

DEWATS FOR AMAGHAR

Godavari, Lalitpur, NEPAL

Background

Amaghar (Ama = Mother; Ghar = Home) is a home for underprivileged children located at Bishankhu Narayan VDC, Lalitpur district near Godavari. The home is run Ama Foundation, a US-based non-profit organization dedicated to providing underprivileged children of Nepal a loving home, education, and the chance to live healthy and secure lives within their community. The Amaghar building has been designed to merge traditional Nepali architecture with modern environmentally sustainable technology. Solar panels and cookers will save precious electricity and innovative waste and wastewater management systems will recycle materials into fertilizers and cooking fuel. The home is designed to house about 100 people.

Kind of Project	DEWATS-SME (Institutional)
Implementing Agency	ENPHO
Construction Period	2010-2011
Construction Cost	NRs. 1,500,000 (US\$ 20,080)

Purpose

- To demonstrate integrated solid waste and wastewater management that generates cooking gas and recycles water.
- To minimize the impact of Amaghar in the surrounding environment

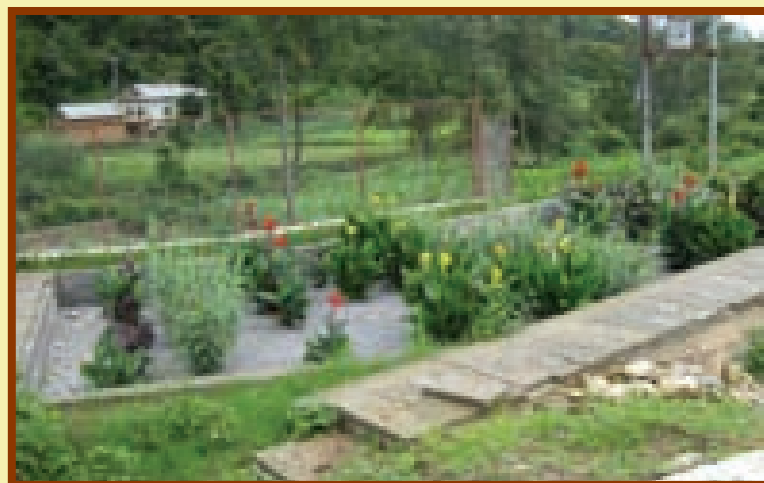
System in Brief

A three step treatment system (Biogas reactor, ABR and Horizontal wetland) has been established. Black water from the toilets is first sent to the biogas reactor, along with the organic solid waste from the kitchen. Greywater is sent directly to the Anaerobic Baffle Reactor (ABR). The outlet of the ABR is connected to a horizontal flow wetland for further treatment. The system is also proposed to have a sludge drying bed to treat and reuse the sludge coming out from the ABR.

- Biogas reactor – for black water and solid waste
- Grease Trap – for kitchen grey water
- Settling Tank – for combined flow, part of Anaerobic Baffle Reactor (ABR)
- ABR with 5 chambers
- Horizontal Flow Wetland

