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TAMIL NADU URBAN SANITATION SUPPORT PROGRAMME

iihs™

INDIAN INSTITUTE FOR HUMAN SETTLEMENTS

In Association With:

Keystone — A GROUP FOR ECO-DEVELOPMENT INITIATIVES

Gramalaya

CDD Consortium for DEWATS Dissemination Society

Training programme on Fecal Sludge Management for Engineers in Trichy Corporation

Case study on FSM

Contents

- FSM in Devanahalli
- FSM in Warrangal
- FSTP – Cochin (Treatment)

FSM in Devanahalli

Devanahalli - Project Objectives

1. To establish a independent fecal sludge treatment Plant as Pilot
2. To ensure good O&M of sanitation infrastructure which leads to reduction in risks to public health and environment
3. To treat the septage to prescribed reuse standards
4. To produce a hygienic and safe by-products for reuse

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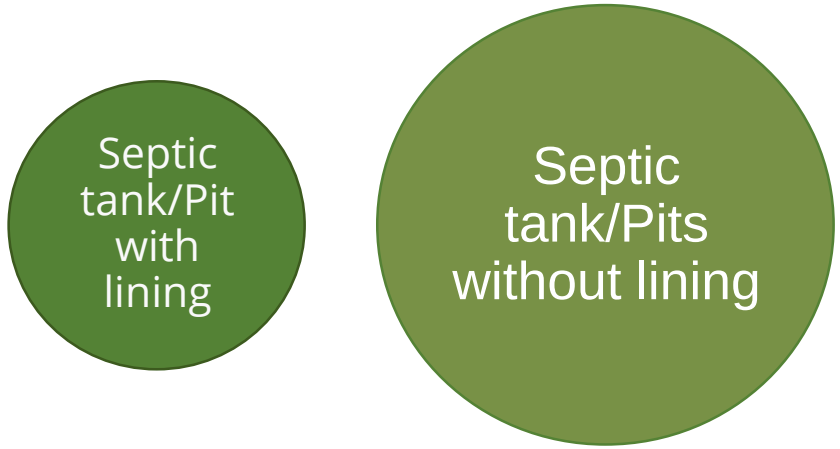
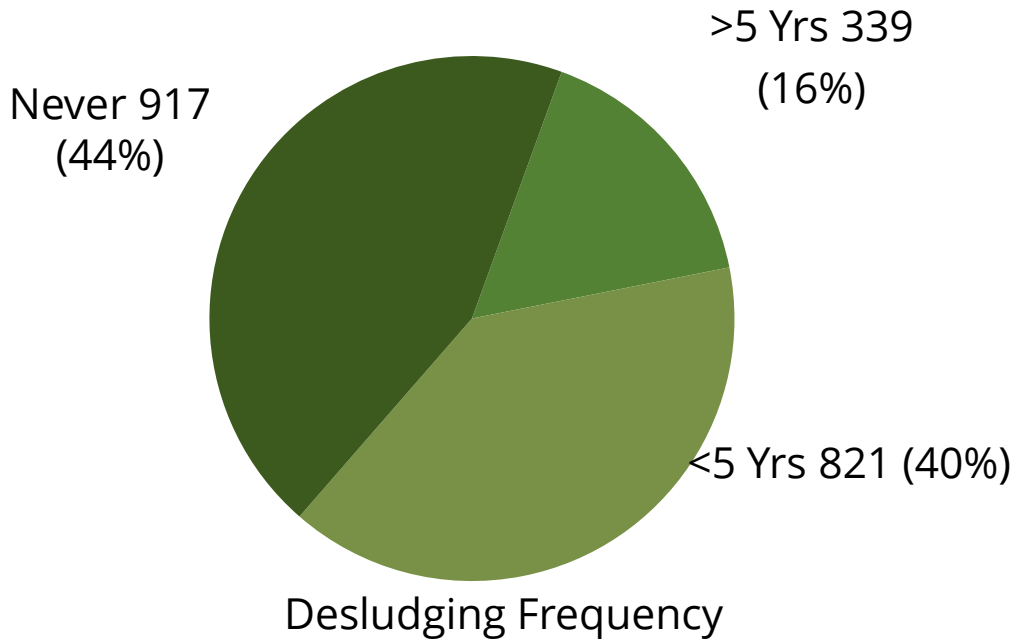
The Data...


