FECAL SLUDGE MAPPING

Understanding fecal sludge source, volumes, characteristics for optimal for treatment

Vinitha Murukesan
Niladri Chakraborti

TN US SP
TAMIL NADU URBAN SANITATION SUPPORT PROGRAMME

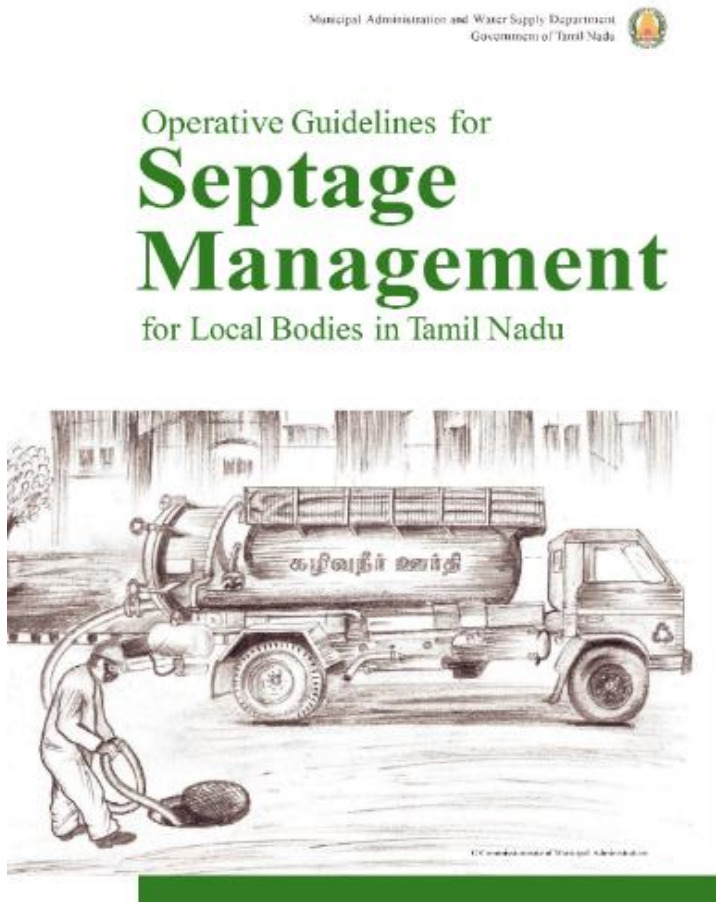
iihs®
INDIAN INSTITUTE FOR HUMAN SETTLEMENTS

Keystone
A GROUP FOR ECO-DEVELOPMENT INITIATIVES

AfricaSan5 FSM5

URBAN TAMIL NADU

1. 38% of urban Tamil Nadu relies on on-site sanitation systems
2. Large number of Sewage Treatment Plants (STPs):
   a. Total capacity – 1400+MLD;
   b. Under utilised
   c. Co-treatment practiced in few STPs; has significant potential to scale-up
3. State Operative Guidelines prescribes 20 KM distance for clustering Local Bodies around STPs
4. Established private desludging market; challenges faced:
   a. Access for disposal
   b. Travelling long distances for disposal is not a profitable venture



PNP-NNP CLUSTER

Periyanaicken-Palayam (PNP)

Population
26,000

Households
7,400

Area
9.38 sq.km

Households with individual latrines
83%

No. of Wards
18

Households using public/ community toilets
14%

Slums
3

Source: Census 2011

Narasimhanaicken-Palayam (NNP)

Population
17,900

Households
5,000

Area
6.37 sq.km

Households with individual latrines
75%

No. of Wards
15

Households using public/ community toilets
20%

Slums
11

NEED FOR UNDERSTANDING FS MAPPING

1. Poor data and reporting on desludging operation
   a. ULBs do not keep records
2. Quantifying FS for treatment and other infrastructure in urban areas
3. Design of treatment systems
   a. Understand the possible sources of sludge
   b. Sizing (for triangulation with other methods)
4. Open markets: possible overlaps

METHODOLOGY

1. Bassline studies: Small sample HH - OSS sizes
2. Questionnaires, Interviews: Desludging operators
3. Mapping of the active operators for details,
    i. Extent of operations
    ii. Diversity of customers
    iii. Possible sources and quality of sludge
    iv. Quantity and quality of sludge
    v. Disposal practices
4. Data validation at field level

