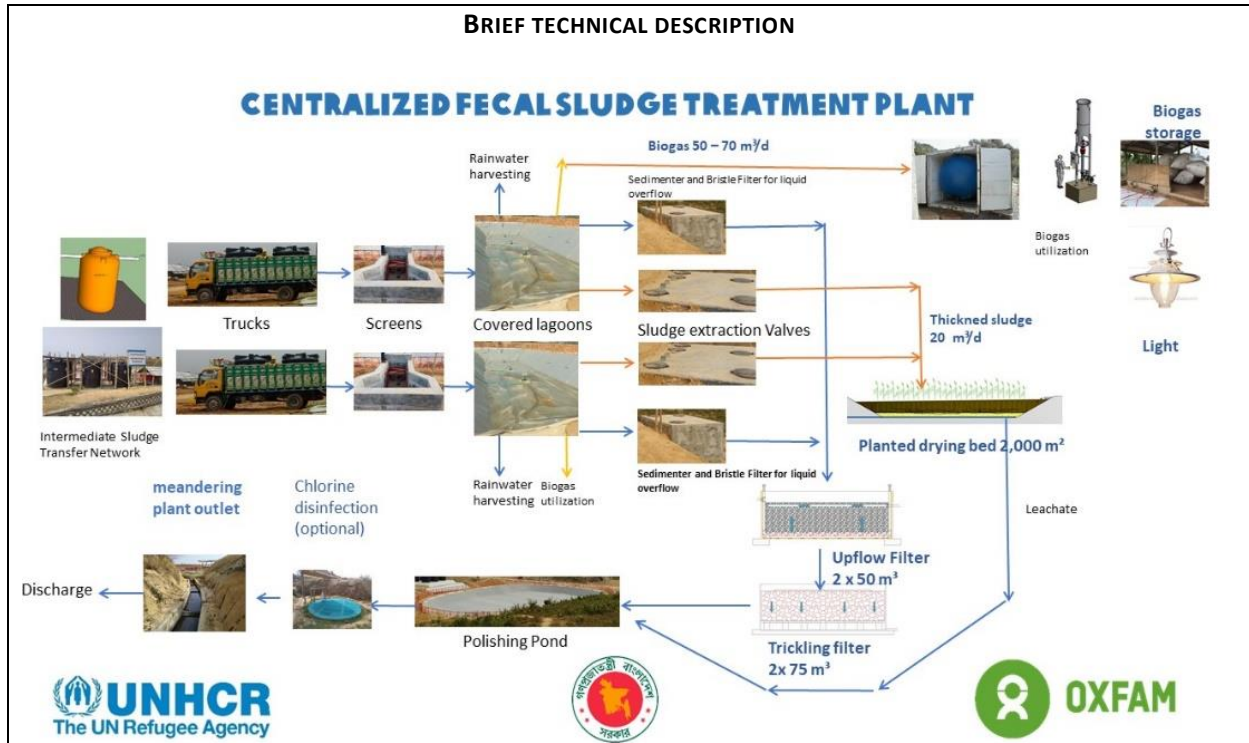


# Centralized Biological Fecal Sludge Treatment Plant Fact Sheet

KUTUPALONG FSTP-1, Camp 4



The treatment plant includes a screen followed by a primary anaerobic digestion in two parallel covered lagoons. In addition to anaerobic digestion, the large lagoons serve the purpose of storage capacity of fecal sludge. Once filled, the lagoons continue to be loaded with fecal sludge but settled sludge is removed multiple times per week and transferred to the second stage of solids treatment in the system, planted drying beds. Dewatering of sludge takes place in planted drying beds, reducing and the sludge volume. Leachate is partially filtered in the media, in which plant roots enable anaerobic and aerobic treatment. Over time, sludge demineralization takes place. Liquid effluent from the primary lagoons is piped to two parallel upflow filters for secondary treatment following pass through trickling filter by gravity. Following this step is a final polishing pond with a meandering trench outlet before effluent is released into nature.

The covered lagoons provide the ancillary benefit of biogas production, which may be captured and bottled and used as an energy source.

**DAILY INFLUENT CAPACITY (M3/DAY):**

180m3/day. Design can be scaled for any capacity with additional treatment units considering available land area.

**IS THE 'END POINT OF THE FSM CHAIN'/DISPOSAL POINT INCLUDED IN THE DESIGN AT ITS SITE?**

Planted drying beds serve as the endpoint for approximately 8 years, after which humified matter may be removed for composting.

**DOES THE TECHNOLOGY INVOLVE SETTLED SOLIDS? WHAT IS THE EMPTYING FREQUENCY OF SETTLED SOLIDS?**

Yes. Settled sludge accumulates until the lagoons are full (approximately after 15 months of 20m<sup>3</sup>/day operation). When full, thickened sludge is removed and emptied on to planted drying beds multiple times per week.

**FINAL SLUDGE/SOLIDS CHARACTERISTICS:**

Sludge undergone mineralization and humification. Requires removal from planted drying beds after approximately 8 years.

**CONTEXTS WHERE TECHNOLOGY IS APPLICABLE**

- Sufficient land area is available (approximately 20,000m<sup>2</sup> + access space for the pilot site with 20-60m<sup>3</sup>/day capacity)
- Road access for sludge loading
- Topography allows for gravity flow
- HDPE liner and PVC membrane is available
- Technical specialists are available

**CONTEXTS WHERE TECHNOLOGY IS NOT APPLICABLE:**

- Locations with unsuitable topography and land area
- Areas with no road access

**OPERATION AND MAINTENANCE REQUIREMENTS**

*Description of O&M operations:*

Operation and maintenance involves managing the influent works, including:

- Daily operation of the receiving station and cleaning of the screen , checking pH ,TDS etc.
- Regular operations include 1-3 times emptying of settled sludge from the anaerobic lagoons and placing the sludge evenly onto drying beds.
- Cleaning, replacement of the bristle filter in the anaerobic lagoon outlet
- Periodic backwash of upflow filter.
- Removal of the mineralized sludge from the planted sludge drying after 8 – 10 years
- Weekly control of the chlorine concentration and optional replacement of the chlorine tablets at the disinfection unit
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Regular, trained treatment plant personnel are required to carry out these duties.

**THE TECHNICAL COMPLEXITY OF O&M:**

Personnel must be trained on maintenance operations, which are relatively simple. However, O&M related to biogas production is requires greater expertise.

**STRENGTHS**

- Simple, low-maintenance design
- Enables large volume of sludge storage capacity to meet the immediate need to desludge a large number of latrines
- Includes end-point sludge mineralization in planted drying beds

**WEAKNESSES**

- Significant start-up time is required for construction when implementing at large scale
- Requires technical specialists for installation

### TREATMENT FLOW



Anaerobic Lagoon

Solid



Planted drying bed

Removal of biosolid / humified sludge after 8 years



Liquid



Anaerobic baffle and filter reactor



Trickling filter



Final discharge



Chlorination chamber (Optional)



Polishing pond