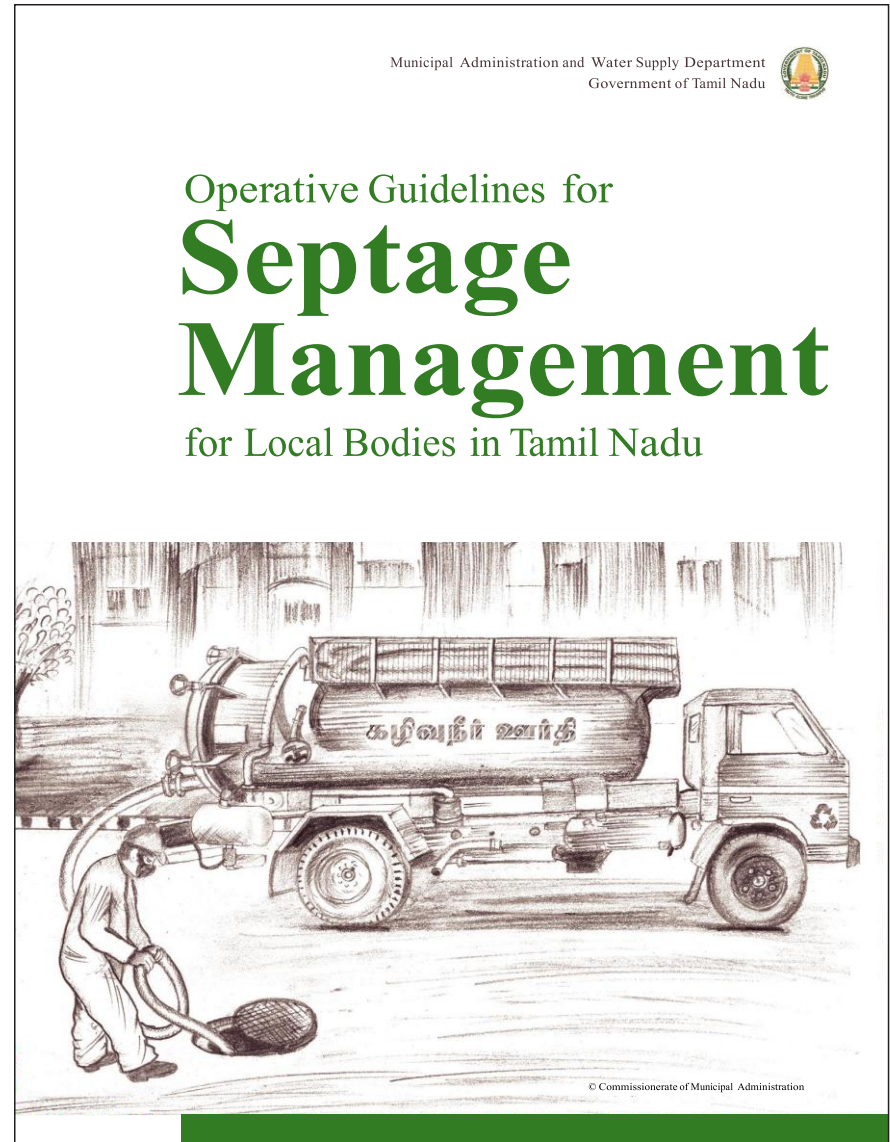
## Operative Guidelines

The state issued the Operative Guidelines for Septage Management in 2014 for local bodies in Tamil Nadu, making it the first such initiative in the country. The guidelines cover the following:

- Design and construction of septic tanks
- Septic tank pumping

- Septage transportation
- Treatment and septage disposal
- Fees for collection, transportation and treatment
- Information, Education and Communication (IEC)
- Record-keeping and reporting

Tamil Nadu was the first Indian State to issue the Operative Guidelines for Septage Management, in September 2014.