CHALLENGES

1. Establishing credible relationship with operators to bring out true data
2. No reported data on type of sludge from industries: Industrial origin or Fecal sludge
3. Exact quantity of FS in the truck
4. Exact location of the source is not known

FINDINGS – PNP-NNP - 1

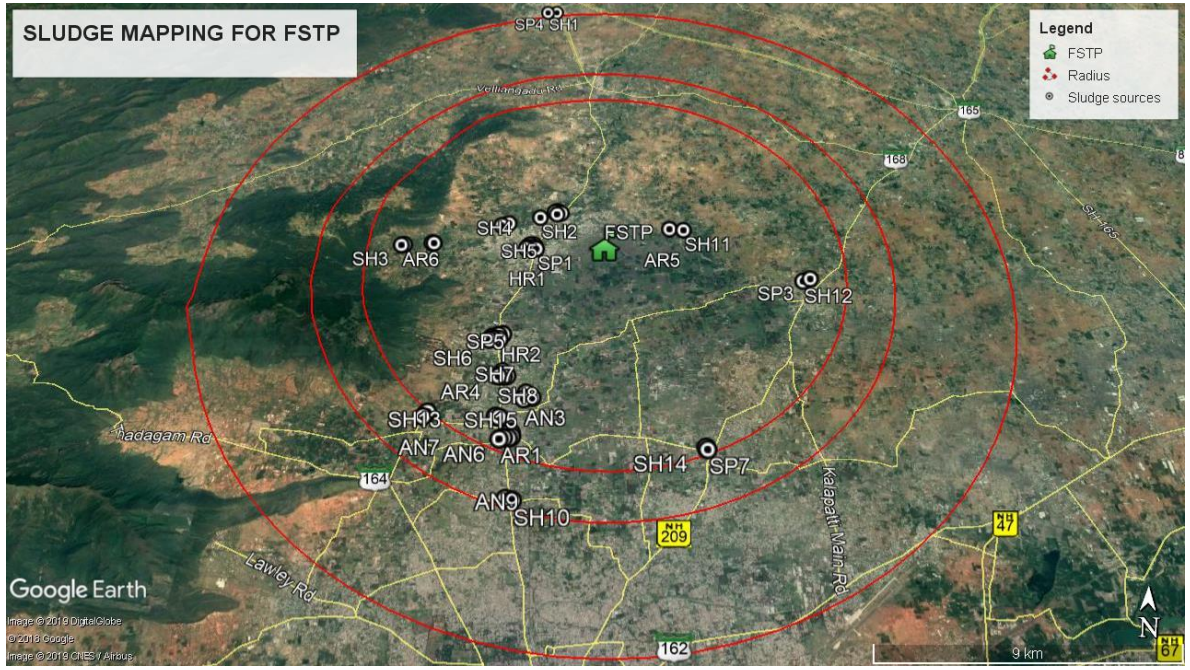
RANKING OF SOURCES OF SLUDGE GENERATION
Residential- Villas, Apartments
Commercial- Hotel, Marriage halls
Industrial- Textile mills, Automobile industries
Others- community and public toilets

Operators report seasonal variation

Characteristics of Fecal Sludge from the desludging trucks in PNP/ NNP			
Parameters	Sample 1	Sample 2	Sample 3
pH	9	8.7	9
Ammonium mg/L	1,100	700	1,400
Phosphates mg/L	1,040	1,200	980
COD mg/L	25,500	23,650	32,000
Total Solids mg/L	24,257	22,730	26,667
Volatile Solids mg/L	15,697	14,330	16,077
Fixed Solids mg/L	8,560	8,400	10,590