Septic tank/Pit with lining
Septic tank/Pits without lining
770 HH (35%)
1,446 HH (65%)


Never 917 (44%)
>5 Yrs 339 (16%)
<5 Yrs 821 (40%)
Desludging Frequency

Transportation

- TMC desludging vehicle

  (capacity 4,000L)
- 1 - 2 loads de-sludged

  daily—dumped in fields
- Private Players too
- No sewer system planned in near future--limit
- City is growing—need to act

Re-Use

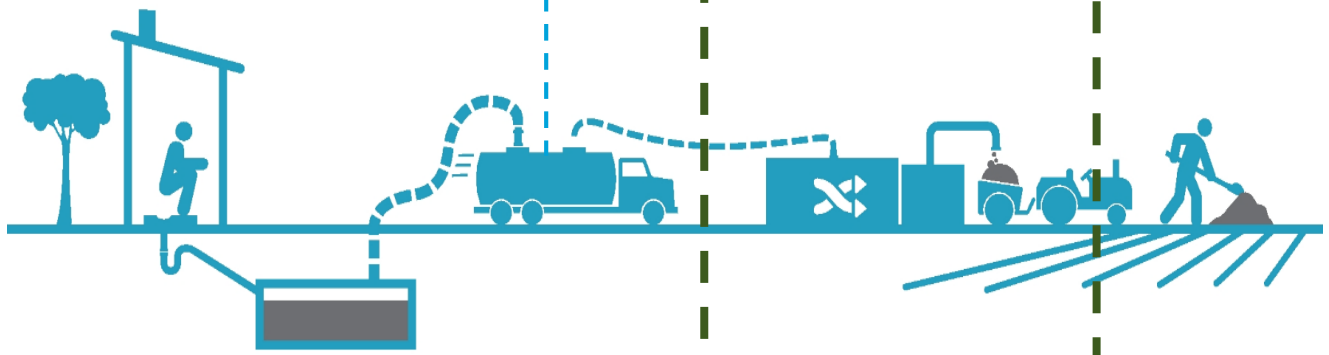
- Private and ULB Truck
  dump sludge in fields
- Potentially unsafe —
  farmers don't want to handle it
- Farms not easily accessible— Peri-urban farms shrinking
- Need a better supply chain for safer, widespread re-use

Solution: FSM

Challenge:
improper dumping

Status quo: improper dumping causes pollution, disease and environmental

Solution: low-tech fecal water treatment



Collection at designated septic locations

Contractors transport waste to FSTP

Proprietary waste treatment for local reuse

Enriched waste provided for agricultural use

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Operating Model

- Private and ULB trucks can bring Sludge here : Free
- TMC agreed to pay O&M costs
- Grant covered CapEx; TMC provided land and services
- Land sold for Advertisement Space
- Integrated O & M Contract for Truck and Plant operations

Treatment Process

Anaerobic Digestion based Faecal Sludge Treatment Plant

1. Separation of solids
2. Sludge stabilization
3. Dewatering / Drying
4. Sludge percolate treatment
5. Disinfection
6. Safe disposal / Reuse

FSTP at Centre for Advanced Sanitation Solution (CASS)

- Treatment principles and process adopted based on the experience of research unit
- Treatment Capacity – max 3m3 of faecal sludge / septage
- Feed frequency – daily

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Design considerations

Feed type – Faecal sludge/septage

Feed frequency – Daily discharge

Treatment capacity – max 8 cum/day

Treatment approach – Gravity based biological **treatment system**

Sample Parameters	Fresh Septage / Fecal Sludge mg/l	Average value mg/l
BOD, mg/l	10,000 - 30,000	20,000
COD, mg/l	20,000 - 60,000	40,000
Total Solids	30,000 - 80,000	50,000
pH	5.8- 7.8	7.2
Coliform	1×10^4 - 1×10^7	3×10^6

