



TN

TAMIL NADU

US

URBAN SANITATION

SP

SUPPORT PROGRAMME

iihsTM
INDIAN INSTITUTE FOR
HUMAN SETTLEMENTS

In Association With:



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

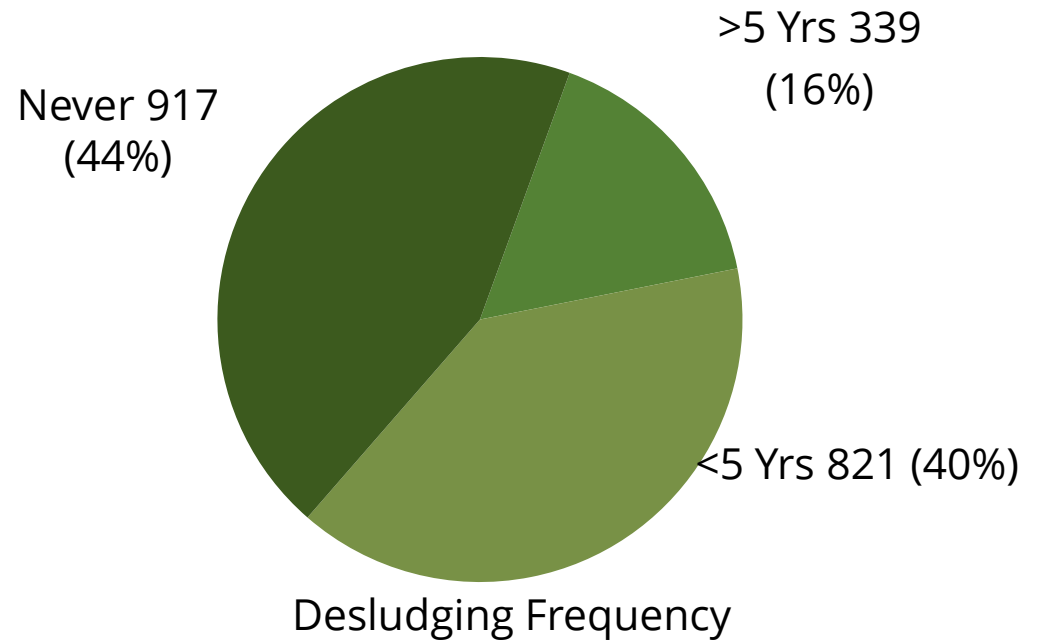
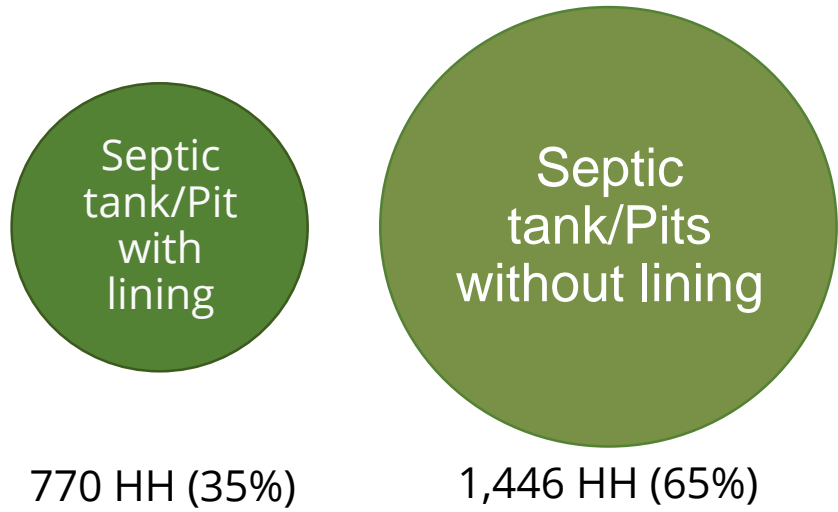
3

To treat the septage to prescribed reuse standards

4

To produce a hygienic and safe by-products for reuse

The Data...



