UP-FLOW FILTRATION SYSTEM TO ENSURE SAFE AND ENVIRONMENT FRIENDLY FAECAL SLUDGE MANAGEMENT at world’s largest settlement for forcibly displaced Myanmar Nationals in Ukhiya, Cox’s Bazar, Bangladesh
LIFE IN THE CAMP

Around 1 million people are living in makeshift huts crammed up on muddy hillsides in a densely packed dismal condition.

Water, sanitation and hygiene remains of high concern there. Proper sludge management facilities are inadequate and in most cases, faecal sludge is being disposed in open environment without any treatment. Thus, the Faecal contamination of water is very high, posing threat to epidemic of diseases.
UP-FLOW FILTRATION SYSTEM
TO ENSURE SAFE AND ENVIRONMENT FRIENDLY
FAECAL SLUDGE MANAGEMENT

Practical Action has devised context specific Faecal Sludge Management (FSM) units, adopting up-flow filtration system to ensure safe disposal of faecal sludge at hilly terrain at the world’s largest settlement for forcibly displaced Myanmar Nationals in Ukhiya, Cox’s Bazar, Bangladesh.

**Schematic Diagram of Faecal Sludge Management Unit**

**COMPONENT, CAPACITY AND DIMENSIONS**

1. **Dumping Chamber**
   - Capacity: 300 Litre
   - Dimension: 3’x3’x1.5’

2. **Filtration Chambers**
   - Capacity: 5000 Litre
   - Dimension: 10’x5’x6’

3. **Burial Pits**
   - Capacity: Minimum 1000 Litre
   - Dimension and Depth Depends on Context

4. **Soakwell**
   - Capacity: Minimum 3000 Litre

5. **Constructed Wetland**
   - Capacity: Minimum 6000 Litre
Adopted the simple up-flow filtration technique

A series of filtration chambers are for solid-liquid separation

The raw faecal sludge gets thickened at lower part of each filtration chamber and is moved to the adjacent burial pits with sand envelops to ensure safe management

The liquid portion of the sludge passes through filter media of each chamber, and the final treatment of the effluent is ensured through a constructed wetland, where the pollutants are absorbed naturally by *Canna Indica* plants

Once digested, the buried sludge is converted into compost, and if needed, the compost can be excavated to reuse the pits
The sludge from toilets are mostly emptied using motorised collection equipment (like hi-cap sucker or any other centrifugal pump). Then the sludge is put into the dumping chamber (minimum capacity of 300 litre). The screener prevents unwanted materials (like cloths, sanitary napkins, etc.) from entering into the filtration chamber. The sludge enters into filtration chamber through gravity flow and regulated by gate valve.

Filtration chambers are made of steel with waterproof tarpaulin fitted inside the structure. Graded filtration materials are placed inside the chambers, and the chambers are interconnected in a baffled system. Each filtration chamber contains valves at its exit to control the outflow of sludge and filtrated water respectively at different elevations. The sludge flows through the filtration units following ‘up-flow system’. Solid portion of the sludge gets trapped at the bottom while the liquid portion rises up through the filter media and flows to the next chamber.
'Constructed wetland’ is a shallow trench with *Canna Indica* plants over stone bed to absorb pollutants naturally. The bottom and sidewalls of the trench are lined with waterproof tarpaulin to avoid contamination by any seepage. The microbial contents of the effluent form gelatin and the roots of the plants reduce the pathogenic organisms while the effluent passes through wetland. Ultimately, the effluent is disposed into a soakwell, which is of 4ft in diameter, 9ft in depth, enveloped by 6 inch sand and one third of it is filled by 40mm graded brick chips.

The burial pits are constructed using locally available RCC rings with a maximum depth of 7ft depending on the groundwater level of the site. Each pit is enveloped by 6 inches of sand which acts as a filter media at outer periphery and the bottom of the pit. Once in every week, the thickened sludge in the first chamber gets emptied and buried into the adjacent pit having sand envelop with lime. The same process takes place in rest of the filtration units, but rate of deposition is very slow and therefore burial of thickened sludge is infrequent.
Do you have any query?

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