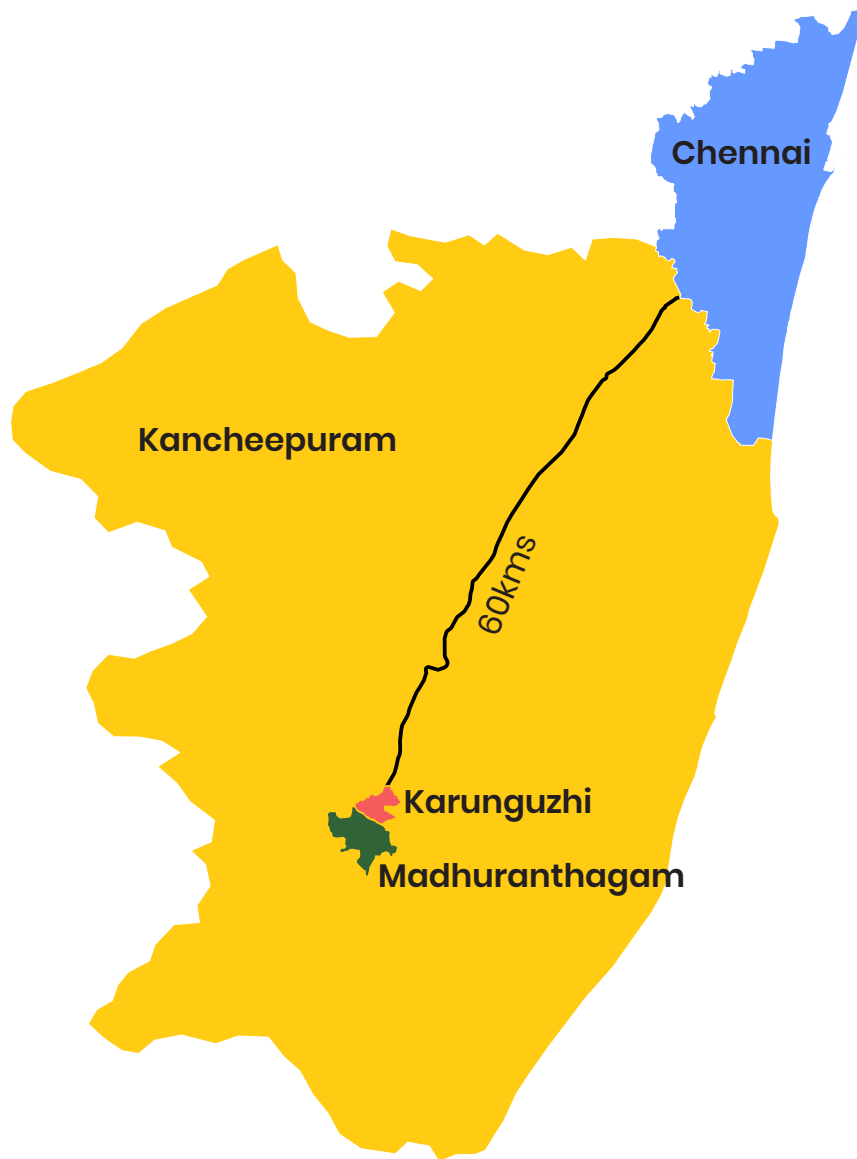


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# Karunguzhi Cluster Map







## Pilot FSTP Project

To demonstrate an effective and efficient septage management operation which can be scaled up across the state, a cluster of urban locations comprising of Karunguzhi Town Panchayat (TP) and the adjacent Madhuranthagam Municipality were identified as a case study to pilot a septage management project in Tamil Nadu.. The government accorded administrative sanction vide G.O (D) No. 398 MA &WS (TP2) on 19.09.2016 to build an FSTP (Fecal Sludge Treatment Plant) in Karunguzhi with a capacity to treat 23 KLD of septage, at an estimated cost of Rs 4.93 crore.


## About Karunguzhi

Karunguzhi is a first grade Town Panchayat in Kancheepuram District with a population of 12,485 (3,075 households). It is situated 3 km north of Madhuranthagam Municipality and 20 kms from Chengalpattu along the Chennai-Villupuram National Highway No.45.

