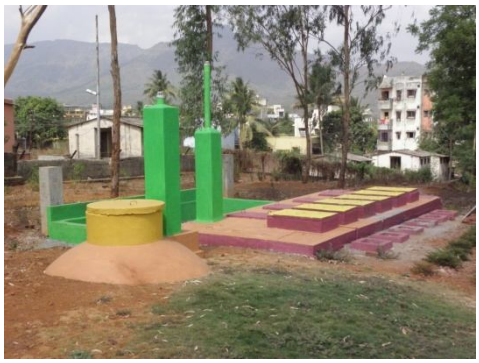
Operation and Maintenance of DTS

At Adarsh College Kulgaon Badlapur

This Operation and Maintenance (O&M) Manual has been prepared by Ecosan Services Foundation in order to support the beneficiaries, specially caretakers and operators in ensuring the smooth functioning of the DTS located at Adarsh College Kulgaon Badlapur. Each of the tasks described include the activities to be performed, the frequency and the need of carrying them out. Following this manual will allow for a proper running of the system, however any changes in quantity and quality of the wastewater will affect the performance of the DTS, and with this the frequency of the O&M tasks.

Activity 1: Protect against vandalism

Location: in all the treatment system.



Procedure: visit the plant at least once at day and inform the people who comes around about the importance of the treatment system for the wellbeing of the students.

Frequency: every day.

Importance: ensuring that the physical components of the treatment systems are kept in good conditions.

Activity 2: Remove dead leaf litter, algae, new growths of plants in the structure and other litter

Location: inside planted gravel filter, the polishing pond and around all the modules of the plant.

Planted Gravel Filter

Polishing Pond

Procedure: check for presence of dead leaf litter and weed inside the planted gravel filter and polishing pond. If some weed is there, remove it manually or using garden tools (garden rake, fish net and sieve).

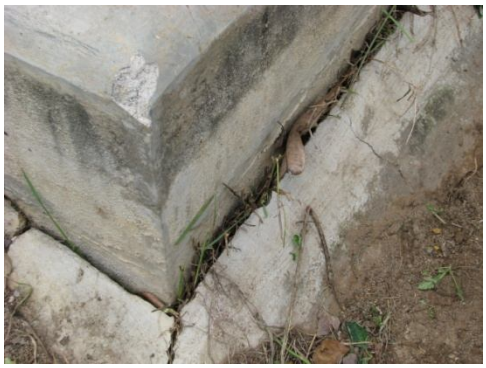
Rake

Fish net

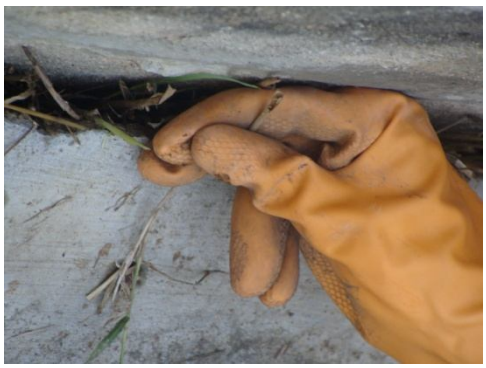
Trowel

Sieve

Walk around the treatment units to identify any possible growth of weed in the structure. Remove it manually or using a trowel.



Presence of growth of plants



Remove manually

Take a look at the polishing pond. If more than half of the surface is covered by algae; remove it using a fish net.

Presence of algae in the polishing pond

Remove all litter and trash you find around the treatment system.

Frequency: any time you see litter and dead leaf, or once every 30 days.

Importance: this activity is important to maintain the cleanliness in the system. Also, it allows to make sure that the Planted Gravel Filter will not clog and that the dead leaf will not interfere with the treatment in the filter. It also avoids algae bloom, permitting that the sun treats the water in the polishing pond.

Activity 3: Make sure that there is free wastewater flow

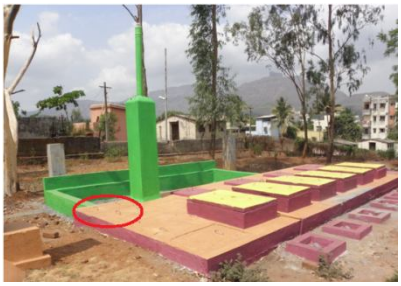
Location: in the pipeline system, specifically in the inlet, outlet and the distribution channels of every unit of the DTS.