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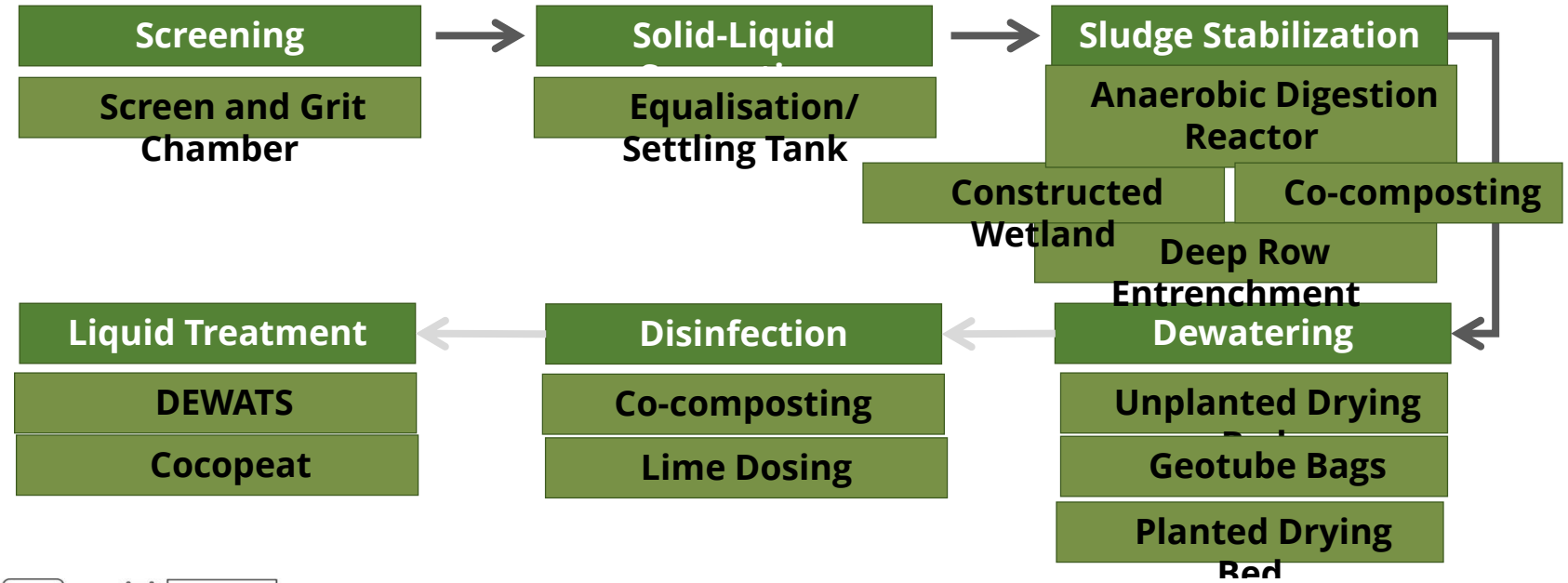
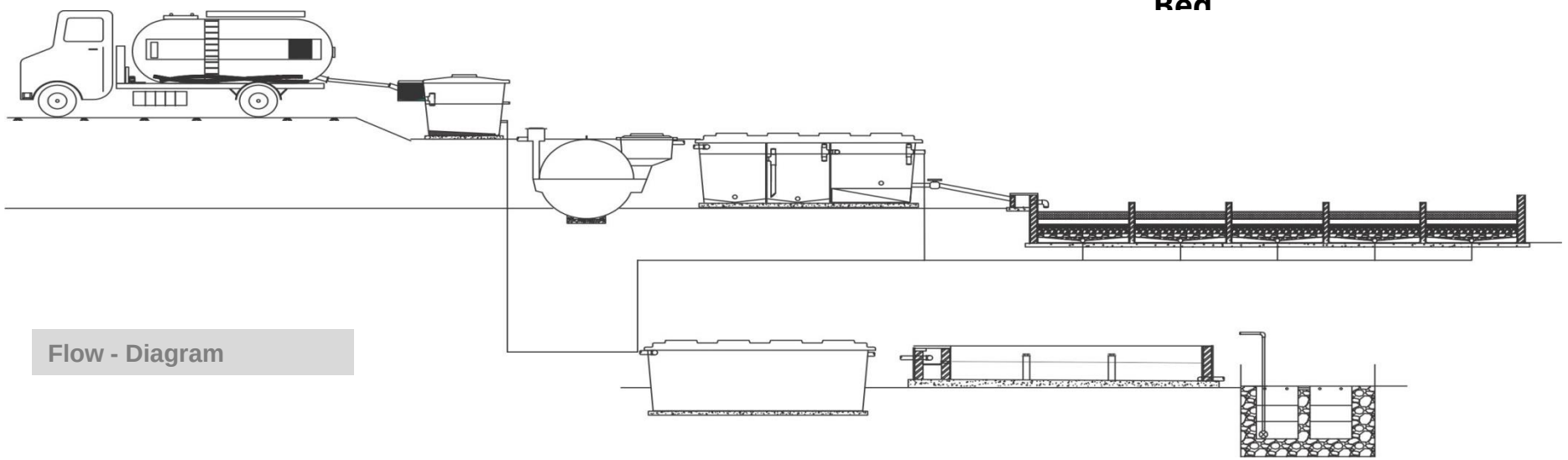
Treatment modules





Flow - Diagram

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O&M Requirements

Operation Requirements

- Receive Faecal sludge
- Influent quality check
- Cleaning of Screens
- Operation of Valves
- Harvesting of Plants in PGF
- Removal of dried solids from SDB

Maintenance Requirements

- Cleaning of pipes
- Desludging
- Cleaning of filter materials in PGF
- Cleaning of filter materials in SDB
- Repair of pipes/valves

Financials

- Treatment capacity - Max 6 m3/day
- Can serve 2,800-4,000 households (cleaning every 2-3 yrs)