The topography of the town is mostly plain with a gentle slope from the south-west direction to the north east, and the ground level varies from 22 to 28 metres above mean sea level. The total area of the town is about 6 sq. km. Farming and industries are the main sources of occupation for the residents.

Only 40 per cent of the households in the town have individual household toilets, and these are connected to septic/holding tanks. A significant number of these households have never emptied their septic/holding tanks, and only 3 per cent of the households reported regularity in emptying their tanks. Since UGSS is unviable for this town, septage management is being considered as a viable, economical and sustainable option to meet its sanitation needs..

To demonstrate the principles and operational requirements of septage management, an FSTP to treat fecal sludge has been constructed in Karunguzhi.



Population<sup>1</sup>  
**12,485**




Distance from  
Chennai  
**82.7kms**



Quantity of septage  
to be treated<sup>2</sup>  
**23KL/Day**



Area<sup>1</sup>  
**6 sq.km**



Households having  
on-site sanitation  
systems<sup>2</sup>  
**2,155**




No. of loads per day<sup>2</sup>  
**6 to 7 loads  
of 3m<sup>3</sup> each**



No. of Wards<sup>1</sup>  
**15**



FSTP  
operational since<sup>2</sup>  
**2017**



Households<sup>1</sup>  
**3,075**

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கருங்குழி  
Karunguzhi



# Septage Management: Towards 100% Safe Sanitation

An FSTP is a treatment facility to treat the fecal sludge and septage from various on-site sanitation systems. The fecal sludge is brought to the treatment location through de-sludging trucks used to evacuate septic/holding tanks at households, public toilets or commercial establishments.

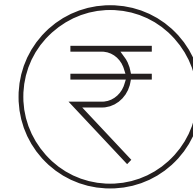
## Key Features of the Treatment Technology



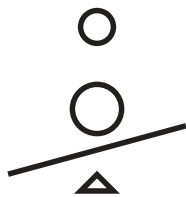
**23,000 litres per day  
(23 KLD) design  
treatment capacity**



**Minimal energy  
input for operation**



**Low cost and  
High efficiency**



**Gravity-based  
system**



**Biological  
treatment system**



**Low operation  
and maintenance**



**No skilled  
labour required**

## The objectives of this project are

- Demonstration of 100 per cent sanitation solutions
- Reduction of environmental pollution
- Wider replication of the project across all ULBs