FINDINGS – PNP-NNP -2

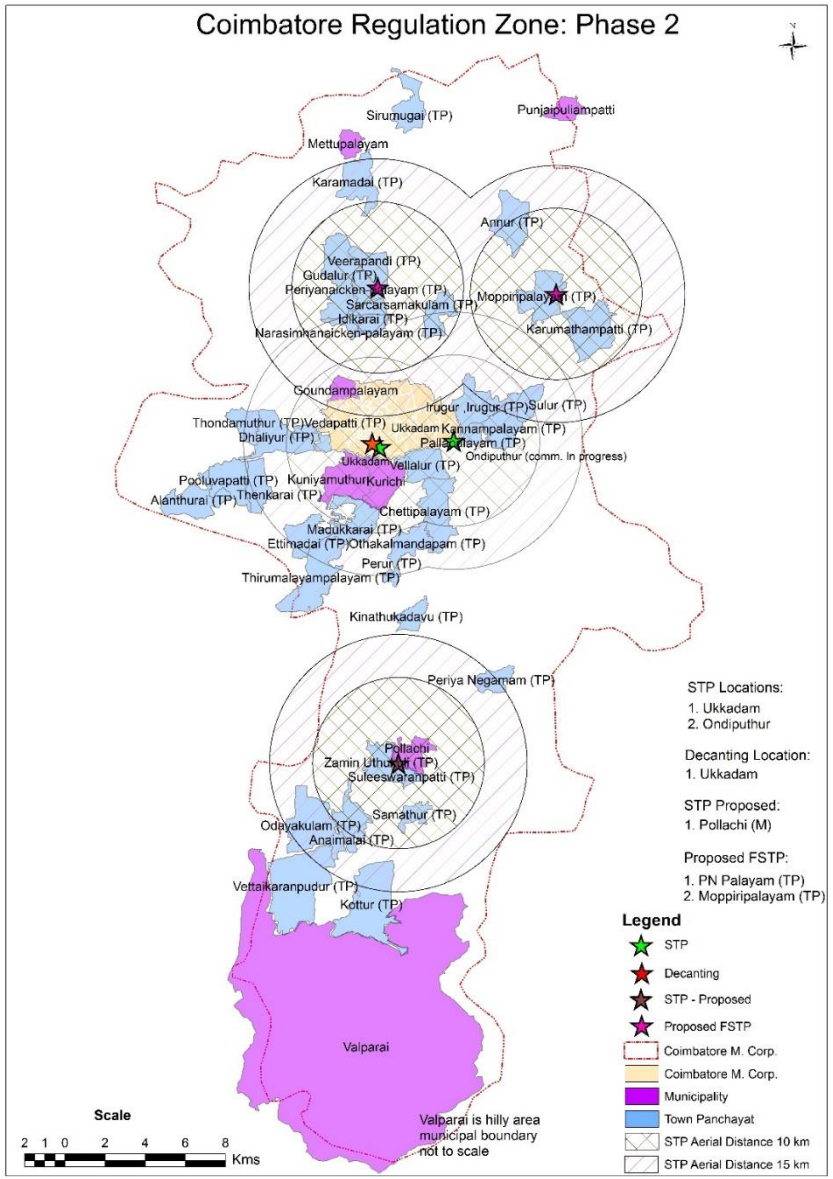
NO	ENTERPRISE NAME	NO OF LOADS PER DAY	NO.OF LOADS IN PNP-NNP PER DAY
1	Hari Ram	10	3
2	Shakthi	15	1
3	SPS	10	1
4	Everfresh	7	3
5	Annai	5	1(per week)
6	Arvind	8	1
	TOTAL	**55**	**10**



