



DEWATS FOR PRIVATE HOUSE

Dallu, Kathmandu, NEPAL

Project Background

Dr Roshan Raj Shrestha constructed a greywater treatment system in his old home in 1998. When he built his new home in 2002, he once again included a greywater treatment and reuse system along with other eco-friendly features. His motivation was to demonstrate the opportunities to reduce the pollution caused by households and make optimal use of the scarce water resources.

The “Eco Home” adopts several approaches for sustainable water and waste management and is a great demonstration of what can be achieved for low cost and in a small area of land.

Kind of Project	DEWATS-Household (Small)
Funding Agency	Private
Implementing Agency	Private, ENPHO
Construction Period	2002
Construction Cost	NRs. 73,000 (US\$ 1,000) including rainwater harvesting and ECOSAN

Purpose

- To tackle growing water crisis in Kathmandu using household level sustainable water management technologies.
- To reduce environment impact of waste discharge by treating wastewater and composting organic waste.
- To demonstrate water optimization and sustainable sanitation options in an urban house

System in Brief

A small scale system comprising of settling tank, an intermittent flow tank which discharges flow 2 times a day, a vertical flow constructed wetland and tank for storage reusable water.

- Settling tank with wetland feeding tank
- Vertical flow wetland
- Storage tank for reuse

Also

- Urine separating Ecosan toilet, urine reuse,
- Rainwater harvesting and Ground Water Recharge through dugwells,
- Biosand filter for treatment of collected rainwater,
- Solar Water Disinfection (SODIS) for water treatment,
- Compost bin, Vermi-composting

Salient Features

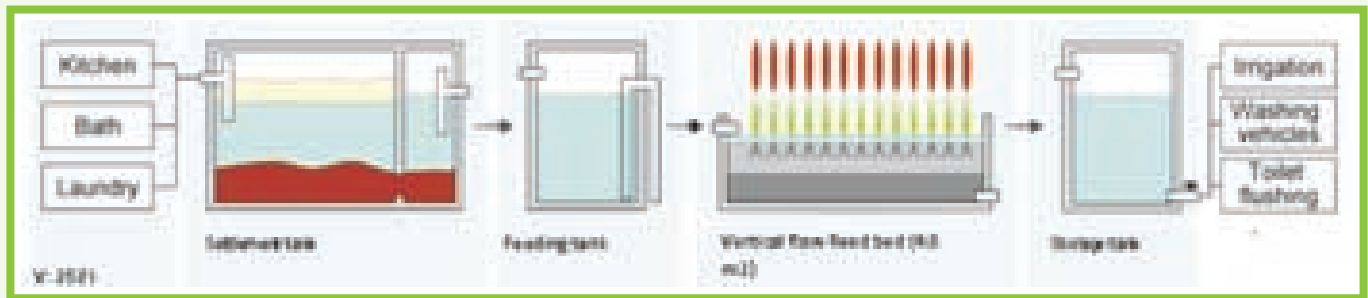
Source	Greywater from bathroom & laundry
Design Capacity	0.50m ³ /d
No. Users	4-5 people
Peak flow	0.25m ³ /d
Influent Quality (2010)	BOD 1025mg/L COD 1865mg/L
Effluent Quality (2010)	BOD 5mg/L COD 15.6mg/L
Efficiency	100% BOD, 96% COD



Modules Adopted

Settling Tank - 2 Units	
No. Tanks	2
Settler Volume	0.5m ³
Depth	1m
Inlet to Wetland	0.2m ³ /bucket
Planted Gravel Filter: Vertical Reed Bed	
Surface area	4.6m ²
Depth	0.9m average
Filter Material	Coarse sand & gravel
Plants Used:	<i>Phragmites karka</i>
Storage Tank for Reuse	
Area	2m ²
Depth	1m average
Total System Area	6m ²

Typical Drawing of Components



Operation and Maintenance

The system has been in operation since early 2003 without any issues. The following maintenance activities are required to ensure a proper operation of the system:

- Sludge removal from the settlement once in two years.
- Regular inspection of dosing chamber for proper siphonic action as vertical bed needs intermittent feeding of greywater.
- Plant or macrophytes trimming once a year
- Regular inspection of pipes and fittings of settling tank to observe clogging problem due to accumulation of oil and grease.

With these water reuse systems, it was estimated that nearly NRs 30,000/year was saved from buying water from private tanker trucks

Reuse Options

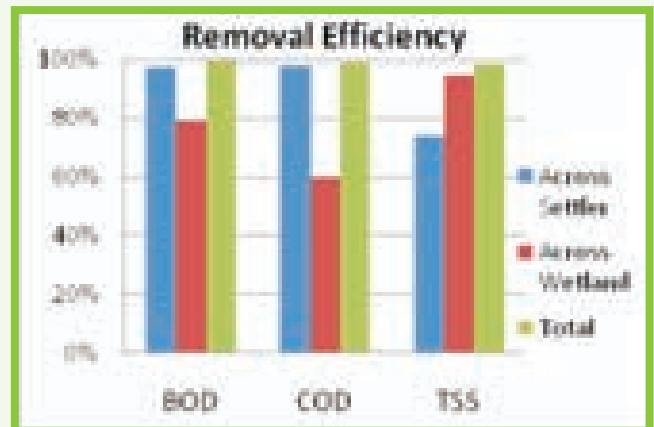
Treated grey water is being used for toilet flushing (Eco-home has two flush toilets besides the dry toilet), cleaning vehicles and gardening. Organic waste compost and urine are applied in the garden as fertilizer.

Monitoring Results

The system has been monitored regularly to assess the effectiveness of treatment and typical wastewater parameters. The results show very high performance of the treatment system.

Parameters	In	Out	% change
pH	6.8	8.1	NA
TN (mg/L)	29.1	3.9	86%
TSS (mg/L)	676	9.0	99%
BOD5(mg/L)	1025	5.0	100%
COD(mg/L)	1864	15.6	99%

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Site Photos