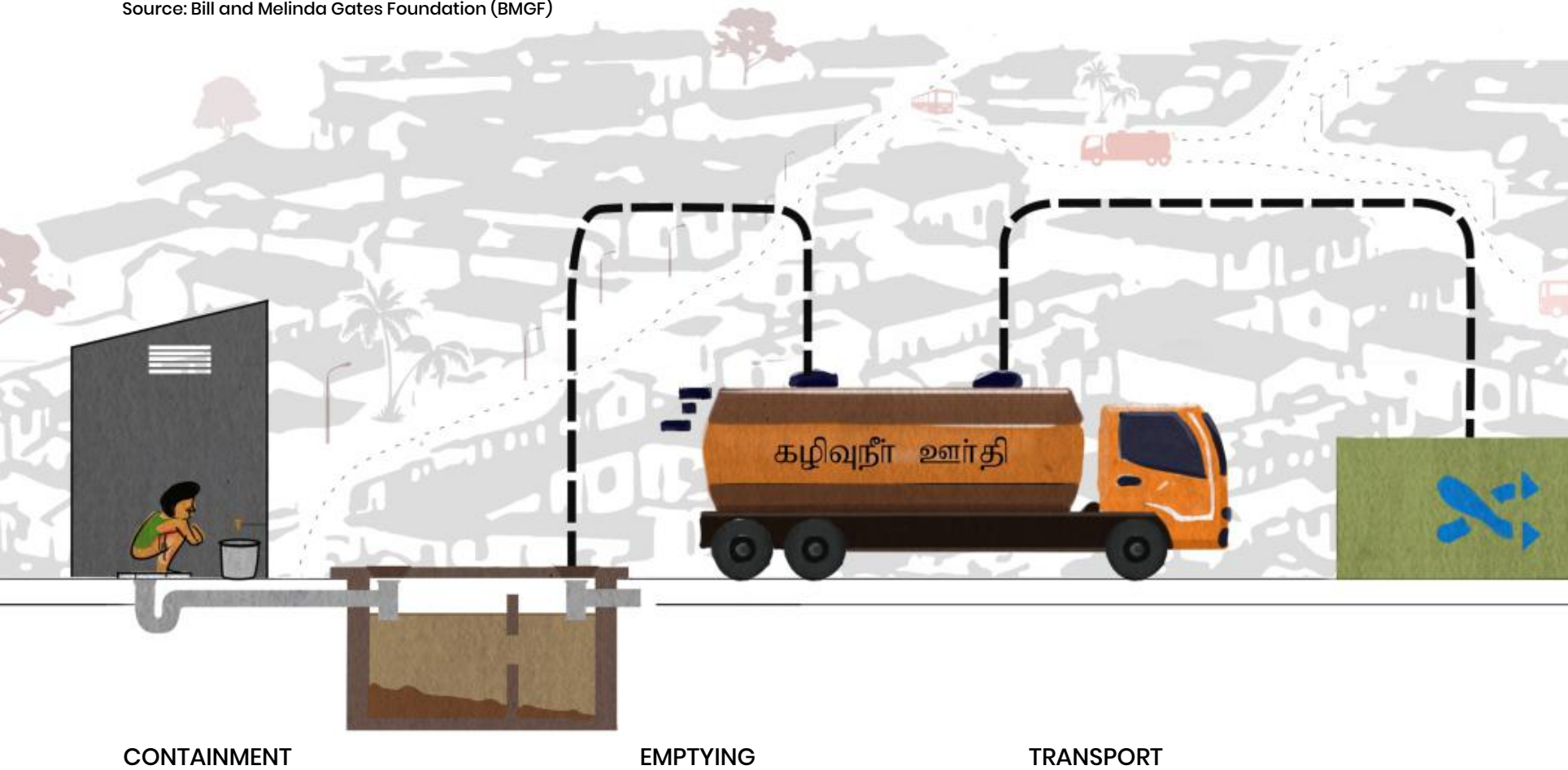
The plant is designed to treat the septage generated in Karunguzhi Town Panchayat and Madhuranthagam Municipality. The Detailed Project Report (DPR) was prepared by the Directorate of Town Panchayats (DTP) and submitted to the Tamil Nadu Urban Finance and Infrastructure Development Corporation (TUFIDCO) Appraisal Committee. The Tamil Nadu

Water Supply and Drainage Board (TWAD) provided technical review and approval, and was also responsible for the implementation of the project. TWAD was also responsible for the Operation and Maintenance (O & M) of the plant for a year from the date of its commencement.

