

# Faecal Sludge Treatment Plant, Devanahalli

## PROJECT BRIEF

Devanahalli is a town located 39 Km North-East of Bangalore. The town does not have an underground drainage (UGD) system and most of the households depend on onsite sanitation infrastructure, such as septic tanks and soak-pits for containment of faecal sludge or septage. Faecal Sludge from these pits and septic tanks is collected and brought to the Faecal Sludge Treatment Plant (FSTP). The FSTP, an implementation by the Town Municipal Council-Devanahalli with support from Consortium for DEWATS Dissemination Society, The Bill and Melinda Gates Foundation (BMGF) and Bremen Overseas Research and Development Association (BORDA), introduces a holistic and integrated treatment facility for the entire town.

## PROJECT OUTCOMES

- To ensure efficient treatment of faecal sludge being generated in the town
- To ensure safe reuse of treatment by-products
- To demonstrate possible financial models for FSTP operations

## REUSE OPTIONS

- The treated effluent is reused in the campus for landscaping
- Biogas generated from the Biogas Digester is used as fuel for cooking at the operators' residence
- The digested sludge from Sludge Drying Bed is co-composted with organic municipal waste
- The produced co-compost is sold to farmers as soil conditioner

## O&M

### Maintenance tasks

- Desludging of BGD, ST, SR, ABR
- Cleaning of filter material at PGF and SDB

### Operation tasks

- Cleaning of screen chamber
- Operation of valves
- Regular desludging of the stabilization tank and stabilization reactor
- Removal of dry sludge from SDB
- Turning of compost heap

## SALIENT FEATURES

Source of faecal sludge: Pits and Septic tanks

Design capacity: 6,000 liters/day

Population Covered: ~40,000

Area: 1425 m<sup>2</sup> (Build up area 625 m<sup>2</sup>)

Influent quality: BOD 3,500 – 50,000 mg/L

COD 9,000 – 12,500 mg/L

Compost Quality: C:N (%) = 18.2 : 1

P:K (%) = 0.33 : 1.014

## PROJECT SPECIFICATIONS

### Funding Agency:

The Bill and Melinda Gates Foundation (BMGF)

### Implementing Agency:

CDD Society

### Supporting Organization:

BORDA, TMC-Devanahalli

### Implementation Cost:

Rs. 70,00,000

### Operation and Maintenance Cost:

FSTP Operations = Rs. 7,00,000 per annum

Truck Maintenance = Rs. 10,30,000 per annum

Co-composting facility = Rs. 7,00,000 per annum

Year of commissioning: 19th November, 2015

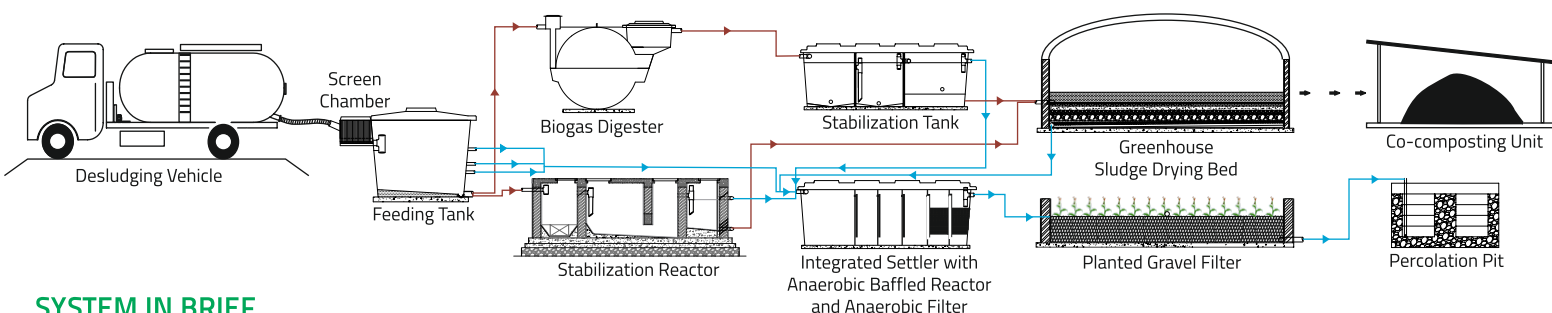


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## TREATMENT PROCESS



## SYSTEM IN BRIEF

The main treatment steps followed in this FSTP are solid-liquid separation, stabilization, dewatering of sludge and pathogen removal. The separated liquid component is also treated to meet discharge standards. The faecal sludge is conveyed to the FSTP through a desludging vehicle. The treatment modules for solid components are: Feeding Tank (FT) with screen chamber, Biogas Digester (BGD), Stabilization Reactor, Stabilization Tank (ST), Sludge Drying Bed (SDB) with Green House Solar Drier Roof (GHSD). Treatment modules for liquid components are: Integrated Settler, Anaerobic Baffled Reactor with filter chambers, Planted Gravel Filter (PGF) and Percolation pit. The treatment system also consists of a co-composting unit where the dried sludge from the SDB is composted with municipal solid waste.

## PERFORMANCE OF FSTP

		Raw Faecal Sludge	Treated Water	Co-compost Quality		
pH		6 to 8	6.5-7.8			
Organic Load	BOD, mg/l	3500 - 50000	<30			
	COD, mg/l	9000 - 125000	<100	C:N Ratio	%	18.2:1
Solids	TSS, mg/l	400 - 22900	<150	Bulk Density	g/cm <sup>3</sup>	0.834
	VS, mg/l	560 - 66000		Active Helminth Eggs	No.s/g	<1
Biological Parameter	E.Coli, CFU/100ml	90000 - 120000	<2000	Moisture content	g/cm <sup>3</sup>	27.2

## LEARNINGS

- Integrated operation and maintenance plans with long terms contracts are better for sustainability and efficient management by ULBs
- Treatment efficiency was improved by adding solar roof tops to planted drying beds, thus reducing sludge drying time
- Perforated and interlocking tiles (Mangalore Jaali tiles) were added to reduce loss of sand from the sludge drying beds during treated faecal sludge recovery
- Since the faecal sludge treated is mostly stored in the containment unit for very long duration, not much gas is generated after digestion in biogas chambers. Thus, biogas chambers were subsequently replaced in future designs with stabilization reactors.
- The reuse objective, that is, the idea of reusing treated bio-solids as a soil conditioner - drives the design of this treatment plant to a large extent. However, if the objective is just safe disposal, the plant can be designed in a manner that it is cheaper to construct and easier to operate and maintain.

## CURRENT STATUS

The plant is operational since the year 2015, more than 1.8 million L of faecal sludge has been treated. More than 19,000 kg of co-compost has been sold to farmers so far. The O&M of the FSTP & Co-composting unit was handed over to the ULB in July 2019