Inlet (pipeline from toilet block)

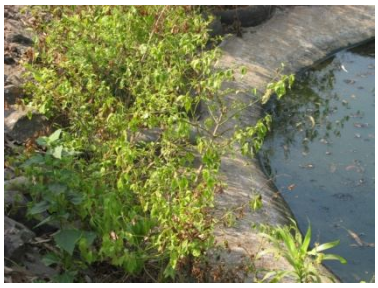
Collection Tank

Inlet of the ABR

Distribution Channel ABR-AF



Outlet of Anaerobic Filter (AF)



Outlet of the Planted Gravel Filter

Procedure: open the manhole covers of the units mentioned above and make sure that there is not any obstruction (solids, deposition, littler, etc.) and therefore the water flows freely. In case there is not water, remove any obstruction using a wooden stick, brush or broom.

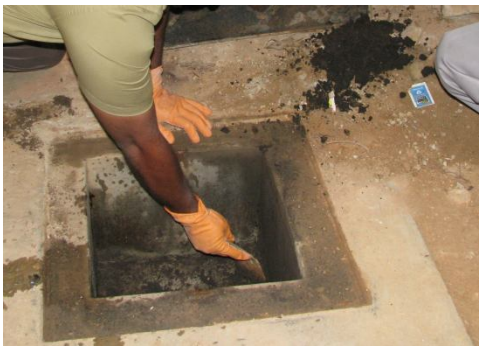
Wooden stick

Broom

Toilet brush

Extendable brush

Cleaning brush



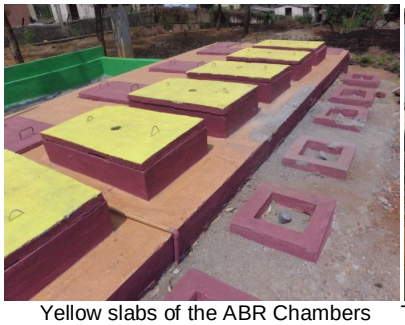
After cleaning, if there is not water coming out, check if the toilets are being used. If the problems persist, contact ESF to take further measures.

Frequency: once every 30 days, during peak usage (when the people are using the toilet). This should be also done if there is overflow in the chambers, the DTS units or if there is not water flow.

Importance: this step is necessary to identify obstructions, leakages and damages of the pipes and the DTS units and to make sure that there is free flow of water.

Activity 4: Make sure that water seal level is kept in the biogas settler and ABR chambers

Location: inside the neck chamber of the biogas settler (circular top chamber) and the chambers of the ABR.



Yellow slabs of the ABR Chambers

The circular neck chamber of BS

Procedure: open the circular slab of the Biogas Settler and the yellow covers of the ABR. Insert a wooden stick through the water until it touches the base of the chamber. Measure the water level (which is the wet part of the stick). If this wet portion is less than 2 inches, then pour water until it reaches 4 inches. In case the water is lost frequently, it means that the clay seal is broken, so contact ESF to take further measures.

Frequency: once every 15 days, or if there is bad odour or bubbling sound near the biogas settler. It is good to do it too when there is not biogas supply.

Importance: to keep the clay seals wet and with this avoid they crack.

Activity 5: Identify gas leakages at the water seal in biogas settler and ABR chambers

Location: inside the neck chamber of the biogas settler (circular top chamber) and the chambers of the ABR.

The water level inside the biogas settler

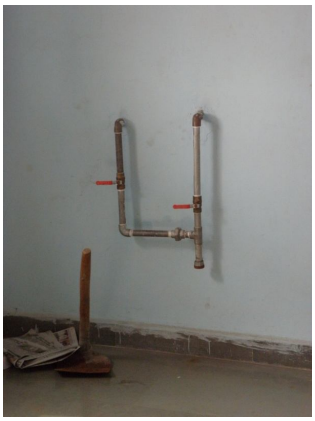
Procedure: first, close the main biogas valve near the biogas settler, and then wait about 2 hours to finally open the manhole cover of the biogas settler neck chamber. After this is done, take a look at the water seal and try to recognize bubbles on the surface. In case there is not water, pour water until it reaches 4 inches from the base, and check again for bubble formation on the water surface. If bubbles are observed, it means that the clay seal has been broken, therefore contact ESF for further measures.

Frequency: once every 60 days, or if there is bad odour or bubbling sound near the biogas settler. It is good to do it too when there is not biogas supply.

Importance: this should be carried out to identify possible leakages of biogas in the chambers.

Activity 6: Release of condensed water in the biogas supply pipe

Location: the water traps installed in the biogas pipelines.