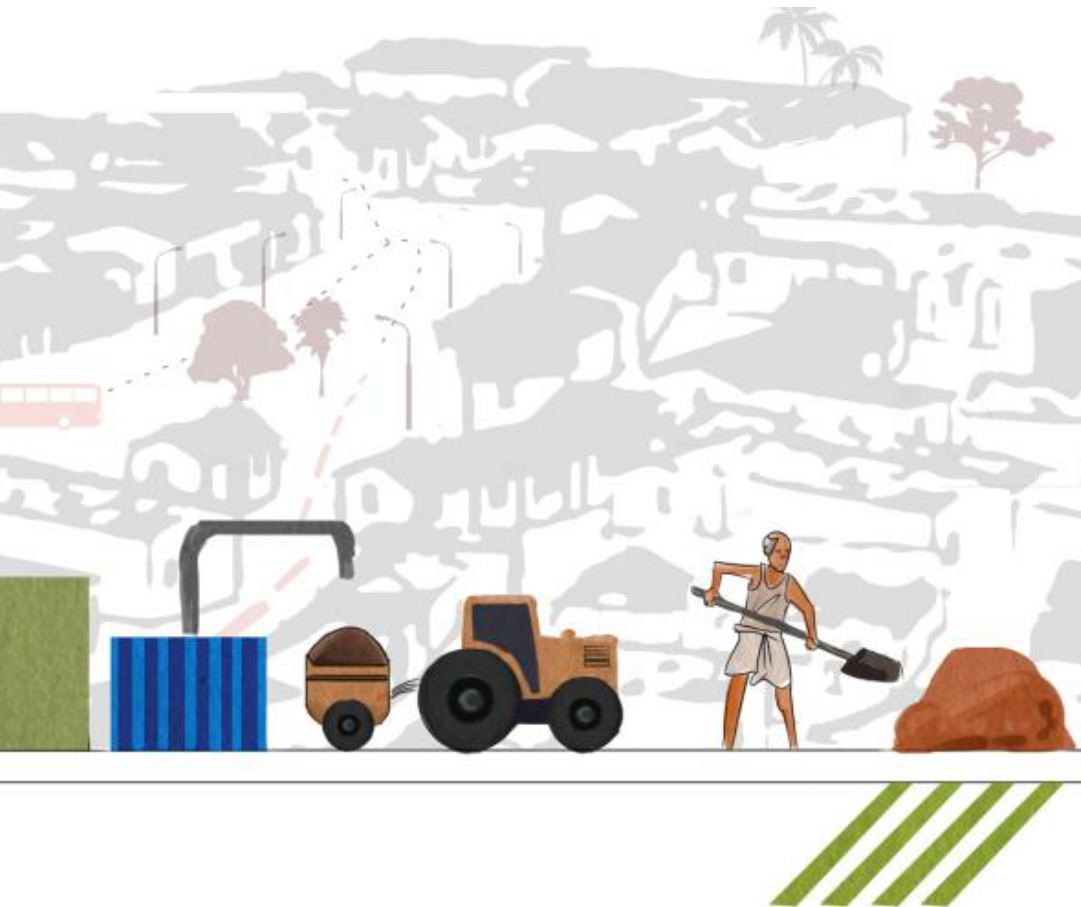
The FSTP is built on 1.5 acres of land and has a capacity of 23 Kilo litres per day (KLD), and is expected to treat septage eventually collected from about 3,000 households in Karunguzhi and about 7,000 households in Madhuranthagam.

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Source: Bill and Melinda Gates Foundation (BMGF)







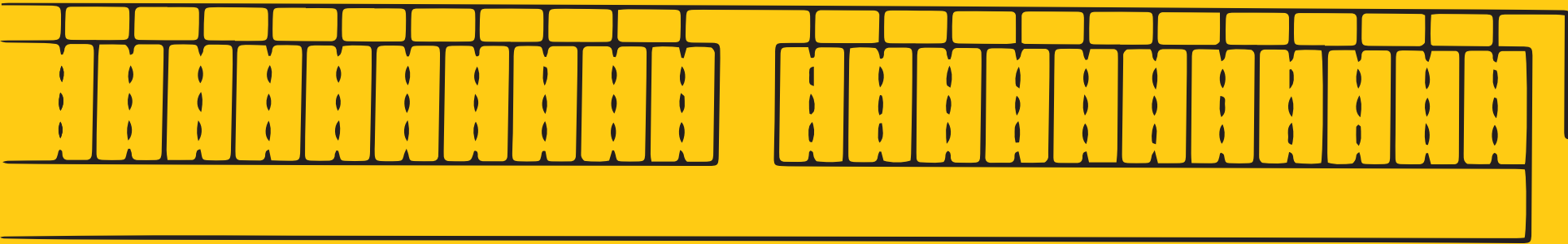
TREATMENT

REUSE/DISPOSAL

## Process Overview

The septage is processed in the treatment facility using Solid-liquid separation, dewatering, and treatment of the separated liquid. The reuse options considered for the dried fecal sludge are as bio-manure by co-composting it with municipal organic waste. Treated water is reused for gardening and controlled irrigation. The dried sludge is co-composted with solid waste from the TP, at the newly constructed Resource Recovery Park.