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

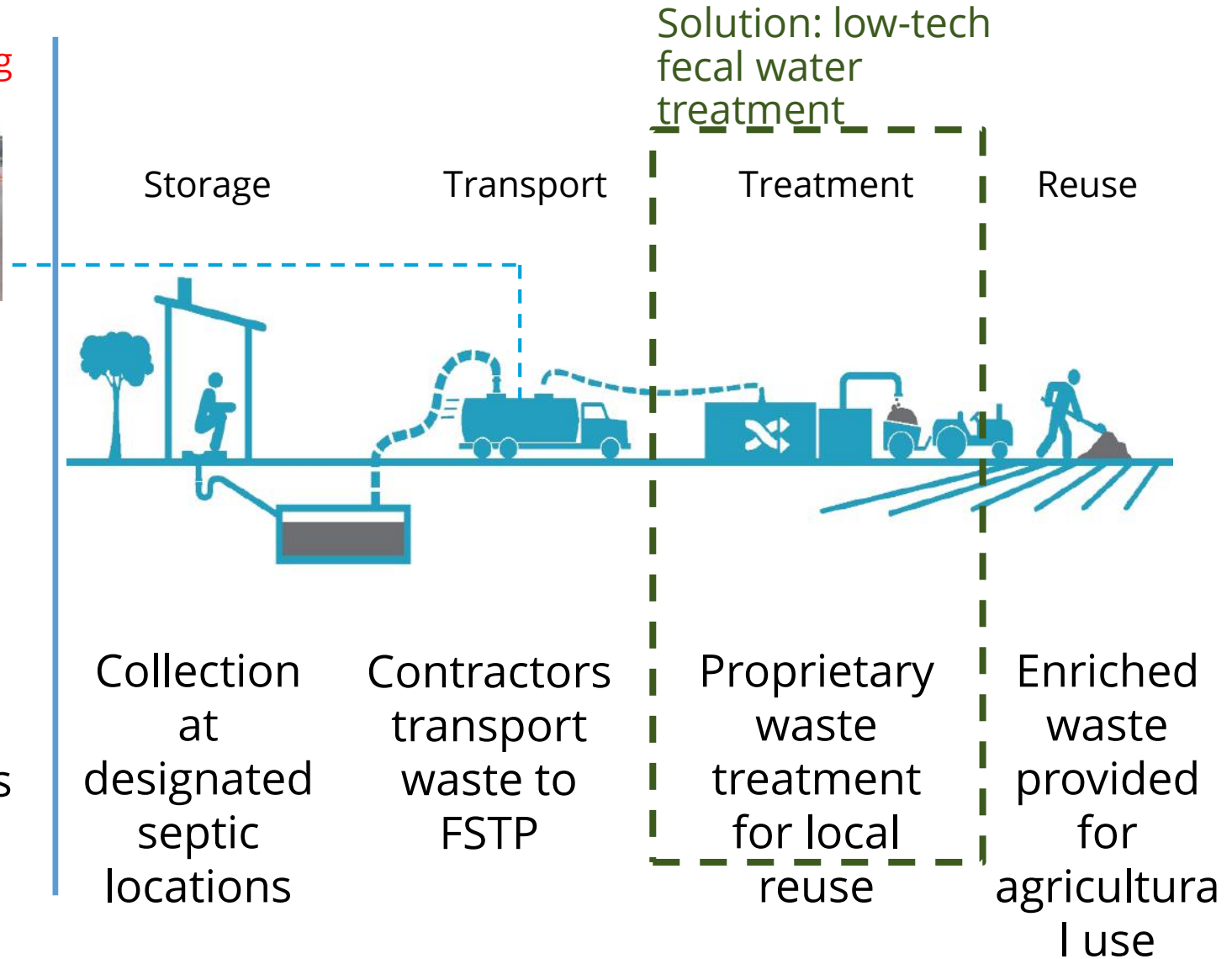


Solution: FSM

Challenge:
improper dumping



Status quo:
improper
dumping causes
pollution,
disease and
environmental



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

FSTP at Centre for Advanced Sanitation Solution (CASS)