Salient Features

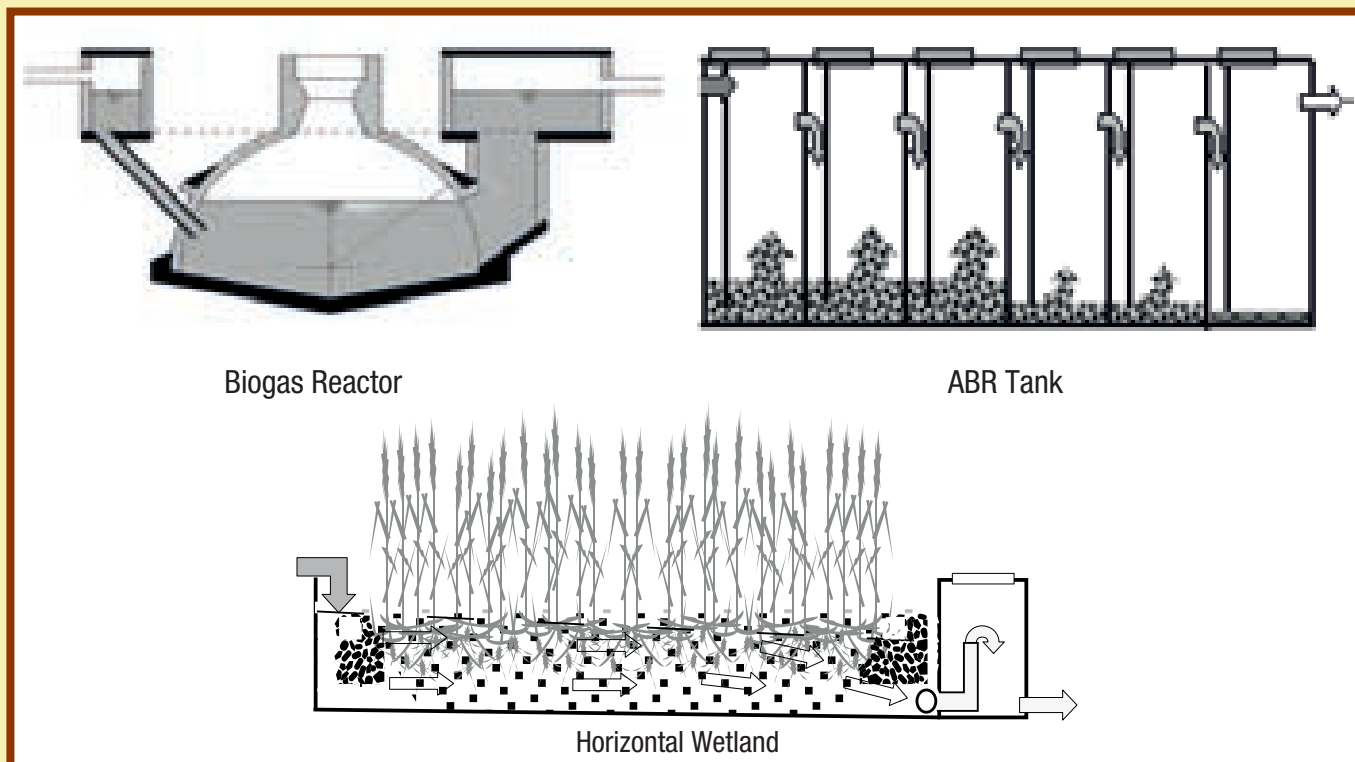
No. Treatment Plants	1
Source	Domestic
Design Capacity	8m ³ /d
No. Users (Designed)	100
Design Influent Quality	BOD = 2083 mg/L
Black water	COD = 4167mg/L BOD = 214 mg/l
Grey water	COD = 429 mg/l
Effluent Quality (Expected)	BOD = 50mg/L COD = 169mg/L



Modules Adopted

Biogas Reactor: TED Model	
Capacity:	17m ³
Radius:	2m
Gas Storage	4.2m ³
Settler & ABR (Anaerobic Baffled Reactor)	
Nos of chambers	1 (settler), 5 (ABR)
Surface Area	8m ²
Volume	17m ³
Planted Gravel Filter: 1 Horizontal Reed Bed	
Surface Area	55m ²
Depth:	50 to 60 cm
Filter Material:	Coarse sand & gravel
Plants Used:	<i>Phragmites karka</i> , and <i>Canna latifolia</i>
Total Built Up Area:	75m ²

Typical Drawing of Components



Operation and Maintenance

ENPHO have provided one day O & M training for the Amaghar staff, who are responsible for all operation and maintenance of treatment plant with occasional supervision and monitoring by ENPHO when required. Yearly desludging is proposed for the effective operation and performance of the treatment system, a sludge drying bed has been proposed to be constructed on site to manage the sludge from ABR. The operation and maintenance costs are funded by Amaghar.

Parameters	Effluent	National standard
pH	7.2	5.5-9.0
TP (mg/L)	2.4	-
TN (mg/L)	18	-
TSS (mg/L)	33.5	50
BOD5 (mg/L)	48	50
COD (mg/L)	153	250
Oil and grease (mg/L)	1.9	10

Reuse Options

Biogas is used as cooking fuel in the kitchen and the treated wastewater is being collected in a pond and is being utilized for irrigation purpose.

Monitoring Results

As the Aamaghar DEWATS unit has just been established, it is too early to evaluate its performance. However, initial monitoring of the effluent from the plant indicates that the plant is functioning well and all key parameters such as TSS, BOD, COD and oil & grease are within national standards. As this is an integrated plant to process both solid waste and wastewater, its performance needs to be monitored carefully over a period of time.

Site Photos