Overlapping markets across ULBs

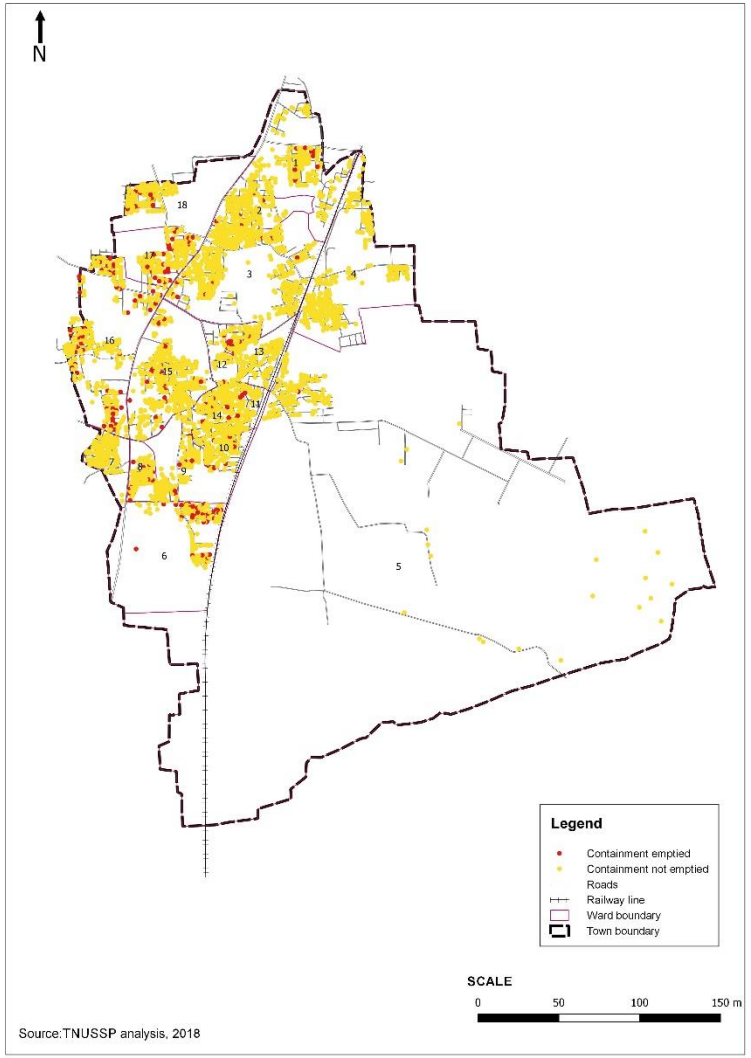
FINDINGS – PNP-NNP -3

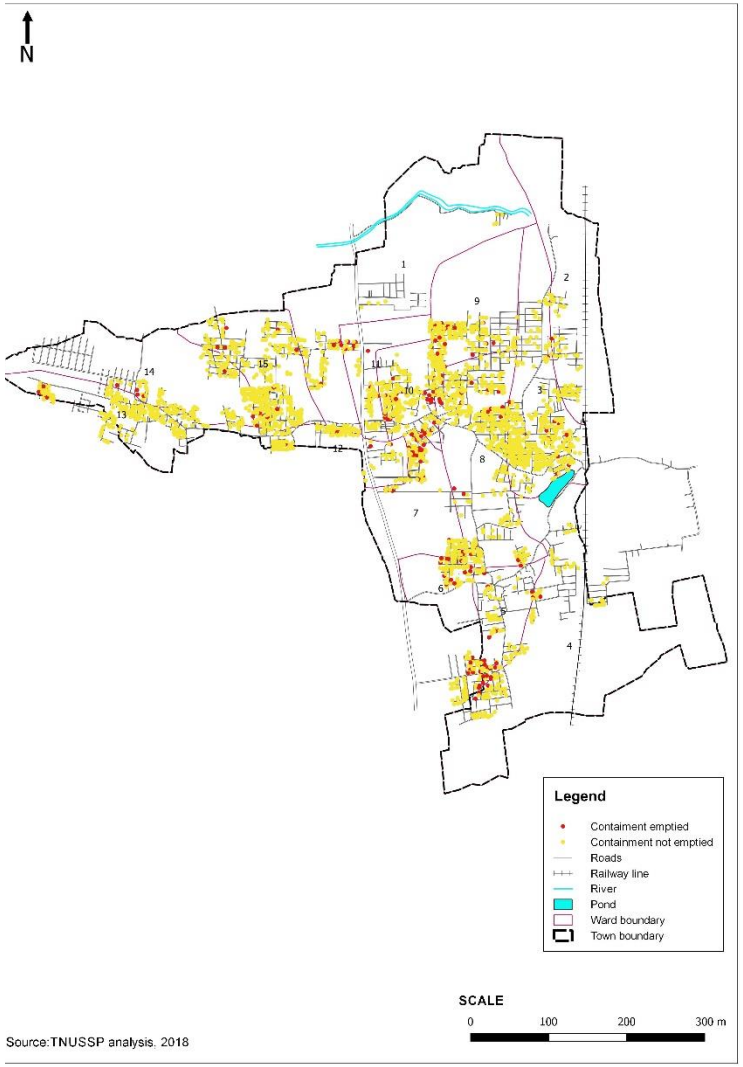
1. Travelling >10-12 km from the collection point to safe disposal site is not a profitable venture – basis of State Investment Plan
2. None of the operators disposed the sludge into the STP located at 15-20 km:
   a. Need for setting up FSTP in PNP
   b. Improvement of sludge receipt facility at the STP



FINDINGS – PNP-NNP -4

1. Only 6% of the HH have ever emptied
2. Sufficient business opportunity for the operators around 15 km radius from the proposed FSTP in PNP
3. Identification of industrial/ hazardous wastes: unclear
    a. Simple testing/ screening methods are needed to safeguard treatment plants from industrial/ hazardous waste