	Total	Per Household
CapEx	Rs 60 Lakhs	Rs 200
OpEx (annual)	Rs 6 Lakhs	Rs 20

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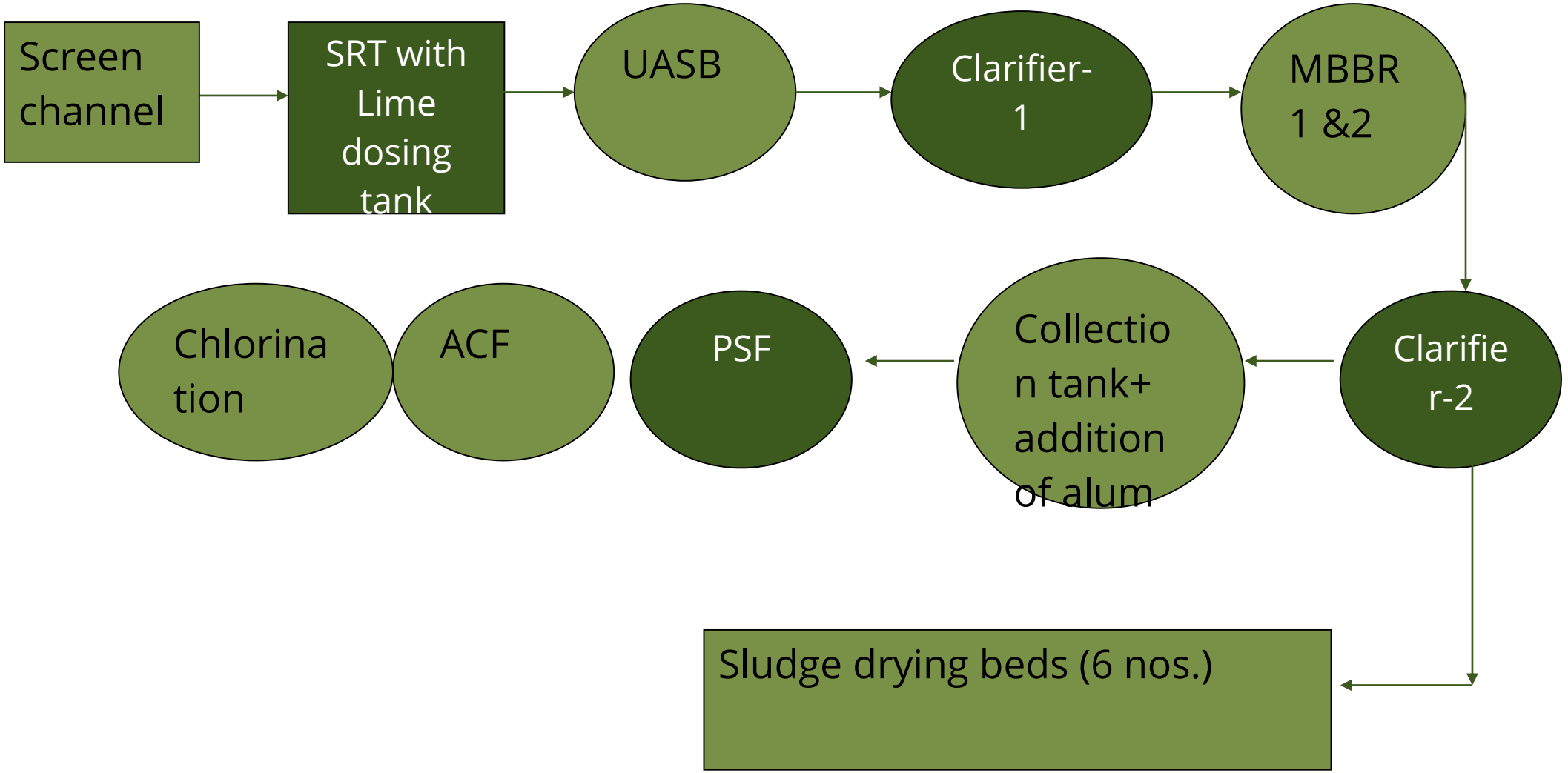
Sanitation Situation - Warangal

- Water availability < 100 lpcd
- City has no sewerage system;
- dependence on onsite options.
- HH having access to onsite toilets: 77%
- Toilets connected to septic tanks : 59%
- Pit latrines : 18%
- HH with OD and Insanitary Toilets: 23%

FSTP at Bhramapura, Kochi

Feed type	– Faecal sludge/septage
Feed frequency	– Batch process
Treatment capacity	– 100 cu. metres
Treatment approach	– Anaerobic and aerobic process
Chemicals used	– lime (2 kg in 20 litre water for five loads in SRT) to maintain pH in UASB Alum (Aluminium chrlorite) as flocculent after MBBR

Treatment concept



Performance and Reuse

- BOD - 25 mg/l
- COD - 96mg/l
- TSS - 13 mg/l
- Faecal coliform - < 2 nos/100ml

- Treated water – gardening and washing desludging vehicles
- Biogas- used to run heat exchanger/ burnt it off
- Sludge: no reuse

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Few pictures of the FSTP

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Thank You