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



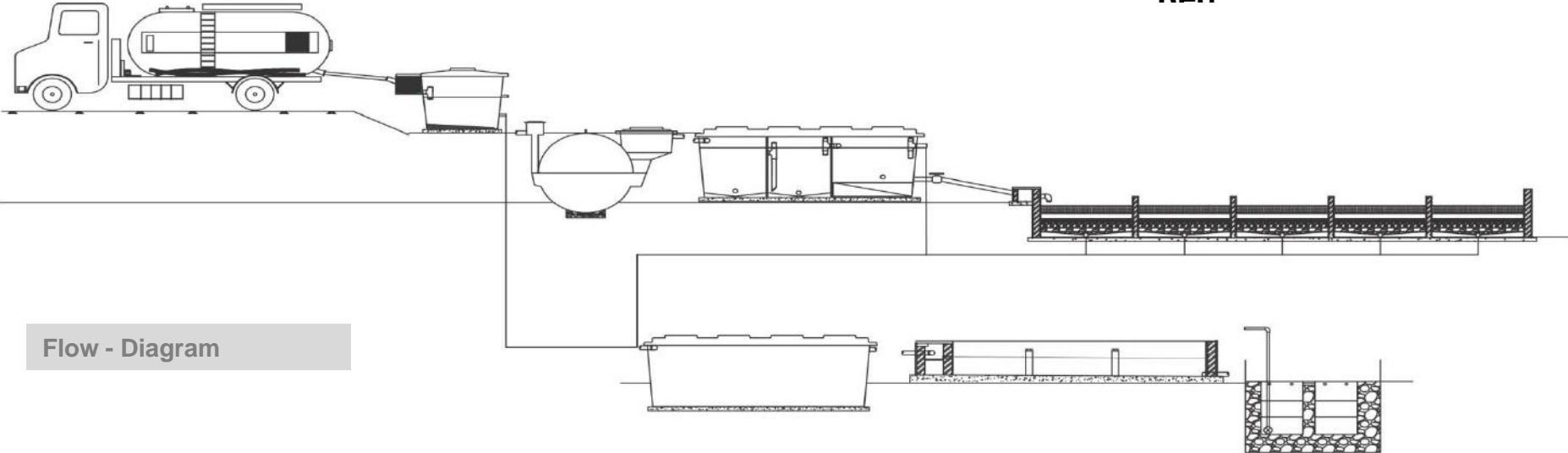
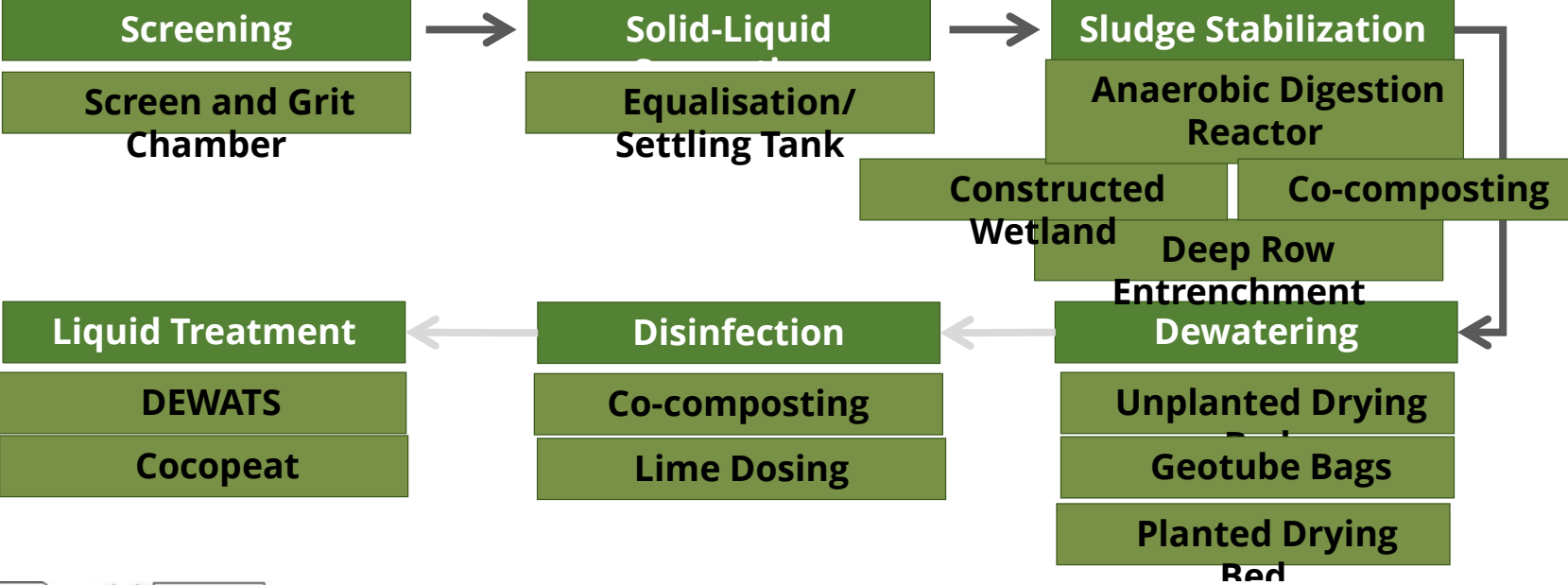
- Treatment principles and process adopted based on the experience of research unit
- Treatment Capacity – max 3m³ of faecal sludge / septage
- Feed frequency – daily