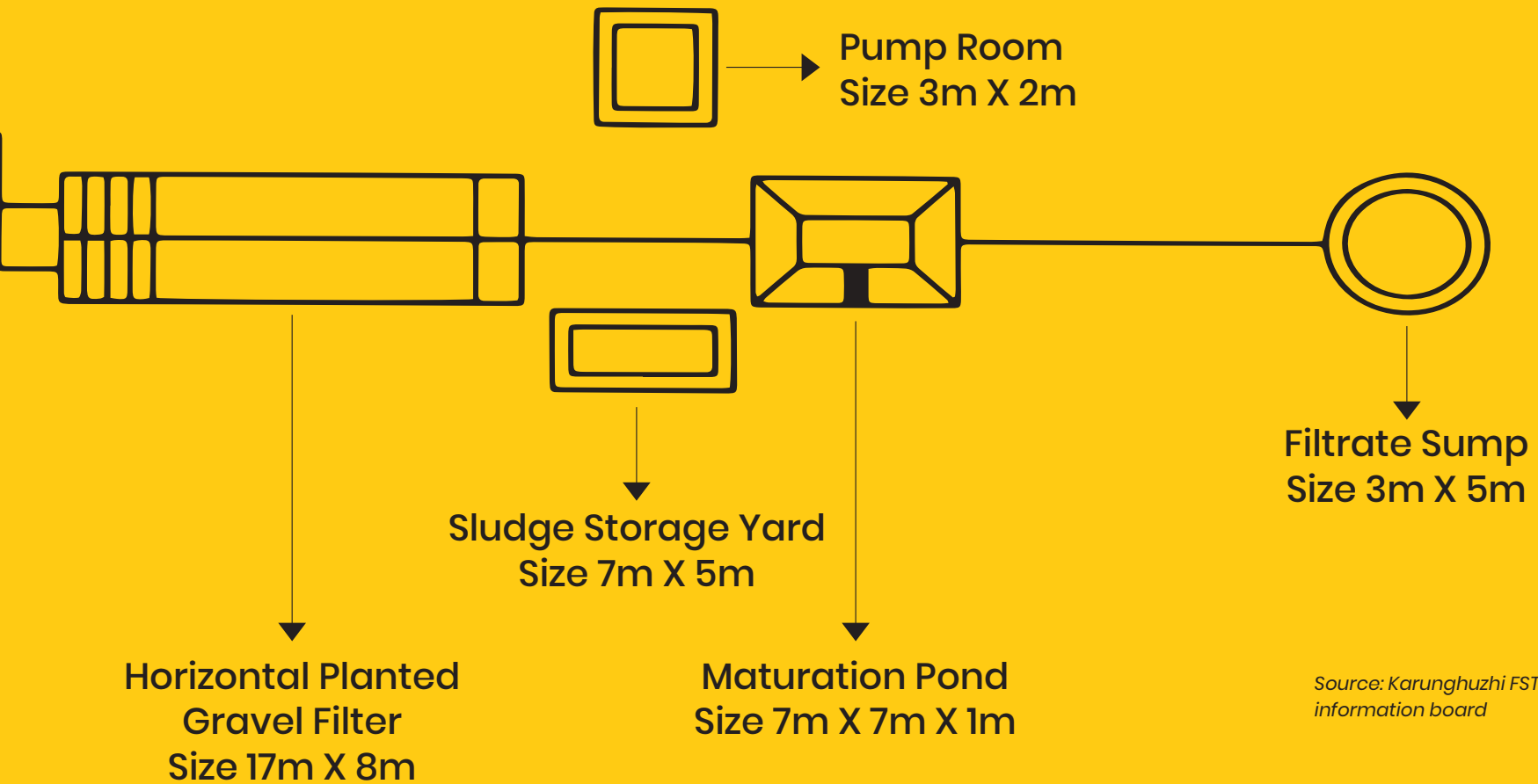
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## FSTP Layout