Visible water trap

Water trap inside a chamber

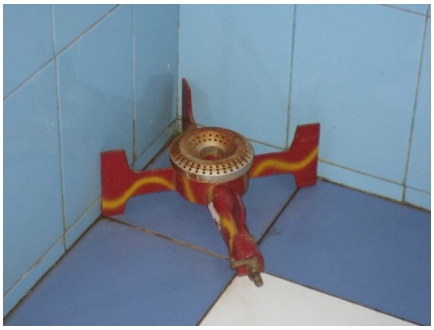
Procedure: identify all the water traps in your biogas pipeline. Make sure there is no fire, nobody is smoking and there is not any other sparking device. Open the condensed water release valve for 5 seconds and close it again. Repeat this process once again. If there is less biogas pressure or unusual flame quality, it means that the pipeline might be blocked, so you should contact ESF to take further measures.

Frequency: once every week, or if there is not biogas supply. In case you hear water bubbling sound in the biogas pipelines or in the stove.

Importance: the condensed water in the biogas pipelines is normal, but it needs to be removed to avoid blockage of the pipeline and with this a slowing down of the biogas to the stove.

Activity 7: Clean the biogas stove burner

Location: at the biogas stove burner.



Stove burner

Needle

Toothbrush

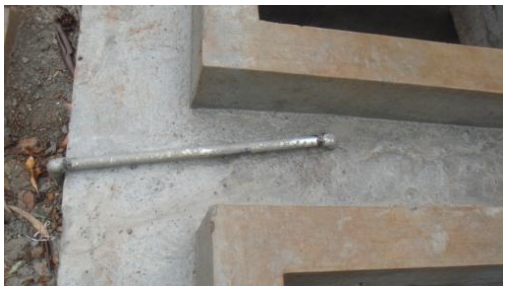
Procedure: release the condensed water (Activity 6) and then close the biogas supply valve near the biogas stove. Dismantle the burner of the stove, cleaning the burner's ring and its holes with a toothbrush or a needle removing all the corrosion. Clean the jet hole with a needle. Put back all pieces together and open the biogas supply valve near the biogas stove to make sure there is a flame.

Frequency: once every 30 days, or if there is an inconsistent flame or corrosion in the stove burner.

Importance: this allows to use the biogas efficiently and to avoid corrosion.

Activity 8: Identify biogas leakages in the biogas supply pipeline

Location: at the biogas pipeline system and all its appliances



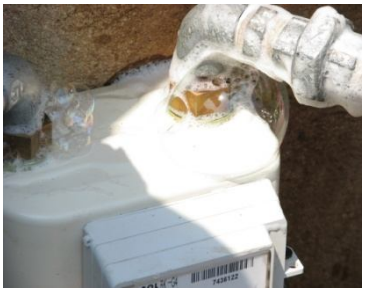
Pipeline collecting biogas from ABR

Pipeline system

Procedure: prepare a soap solution by mixing water and liquid soup (3:1 mixture). Check that the main valve at the biogas unit is open and that there is enough gas for lighting the stove. Apply the solution on exposed pipes and pipe joints using a paint brush at the place, where the gas leakage is suspected. Check for the bubbles or foam formation during the application of the soap, this indicates the location of gas leakage. If bubbles are observed, contact a plumber to repair the leakage.

Materials needed to prepare the soap solution

Application of soap



Bubbles formation

Frequency: once every 4 months or if there is biogas smell, little or no biogas supply or no steady pressure.

Importance: to avoid leakage of biogas, thus ensuring optimum use and avoiding outbursts of fire and bad odours.

Prepared by: MSc. Leonellha Barreto Dillon

Date: September 10th 2010-09-10

References: Consortium for DEWATS Dissemination Society (CCD): Operational Tasks for the Upkeep of Decentralised Wastewater Treatment System (DEWATS). Bangalore: CDD Society.

Documentation of the O&M activities of the DTS at the Adarsh College Kulgaon Badlapur

Number	Activity	Frequency	Date when the activity was carried out	Signature of the caretaker	Remarks
1	Protect against vandalism	Every day			
2	Remove dead leaf litter, algae, new growths of plants in the structure and other litter	Once every 30 days			
3	Make sure that there is free wastewater flow	Once every 30 days			
4	Make sure that water seal level is kept in the biogas settler and ABR chambers	Once every 15 days			

Number	Activity	Frequency	Date when the activity was carried out	Signature of the caretaker	Remarks
5	Identify gas leakages at the water seal in biogas settler and ABR chambers	Once every 60 days			
6	Release of condensed water in the biogas supply pipe	Once every week			
7	Clean the biogas stove burner	Once every 30 days			
8	Identify biogas leakages in the biogas supply pipeline	Once every 4 months			