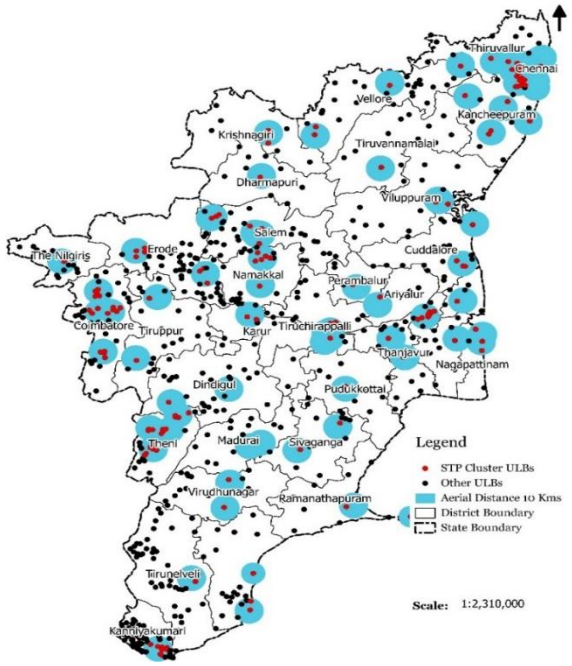




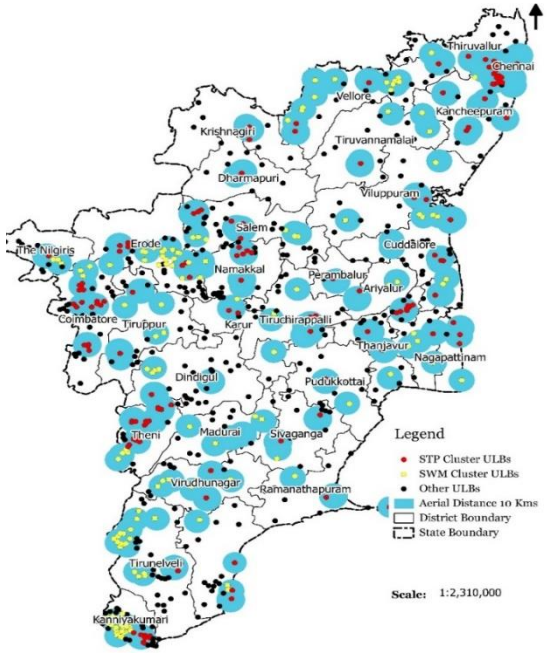
LEARNINGS

1. Development systematic tools, instruments for information collection
2. Decision support:
   a. Clustering distances (road based)
   b. Phased/ modular approach for implementation – treatment
3. Protocols for FS testing

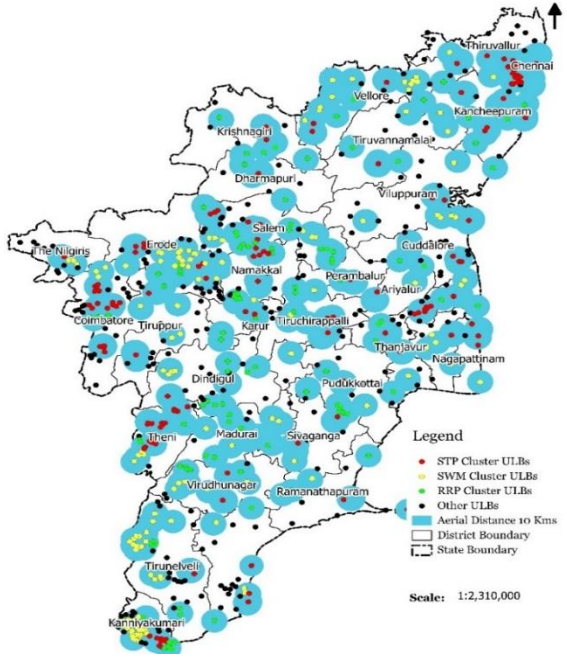
Phase I



Phase II



Phase III



	STP Cluster ULBs		Other ULBs		SWM Clusters		RRP Clusters
	Aerial Distance 10 km		District Boundary		State Boundary	Scale: 1:2,310,000	

THANK YOU