↓  
Sludge Drying Bed  
20Nos  
Size 6m X 8.20m

**FSTP Cost:**  
**Rs. 49 Million**  
**(68,865 USD)**



Source: Karunguzhi FSTP information board

**The FSTP is built on 1.5 acres and is expected to treat septage collected from about 3,000 households in Karunguzhi, and about 7,000 households in Madhuranthagam.**

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கருங்குழி பேரூராட்சி  
KARUNGUZHITOWN PANCHAYAT

கசடு கழிவு நீர் மேலாண்மை திட்டம் - கழிவுநீர் சுத்திகரிப்பு நிலையம்  
SEPTAGE MANAGEMENT SCHEME - FECAL SLUDGE TREATMENT PLANT

The entrance to  
the Fecal Sludge  
Treatment Plant



Desludging truck emptying raw sludge into the Sludge Drying Bed through the inlet chamber



SS screens to remove grit and other coarse particles



Coarse material being removed from the fresh sludge

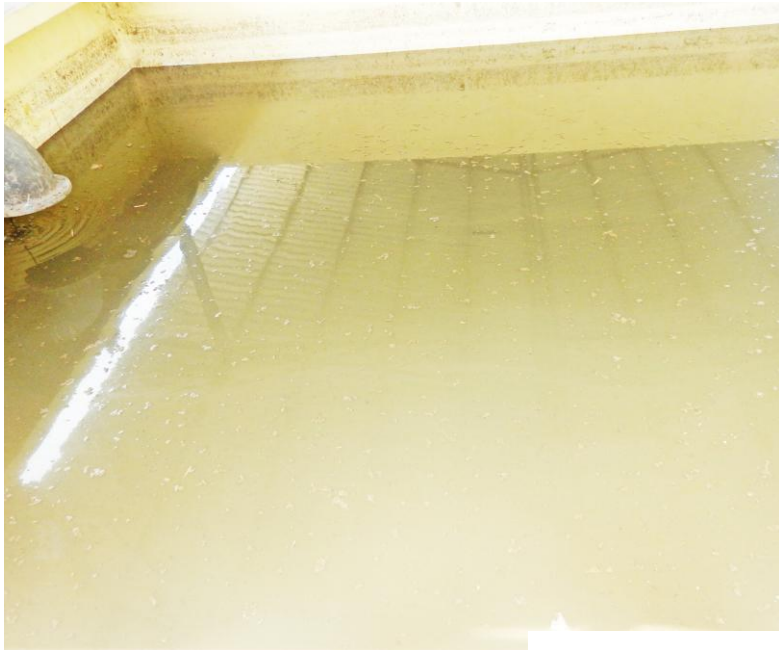
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The raw sludge enters the Sludge Drying Bed



Sludge Drying Beds at the FSTP



A close-up view of the Sludge Drying Beds



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Dried sludge stored in the Sludge Storage Yard





The residual liquid (leachate) passes through stoneware pipes to the Horizontal Planted Gravel Filter



A close-up view of the leachate



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Planted Gravel Filter - The bottom is filled with graded gravel and pebbles



Canna Indica and coral reeds are planted over the filter media



Effluent sent to the Maturation Pond for tertiary treatment

The treated effluent is collected in the Filtrate Sump



The treated water is reused for gardening

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A close-up of the Filtrate Sump



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## Testing Raw Septage:

The raw septage coming into the FSTP is tested to check for industrial wastes that may adversely affect the working of the plant.

A sample of the fresh fecal sludge is collected for screening



Testing the fecal sludge for pH



Close-up of the pH test



Testing the conductivity of the Fecal Sludge



## Resource Recovery Park:

The dried sludge is co-composted with solid waste from the TP, at newly constructed Resource Recovery Park. There are plans to sell this as agricultural fertiliser'.



Windrows of the co-compost at the Resource Recovery Park



Co-composting at the Resource Recovery Park in Karunguzhi





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