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

Treatment modules



Flow - Diagram

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



Sanitation Situation - Warangal

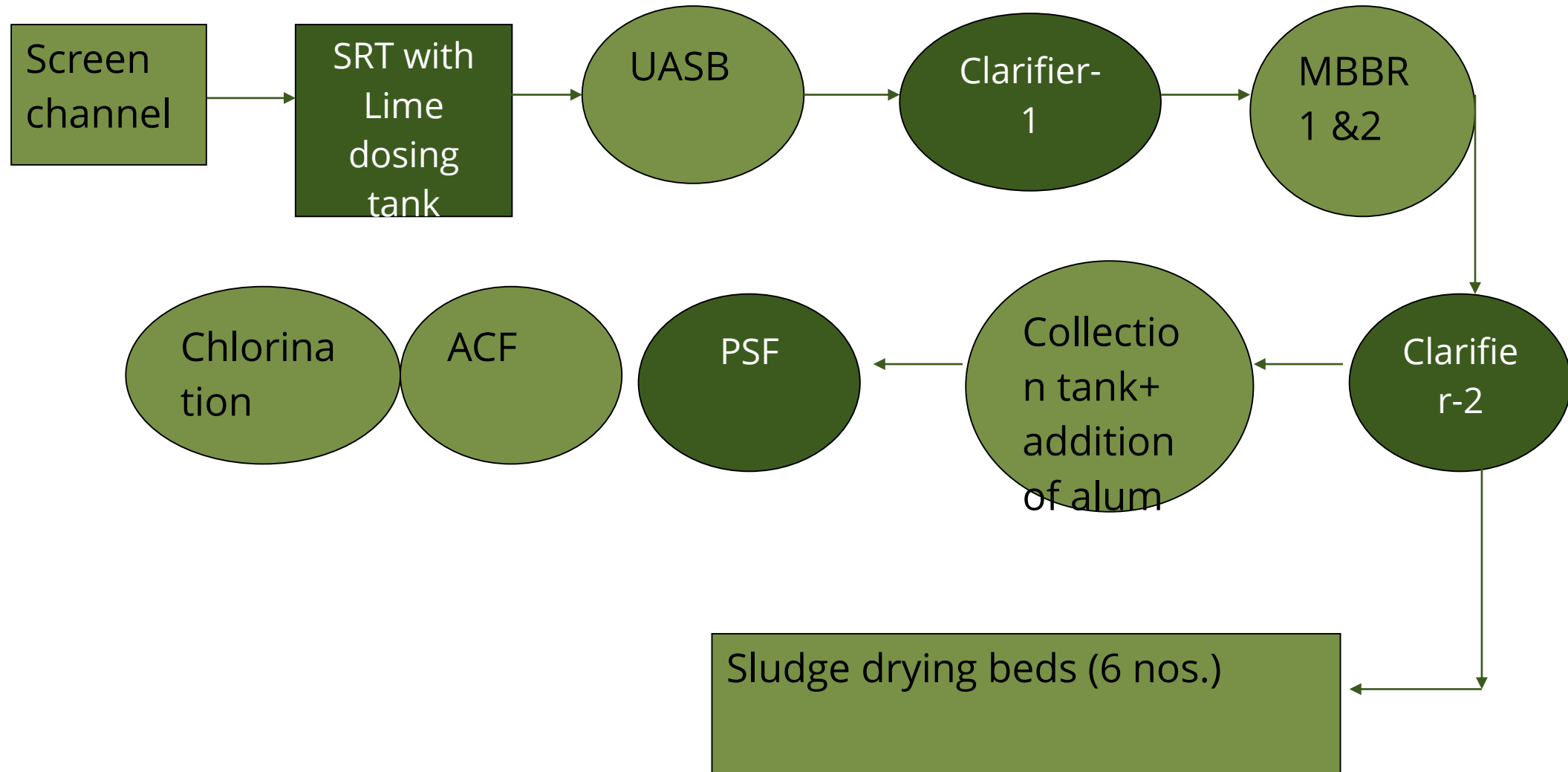
- Water availability < 100 lpcd
- City has no sewerage system;
- dependence on onsite options.
- HH having access to onsite toilets: 77%
- Toilets connected to septic tanks : 59%
- Pit latrines : 18%
- HH with OD and Insanitary Toilets: 23%



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 chlorite) 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



Few pictures of the FSTP



Thank You